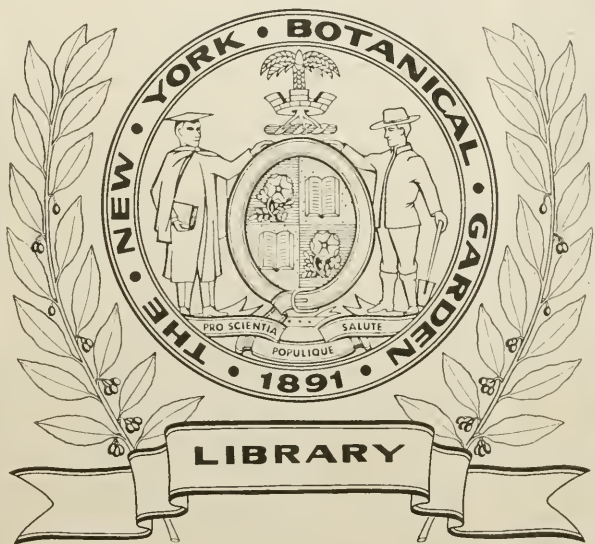




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Grevillea,

A QUARTERLY RECORD OF

CRYPTOGAMIC BOTANY

AND ITS LITERATURE.

EDITED BY M. C. COOKE, M.A.,

*Author of "Handbook of British Fungi," "Fungi, their uses," &c.,
"Rust, Smut, Mildew, and Mould," &c., &c.*

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INDEX.

	PAGE.
<i>Æcidium Scrophulariæ</i>	74
<i>Agaricus ascophorus</i> , on	169
<i>Aleurodiscus amorphus</i>	137
<i>Aleurodiscus Oakesii</i>	172
Archer W., on <i>Cylindrocapsa</i>	40
Berkeley, North American Fungi	1, 49, 97, 145
Braithwaite on Bog Mosses	44, 80, 139
British Collemacei	92, 190
British Hepaticæ	25
British Lichens	22, 33, 79, 92, 190
Bryological Notes	90
Carpology of <i>Peziza</i>	30, 73, 127, 186
<i>Coleochaete</i> , on	89
Collemacei, British	92, 190
Cooke, M. C., British Fungi	65, 119, 177
Cooke, M. C., Himalayan Fungi	75
Cooke, M. C., on <i>Geoglossum</i>	133
Cooke, M. C., on Spores and Sporidia	84
<i>Corticium amorphum</i>	136
<i>Corticium Oakesii</i>	172
Crombie on British Lichens	22, 92, 190
Crombie, J. M., on Collemacei	92, 190
Crombie, J. M., new British Species of Collemacei	190
Crombie, J. M., on <i>Lecidea didymospora</i>	142
Crombie, J. M., on <i>Xylographa</i>	128
Cryptogamic Literature	48, 95, 144, 191
Cryptogamic parasites on living insects	175
Cryptogamic Society of Scotland	176
<i>Cylindrocapsa involuta</i>	40
Desmids, reproduction of	83
Diatomaceæ, critical notes	38
Diatomaceæ, new genus	72
<i>Dichæna rugose</i> , by F. C. S. Roper	45
<i>Dicranum flagellare</i>	26
Edwards, Dr., Diatomaceæ	118
Elvellacei Britannici	131
<i>Epicrisis Hymenomycetum</i>	69, 83,
Fungi Britannici exsiccati	76
Fungi exsiccati	163
Fungi from white ant hill	165
Fungi, New British	65, 119, 124, 177
Fungi, North American	1, 49, 97, 145
Fungus Shows	78
Geasters, Hungarian	161
<i>Geoglossum</i> , revision of	133
Hazslinszky, F., Hungarian Geasters	161
Hepaticæ, British	25
Hepaticæ Europæ	86
Hepaticæ of Borneo	123
Hepaticæ Scandinaviæ	129
Himalayan Leaf Fungi	75

	PAGE.
Hollyhock disease	41, 176
Holmes, E. M., Bryological notes	90
Holmes, E. M., Lichenological notes	96
Holmes, E. M., on <i>Dicranum flagellare</i>	26
Holmes, E. M., on <i>Stenogramme interrupta</i>	88
Hungarian Geasters	161
Introduction to Fungi	140
Kalchbreuner's <i>Icones</i>	28
Kitton, F., Critical Notes	38
Kitton, F., new Genus of Diatoms	72
Kitton, F., on Schmidt's Atlas	134, 187
Lecidea didymospora	142
Leighton, Rev. W. A., Lichen : memorabilia	113, 167
Lichenes Britannici exsiccati	81
Lichen from Ben Lawers	24
Lichenological memorabilia	113, 167
Lichenological notes	91
Lichens, New British... ..	22, 33, 79, 190
Microscopic Examinations of Air	70
Mosses, new European	132
<i>Mycotheca universalis</i>	32
New and Rare British Fungi	124
New British Fungi	65, 119, 124, 177
New European Mosses	132
<i>Nitophyllum versicolor</i> , fruit of	138
<i>Nostoc and Collema</i>	43
Note on <i>Lecidea didymospora</i>	142
Note on North American Fungi	42
Nylander, W., on Dr. Weddell's remarks	17
Onion blight in United States	118
<i>Palmodictyon viride</i>	29
Parfitt, E., on <i>Palmodictyon</i>	29
<i>Parmelia Millaniana</i>	117, 173
Perrya, new genus of Diatoms	72
<i>Peziza</i> , Carpology of	30, 73, 127, 186
<i>Peziza fuscescens</i> , note on	188
<i>Peziza</i> , parasite on	76
Phillips and Plowright, British Fungi	124
Phillips, W., on <i>Peziza fuscescens</i>	188
<i>Phragmidium</i>	171
<i>Podisoma</i> on <i>Juniperus Phœnicia</i>	189
<i>Puccinia malvacearum</i>	41, 176
Roper, F. C. S., on <i>Dichaena</i>	45
Schmidt, A., Atlas der Diatomaceæ-kunde... ..	134, 187
Seynes, J. de, <i>Agaricus ascophorus</i>	169
Seynes, J. de, Parasiti on <i>Peziza</i>	76
<i>Sphagnum Lindbergii</i>	80
<i>Sphagnum intermedium</i>	139
<i>Sphagnum teres</i>	44
Spores and Sporida	84
<i>Stenogramme interrupta</i>	88
Stirton, Dr., Lichen from Ben Lawers	24
Stirton, Dr. J., New British Lichens	33, 79
Stirton, Dr., on <i>Parmelia Millaniana</i>	173
<i>Vaucheria</i>	31
White, Dr. B., on Insect Parasites	175
Wood, Prof., on <i>Nostoc and Collema</i>	43
<i>Xylographa</i> , new British Species	128

Grevillea,

A QUARTERLY RECORD OF CRYPTOGAMIC BOTANY
AND ITS LITERATURE.

NOTICES OF NORTH AMERICAN FUNGI.

By the REV. M. J. BERKELEY, M.A., F.L.S.

(Continued from Vol. 2, Page 181.)

415. **Sphærospis pulchella.** B. & C.—Peritheciis in stromate communi circinantibus; sporis fusiformibus brevibus hyalinis trinucleatis.

On branches of *Rhus copallina*. Car. Inf. No. 2951.

Perithecia minute, arranged round the margin of the black stroma; sporophores slender; spores shortly fusiform, trinucleate.

415 (bis). **Sphærospis seminalis.** B. & C.—Peritheciis sparsis applanatis; sporis oblongis.

On seeds of water melon. Car. Inf. No. 5034.

Perithecia scattered, brownish, flattened; spores oblong, with one side not so much curved, .0006 long, $\frac{1}{2}$ or $\frac{1}{3}$ as much wide, granular within. Quite distinct from the two species of *Phoma* which are found on water melon seeds.

416. **Sphærospis persicina.** B. & C.—Peritheciis minutis nitidis ocellatis; sporis oblongis pedicellatis.

On twigs of peach. Pennsylvania. No. 3422.

Scattered, shining, covered with the black cuticle, which is white in the centre; spores oblong, seated on a short pedicel, .0006 long, about $\frac{1}{2}$ or $\frac{1}{3}$ as much wide, with one or two nuclei.

416 (bis). **Sphærospis brunneola.** B. & C.—Peritheciis epidermide brunneola tectis hysteriiformibus; sporis breviter subfusiformibus.

On twigs of *Smilax rotundifolia*. New England, Sprague. No. 5269.

Perithecia scattered, covered with the brown cuticle, sometimes very distinct and darker; hysteriiform; spores shortly subfusiform, .0004 long, often broader at one end.

417. **Sphærospis uvarum.** B. & C.—Peritheciis innumeris hyalinis, centro nigris; sporis breviter cymbæformibus.

On Scuppernong grapes. Car. Inf. No. 4031.

Perithecia pale, collapsed, surrounded by the filmy cuticle, spores shortly cymbæform or slightly curved, $\cdot 000\frac{3}{4}$ - $\cdot 000\frac{4}{4}$ long, about $\cdot 000\frac{2}{4}$ wide. Looks at first like a chemical efflorescence.

417 (bis). **Sphæropsis maculans**. *B. & C.*—Maculis candidis rufomarginatis; peritheciis punctiformibus; sporis obovatis brevibus.

On leaves of *Bumelia*. Alabama, Peters. No. 4563.

Spots white or pallid, surrounded by a thin umber border; perithecia minute punctiform; spores shortly obovate, $\cdot 000\frac{5}{4}$ long, nearly as much wide.

418. **Sphæropsis minima**. *B. & C.*—Maculis pallide brunneis; peritheciis minutis tectis, sporis breviter obovatis.

On leaves of *Acer rubrum*. New England, Sprague. No. 5314.

Forming little suborbicular brownish spots; perithecia subcuticular, minute, spores shortly obovate, $\cdot 000\frac{4}{4}$ long. Totally different in appearance from the last, though the spores are similar.

418 (bis). **Sphæropsis torulosa**. *B. & C.*—Peritheciis in pustulas parvas mammæformes rugosas congestis; sporis ellipticis apiculatis, sporophoris torulosis.

On bark. New England, Sprague. No. 5839.

Perithecia collected into little mammæform ragged pustules, surrounded by the cuticle; spores elliptic, with a little apiculus springing from a thick torulose pedicel, $\cdot 000\frac{4}{4}$ - $\cdot 000\frac{5}{4}$ long, nearly as much wide. It is probable that a second or third spore is produced from the same pedicel, as in one case three spores were seated on the triangular apex of a sporophore.

419. **Sphæropsis collabens**. *B. & C.*—Peritheciis nudis collabentibus nitidis nigerrimis; papilla centrali; sporis allantoideis.

On decorticated branches. New England, Murray. No. 5680.

Perithecia naked, collapsing, with a central papilla, resembling those of *Discosia artocreas*; spores sausage-shaped, hyaline.

* **Dothiora pyrenophora**. *Fr.*—On apple twigs. *Car. Sup.* No. 860.

* **Diplodia Zeæ**. *Lév.*—On Indian corn. *Car. Inf.* No. 1432, 1433, 1303.

Spores elongated, sausage-shaped, or clavate.

* **Diplodia vulgaris**. *Lév.*—On twigs of ivy. *Car. Sup.* No. 6424, and many other numbers on various plants.

* **Diplodia Corchori**. *Desm.*—On *Kerria japonica*. Massachusetts, Russell. No. 5449. *Car. Inf.* No. 3229.

419 (bis). **Diplodia paupercula**. *B. & Br.*—Peritheciis minutis punctiformibus, sporis minoribus. *D. quisquiliarum*, *B. & C.*

On twigs of honeysuckle and other plants. *Car. Inf.* No. 1067, 3752.

Perithecia punctiform; spores oblong or subobovate, $\cdot 000\frac{4}{4}$ long, half as much wide.

* **Diplodia smilacina**. *B.*—On *Smilax rotundifolia*. Ohio. On *Smilax tannoides*. *Car. Sup.* No. 308.

* **Diplodia circinans.** *B. & Br.* Var. *diffusa*.—On *Yucca aloifolia*. No. 660. Also in Ceylon.

* **Diplodia vitis.** *Desm.*—On branches of vine. Car. Inf. No. 2279. Car. Sup. No. 3087. New England, Sprague. No. 5313.

420. **Diplodia megalospora.** *B. & C.*—Peritheciis sparsis erumpentibus obtusis; sporis majoribus oblongo-ellipticis.

On cones of *Pinus taeda*. Car. Inf. No. 5012.

Scattered, erumpent, obtuse; spores oblong-elliptic, .0015 long, about a third as much wide.

420 (bis). **Diplodia herbicola.** *B. & C.*—Peritheciis sparsis breviter hysteriiformibus epidermide tectis; sporis oblongo-ellipticis hyalinis.

On stems of *Nepeta Cataria*. Pennsylvania, Dr. Michener, No. 3572.

Perithecia scattered, shortly hysteriiform; spores oblongo-elliptic, hyaline.

421. **Diplodia Rosæ.** *B. & C.*—Peritheciis epidermide tectis sparsis vel congestis; sporis oblongis uninucleatis.

On rose. New England, Russell. No 5874 (bis).

Perithecia scattered, or collected into little groups, covered with the cuticle; spores oblong, .0005 long, about half as much wide; each cell uninucleate.

421 (bis). **Diplodia Parmeliæ.** *B. & C.*—Peritheciis depressis lanatis apice perforatis; sporis centro constrictis, articulis inæqualibus hyalinis.

Parasitic on some *Parmelia*. Car. Inf. No. 1278.

Perithecia scattered, hemispherical, depressed with a central perforation, loosely clothed with flexuous threads; spores hyaline, strongly constricted, the two portions unequal.

422. **Diplodia stenospora.** *B. & C.*—Peritheciis papillæformibus e macula grisea oriundis; sporis angustis hyalinis breviter fusi-formibus.

On bark of *Acer rubrum*. Car. Sup. No. 306.

Perithecia scattered, papillæform, bursting through grey spots; spores shortly fusiform, narrow, hyaline.

422 (bis). **Diplodia microspora.** *B. & C.*—Peritheciis sparsis; sporis oblongis minimis.

On *Viburnum opulifolium*. Pennsylvania, Michener. No. 4106, with *Sphaeropsis enucleata*.

Perithecia scattered; spores pale brown, .00025 long, about half as much broad.

423. **Diplodia cyanostroma.** *B. & C.*—Peritheciis in stromate cyaneo abditis; sporis breviter obovatis vel oblongis pallidis.

On decayed twigs. Pennsylvania.

Perithecia crowded into erumpent patches of various shapes, included in a blue stroma; spores pallid, oblong, or shortly obovate, .0005 long, half as much broad.

Hypocenia. *B. & C.*—Perithecia crassa obtusissima, cellulam unicam semiorbicularem includentia; sporis endochromate utrinque retractis.

423 (bis). **Hypocenia obtusa.** *B. & C.*—On branches of trees. Car. Inf. No. 3840. Pennsylvania, Michener. No. 3926.

Perithecia crumpent single or two together, surrounded at the base by the cuticle, very obtuse; wall thick, cellular, pale internally, semiorbicular, with a cell of the same form at the base; spores shortly fusiform, .0008 long, about $\frac{1}{2}$ th as much wide; endochrome retracted to either extremity, pale, reddish-brown when seen within the perithecium.

424. **Hendersonia eximia.** *B. & C.*—Peritheciis congestis seriatis; sporis utrinque obtusis biseptatis.

On exposed wood of *Carya*. Car. Inf. No. 5607.

Perithecia raising the wood into white elongated patches; spores obtuse, biseptate, .001-.0012 long, nearly twice as broad as long. In the same perithecium uniseptate spores also occur.

424 (bis). **Hendersonia sphærosperma.** *B. & C.*—Pustulis epidermide cinctis, pluricellulosis; sporis sphæricis long pedicellatis, e septis obliquis horizontalibusque.

On branches of ash. Pennsylvania, Michener. No. 4882.

Pustules surrounded by the cuticle containing several cells; spores spherical, with at first four divisions, then variously septate. The spores are similar to those of *H. oreades*, B. & Br., on oak leaves.

425. **Hendersonia pauciseptata.** *B. & C.*—Peritheciis appanatis basi epidermide cinctis; sporis oblongis triseptatis utrinque obtusis.

On *Liriodendron*. Car. Inf. No. 2148. On *Laurus benzoin*, Pennsylvania, Michener. No. 4183. On *Populus dilatata*. Pennsylvania, Michener. No. 4244. On *Lagerstræmia*. Car. Inf. No. 4994.

Perithecia flattened above, surrounded at the base by the cuticle, spores oblong, obtuse at either end, sometimes slightly attenuated below, .0005-.00028 long, about a third as much broad, triseptate, with a distinct hyaline border, variously pedicellate. In 4244 the spores are large. In No. 2148 the pedicels spring from a basal network. No. 850. Car. Sup. on *Rhus glabra*, appears to be a variety. I cannot distinguish Car. Sup. on ash. No. 835.

425 (bis). **Hendersonia longipes.** *B. & C.*—Peritheciis demum liberatis collapsis sporis oblongis triseptatis, pedicellis longissimis.

On branches of vine. Car. Sup. No. 861. On rose. Car. Sup. No. 880 seems to be the same.

Perithecia at length free, collapsed; spores oblong, narrow, triseptate, seated on very long, extremely slender pedicels, which spring from decumbent septate threads.

426. **Hendersonia variabilis.** *B. & C.*—Maculis orbicularibus pallidis; peritheciis punctiformibus epidermide tectis; sporis utrinque obtusis triseptatis variis.

On leaves of *Quercus obtusiloba*. Car. Inf. No. 5010.

Dot-like, quite covered by the cuticle, minute, slightly prominent, seated on pallid orbicular spots; spores variable, at length obovate, triseptate, with now and then a vertical septum, $\cdot 001$ - $\cdot 03004$ long.

426 (bis). **Hendersonia effusa**. *B. & C.*—Peritheciis in maculas angustas elongatas congestis; sporis oblongis leviter curvis triseptatis.

On stalk of *Aristida stricta*. Car. Sup. No. 5038.

Perithecia minute, crowded into elongated black spots; spores oblong, slightly curved, triseptate, $\cdot 0005$ - $\cdot 0006$ long.

427. **Hendersonia caespitosa**. *B. & C.*—Peritheciis caespitosis brunneolis; sporis breviter fusiformibus curvulis triseptatis.

On shoots apparently of elder. New England, Sprague. No. 5842.

Perithecia minute, caespitose; spores shortly fusiform, curved, $\cdot 001$ long, hyaline, triseptate.

427 (bis). **Hendersonia subfenestrata**. *B. & C.*—Peritheciis sparsis congestisve; sporis 5-septatis, verticaliter divisis.

On twigs of *Robinia*. Car. Sup. Nos. 145, 205.

Perithecia scattered or crowded into little groups; spores oblong, obtuse at either extremity, 5-septate, with vertical divisions.

428. **Hendersonia hyalopus**. *B. & C.*—Peritheciis congestis epidermide cinctis; sporis brunneis utrinque acutis 5-septatis pedicellis brevibus hyalinis.

On *Rhus copallina*. Car. Inf. No. 3207.

Perithecia collected into little groups surrounded by the cuticle, collapsed; spores acute at either end, subfusiform, short, oblique, brown, with 5-septa.

428 (bis). **Hendersonia partita**. *B. & C.*—Peritheciis caespitosis opacis epidermide cinctis; sporis oblongis obtusis vel utrinque leviter attenuatis 5-7 septatis, septis verticaliter divisis.

New Jersey. No. 4682.

Perithecia caespitose, opaque, surrounded by the cuticle; spores oblong, sometimes obtuse at either extremity, sometimes slightly attenuated, $\cdot 001$ - $\cdot 0025$ long, 5-7 septate, with vertical divisions.

* **Hendersonia Berkeleyana**. *Lév.*—On *Ailanthus*. New York, Sartwell. No. 1857.

The spores are a little longer in Léveillé's specimen, and have one or two vertical septa.

429. **Hendersonia prominula**. *B. & C.*—Peritheciis sparsis punctiformibus prominulis; sporis hyalinis clavatis triseptatis.

On apple leaves. Car. Inf. No. 3796.

Perithecia scattered, rather prominent, punctiform; spores hyaline, shortly clavate, triseptate, $\cdot 00043$ - $\cdot 0007$ long, sometimes slightly curved.

429 (bis). **Hendersonia pallida.** *B. & C.*—Peritheciis sparsis nudis pallide carneis; sporis arcuatis hyalinis 7-8 septatis.

On *Cornus*, springing from some *Helminthosporium*. Alabama, Peters. No. 5474.

Perithecia globose, scattered, pale flesh colour, hyaline; spores fusiform, hyaline, with from 7 to 8 septa, each division containing a single nucleus. Possibly a state of some *Nectria*.

430. **Hendersonia microspora.** *B. & C.*—Peritheciis sparsis e basi latiusculâ acutis; sporis minutis hyalinis angustis breviter fusiformibus trinucleatis.

On *Sambucus Canadensis*. Car. Sup. No. 799.

Perithecia scattered, at length naked, minute; base rather wide, somewhat acute; spores hyaline, minute, shortly fusiform, with three nuclei, indicative probably of two septa.

* **Vermicularia subeffigurata.** *Schwein.*—On *Yucca filamentosa*. Pennsylvania, Michener. No. 4249. On tulip. No. 4340. On *Impatiens fulva*. No. 4342.

* **Vermicularia ovata.** *Schwein.*—On *Ruellia strepens*. Pennsylvania, Michener. No. 4338.

* **Vermicularia Dematium.** *Lk.*—On *Lilium tigrinum*. Pennsylvania, Michener. No. 4355. On *Phytolacca*. Alabama, Beaumont. Nos. 5704, 5115.

* **Vermicularia circinans.** *B.*—On onion bulbs. Pennsylvania, Michener. No. 3609.

430 (bis). **Vermicularia carbonacea.** *B. & C.*—Peritheciis nigerrimis punctiformibus; sporis arcuate fusiformibus triseptatis.

On leaves of *Magnolia grandiflora*. Car. Inf. No. 4989.

Perithecia distinct, collected into little groups, without any apparent basal threads; spores fusiform, arcuate, .0015 long, obscurely triseptate.

431. **Vermicularia uncinata.** *B. & C.*—Peritheciis sparsis hispidis; sporis magnis hamatis, a basi attenuata.

On stalks of *Desmodium nudiflorum*. No. 4691.

Perithecia distinct, clothed with short bristles; spores with a short pedicel, rather arcuate, with the apex suddenly turned over, .0026 long, hyaline, with a broad distinct border. This is certainly the finest species in the genus.

* **Vermicularia culmigena.** *Desm.*—On *Phleum pratense*. Pennsylvania, Michener. No. 4357.

There are many other *Vermiculariæ* in the collection, but without sufficiently distinctive characters.

* **Discosia artoccras.** *Fr.*—On *Cercis Canadensis*. Car. Sup. No. 678. On *Magnolia glauca*. Car. Inf. No. 1373. Rhode Island, Olney. No. 1824. Car. Inf. No. 3732. Alabama, Beaumont on holly. No. 5093. On *Aralia spinosa*. Alabama, Peters.

No. 5189. On *Magnolia tripetala*, Pennsylvania, Michener. No. 4078.

431 (bis). **Discosia grammita.** *B. & C.* — Peritheciis hysteriiformibus opacis, appendicibus terminalibus.

On dead *Pæonia arborea*. New England. Rev. I. D. Russell. No. 5873.

Perithecia opaque hysteriiform; spores triseptate, with an acuminate appendage at either extremity, .0008 long.

* **Discosia nitida.** *Lév.*—On *Magnolia*. *Car. Inf.* No. 5023. Spores .0008 long.

This was distributed as *D. ocellata*, *B. & C.*, but I consider it a mere variety of Lévillé's plant, which is far prettier. No. 2712 is a distinct variety, in which the cuticle remains opaque. The spores in this specimen are triseptate.

* **Discosia faginea.** *Lib.*—Alabama, Beaumont. No. 5100.

The spores are without septa, but they are clearly immature.

432. **Discosia rugulosa.**—*B. & C.*—Peritheciis orbicularibus opacis rugosis.

On leaves of *Carya*. Alabama, Peters. No. 5210.

This seems to be quite different from *D. artocreas*, the perithecia being rugulose and opaque, and not at all shining, as in that species. No. 4696 from New Jersey, on *Carya*, is merely a diseased state of the leaf.

432 (bis). **Discosia minima.** *B. & C.* — Peritheciis minutissimis innumeris punctiformibus, sporis utrinque appendiculatis.

On leaves of *Ilex*. Alabama, Beaumont. No. 5113.

Extremely minute, gregarious; spores .0015 long, without septa, but probably young, furnished as in *D. grammita* with a terminal appendix at either end. There is a species almost as minute on fruit of *Dioscorea*, Pennsylvania, Michener. No. 4149, but I have not seen any fruit.

* **Melasmia acerina.** *Lév.*—On leaves of *Myrsinites* apparently. Texas, Wright. No. 3772.

I do not see any difference between this and Lévillé's plant. It has the same black patches seated on a yellow spot. Spores minute, .00025 long.

433. **Melasmia ulmicola.** *B. & C.*—Punctiformis prominula basi epidermide cincta e maculis rufis indefinitis oriunda.

On leaves of *Ulmus Americana*, Massachusetts. No. 3391.

Spots reddish-brown, indefinite; perithecia dotlike, prominent, surrounded at the base by the cuticle, spores minute, similar to those of the last. This is just intermediate between *Melasmia* and *Piggotia*.

433 (bis). **Piggotia fraxini.** *B. & C.*—Peritheciis hic illic in cæs-pites punctiformes congestis; sporis oblongis minutis.

On leaves of Ash. Pennsylvania, Michener. No. 5153. Hypo-

phyllous. Perithecia collected two or three together into little rugged dot-like groups; spores minute, oblong, similar to those of the two last species.

434. **Septoria rhoidis.** *B. & C.*—Maculis parvis albis, margine lato nigro cinctis; perithecio centrali, sporis vermiformibus.

On leaves of *Rhus*. New England, Sprague. No. 5769.

Spots minute, white, with a broad black border; perithecium solitary; spores long, tolerably thick, .003 long, slightly flexuous. It is not the same species with *Septoria Rhois*, Lév.

434 (bis). **Septoria albo-nigra.** *B. & C.*—Maculis albis, fascio-annulatis; peritheciis minimis, sporis filiformibus.

On living leaves. Alabama, Peters. No. 4534.

Spots orbicular, white, marked with one or two concentric brown rings, and generally bordered; perithecia very minute, spores filiform, nearly straight, .0022 long.

435. **Septoria pulchella.** *B. & C.*—Maculis rufulis linea nigra circumdatis; peritheciis punctiformibus; sporis lineari-oblongis.

On leaves of *Andromeda*. Alabama, Peters. No. 4605.

Spots suborbicular, rather irregular, very pale rufous, surrounded by a narrow black line; perithecia punctiform; spores linear, very slightly curved, .0002 long.

435 (bis). **Septoria examinans.** *B. & C.*—Peritheciis gregariis punctiformibus ocellatis in folium dealbatum sitis; sporis filiformibus flexuosis.

On whitened leaves of *Ilex*. No. 5217.

Perithecia gregarious, closely dotting a portion of the leaf; spores thread-shaped, flexuous, .001 or more long.

436. **Septoria Rubi.** *B. & C.*—Maculis parvis rufulis rubro-marginatis, sporis filiformibus curvulis.

On leaves of *Rubus*. Alabama, Peters. No. 4537. Santee River. No. 1669.

Spots pale-rufous, surrounded by a red indefinite border; spores thread-shaped, very slightly curved, .00016 long.

436 (bis). **Septoria Coptidis.** *B. & C.*—Maculis rufulis rufo-marginatis, sporis brevioribus filiformibus.

On leaves of *Coptis*. Wisconsin. No. 3829.

Spots pale rufous, with a clouded, indefinite darker border; spores straight, thread-shaped, about .001 long.

437. **Septoria speculariæ.** *B. & C.*—Maculis pallidis obsoletisve, peritheciis prominulis sparsis, sporis filiformibus sigmatoideis.

On leaves of *Specularia perfoliata*. Pennsylvania, Michener. No. 4328.

Spots pallid, often indefinite; spores filiform, with two points of contrary flexure.

437 (bis). **Septoria erigerontis.** *B. & C.*—Maculis rufulis margine elevato concolori; sporis rectis filiformibus.

On leaves of *Erigeron*. Massachusetts. No. 3886.

Spots rufous, with a raised margin of the same colour; spores filiform, straight, .0015 long.

* **Septoria polygonorum**. *Desm.*—On leaves of *P. Persicaria*. New England, Sprague. No. 5768.

* **Septoria Kalmicola**. *B. & C. Depazea Kalmicola*. Schwein.—On leaves of *Kalmia latifolia*. Car. Sup. No. 421.

438. **Septoria ochroleuca**. *B. & C.*—Maculis parvis orbicularibus peritheciisque ochroleucis marginatis; sporis curvis utrinque acutis uniseptatis.

On leaves of Chesnut. New England, Russell. No. 5948.

Spots small, pale, surrounded by a thin, dark margin; perithecia ochroleucous, collapsed, spores curved, subfusiform, uniseptate, .001 long.

438 (bis). **Septoria Nabali**. *B. & C.*—Maculis rufis, margine lato brunneo cinctis; sporis tenuissimis flexuosis.

On leaves of *Nabalus*. New Hampshire. No. 5772.

Spots rufous, small, surrounded by a broad, flat, brown border; spores very slender, with two points of contrary flexure, .0013 long.

439. **Septoria speculariæ**. *B. & C.*—Peritheciis minutis sparsis in plantam moribundam insidentibus; sporis linearibus leviter curvatis.

On moribund *Specularia Ludoviciana*. Car. Inf. No. 1129.

Scattered over various parts of the plant; spores linear, slender, slightly curved, about .001 long.

439 (bis). **Septoria inconspicua**. *B. & C.*—Peritheciis minimis in maculam albidam indefinitam insidentibus; sporis rectis tenuibus.

On leaves of *Plantago lanceolata*. Car. Sup. No. 675.

Perithecia very minute, seated on white indefinite spots; spores slender, straight.

440. **Septoria ampelina**. *B. & C.*—Maculis rufulis, aliis brunneis stellatis intermixtis; sporis linearibus curvatis.

On Vine leaves. Texas, C. Wright. No. 3885.

Spots pale rufous, blotted more or less with little brown patches, spores linear, curved, .0002-.0016 long.

440 (bis). **Septoria stigma**. *B. & C.*—Peritheciis punctiformibus in folium dealbatum insidentibus; sporis linearibus brevioribus.

On leaves of *Symplocos*. Alabama, Peters.

Perithecia punctiform, seated on the whitened leaf; spores linear, .0006 long.

Besides these are several species which I cannot define in the absence of fruit. On *ænothera sinuata*. Car. Inf. No. 1264, 2157. Rav. No. 959. On *Pachysandra*. Alabama, Peters. No. 4593. On *Symplocos*. Alabama, Peters. No. 4545. On *Ludwigia*. Alabama, Peters. No. 4595. On *Verbascum Blattaria*. Alabama, Peters. No. 4579. On *Epigæa repens*. Car. Inf., Ravenel. No. 1672. On *Magnolia glauca*. Car. Sup. No. 657. On *Liriodendron*.

Car. Inf., Ravenel. No. 1631. On *Cydonia*. New England, Sprague. No. 5785. On *Orontium aquaticum*. Car. Inf. No. 1517.

441. **Septoria Phlyctanoides**.—*B. & C.*—Caulicola in maculam albam insidens; peritheciis hysteriiformibus; sporis filiformibus curvatis.

On stalks of *Phytolacca Pennsylvanica*. Michener. No. 4136, 4222, 4400. New England. Sprague. No. 5268, 5814.

Spots elongated, white; perithecia hysteriiform; spores thread-shaped, curved at the apex, sometimes mixed with others simply curved, as in 5268. No. 5663, New England (Murray), is a slight variety, about $\cdot 001$ long. No. 5448, New England, Murray, on *Cornus*, and No. 4331, Pennsylvania, Michener, sent out as this species, belong to *Phoma mixtum*. No. 4177, on *Robinia*, is also the same species.

441 (bis). **Septoria Tritici**. *B. & C.*—Caulicola in maculam pallidam insidens; peritheciis hysteriiformibus; sporis tenuissimis.

On stalks of wheat. Pennsylvania. Michener. No. 4178.

Seated on pale parts of the stalk; perithecia hysteriiform, black; spores very slender, springing from rather obtuse sporophores.

442. **Septoria allantoidea**. *B. & C.*—Caulicola in maculam elongatam pallidam insidens; sporis leviter allantoideis.

On stalks of *Medicago sativa*. Pennsylvania. Michener. No. 4251.

Spots pale, elongated; spores oblong, slightly curved, $\cdot 0006$ – $\cdot 0005$ long.

442 (bis). **Septoria simulans**. *B. & C.*—Caulicola in maculam elongatam pallidam insidens; peritheciis hysteriiformibus; sporis linearibus curvis.

On stalks of *Nabalus*. New England. Murray. No. 5675.

Externally resembling *S. phlyctanoides*, but the spores are thicker, linear, curved, $\cdot 001$ long.

443. **Septoria complanata**. *B. & C.*—Caulicola; peritheciis hysteriiformibus; sporis tenuissimis subrectis longissimis.

On stalks of *Polygonum Virginicum*. Pennsylvania. Michener. No. 4082.

Perithecia hysteriiform rather large, flattened; spores very slender, long, nearly straight.

443 (bis). **Septoria fructigena**. *B. & C.*—Peritheciis sparsis minimis; sporis filiformibus sursum hamatis.

On fruit of Passion flower. Car. Inf. No. 3699.

Perithecia scattered, minute, situated on the bleached fruit; spores thread-shaped, curved above, $\cdot 0013$ long.

* **Septoria graminum**. *Desm.*—On leaves of *Panicum*. Car. Inf. No. 3677.

Spores long, very slender, flexuous.

444. **Septoria continua.** *B. & C.*—Caulicola; peritheciis epidermide abditis prominulis; sporis rectis filiformibus.

On stalks of *Plantago major*. Pennsylvania. Michener. No. 4145.

Perithecia scattered uniformly over the whole of the stalk, concealed by the cuticle, rather prominent; spores very slender, straight, sporophores scarcely half as long.

444 (bis). **Septoria ribicola.** *B. & C.*—Ramulicola; peritheciis sparsis nitidis; sporis linearibus curvulis.

On whitened twigs of *Ribes rotundifolium*. Wisconsin. No. 1421.

Perithecia scattered, shining; spores linear, slightly curved, about .001 long.

445. **Septoria decipiens.** *B. & C.*—Ramulicola; peritheciis demum denudatis; sporis tenuissimis longissimis flexuosis.

On whitened twigs of *Lonicera*. Car Inf. No 5036.

Perithecia at length naked; spores very long, slender, thread-like, flexuous.

* **Septoria Juglandis.** *B. & C.*—Sph. Juglandis Schwein.

On twigs of *Juglans nigra*. Pennsylvania. Michener. No. 4204.

Spores slender, shortly hooked at the apex.

445 (bis). **Septoria Dianæ.** *B. & C.*—Ramulicola; peritheciis majoribus apice complanatis; sporis arcuatis utrinque acutissimis.

On twigs of some unknown tree. New England. Murray. No. 6283.

Perithecia rather large, flattened above; spores slender, very long, curved, very much attenuated at either end, containing within a row of nuclei.

446. **Septoria interrupta.** *B. & C.*—Ramulicola; peritheciis sparsis; sporis linearibus flexuosis multinucleatis.

On branches of *Viburnum Opulus*. Pennsylvania. Michener. No. 4184.

Perithecia scattered; spores linear, curved, or with two points of contrary flexure, .002 long, containing a single row of nuclei.

446 (bis). **Septoria falx.** *B. & C.*—Ramicola; peritheciis erumpentibus majoribus; sporis filiformibus curvis pedicellis æquilongis.

On branches of vine. Car Inf. Ravenel. No. 1255.

Perithecia erumpent, rather large; spores curved, seated on a pedicel of equal length, and resembling when *in situ* a reaping hook.

447. **Septoria verrucæformis.** *B. & C.*—Peritheciis majoribus rugosis; sporis tenuissimis subrectis.

On branches of *Cephalanthus*. Alabama, Peters. No. 4563.

Perithecia rather large, rugged; spores very slender, nearly straight.

447 (bis). **Septoria niphostoma**. *B. & C.*—Peritheciis nitidis nigris centro candidis; sporis rectis utrinque obtusiusculis.

On dead coriaceous leaves. *Car. Inf.* No. 4974.

Perithecia scattered, shining, white in the centre; spores straight, linear, slightly obtuse at either end, $\cdot 001$ long.

448. **Septoria recta**. *B. & C.*—Peritheciis nitidis totam superficiem occupantibus; sporis rectis linearibus utrinque acutiusculis.

On dead coriaceous leaves. *Car. Inf.* No. 6178.

Occupying the whole surface. Perithecia scattered, not ocellated as in the last; spores straight, rather acute at either end, $\cdot 001$ long.

448 (bis). **Septoria maculans**. *B. & C.*—Ramulos maculans; peritheciis punctiformibus gregariis; sporis tenuissimis flexuosis.

On young shoots of elder. *Car. Inf.* No. 2801.

Forming more or less definite irregular pale spots, with a thin darker border; spores very slender, $\cdot 001$ long, with two points of contrary flexure.

449. **Septoria vestita**. *B. & C.*—Peritheciis prominulis applanatis margine furfuraceo vestitis; sporis brevioribus curvis.

On gourds. Pennsylvania. Michener.

Perithecia rather prominent, flattish, surrounded by a mealy border; spores $\cdot 0005$ long, slender, curved.

* **Septoria Ulmi**. *Fr.*—On the under side of elm leaves. Boston. Sprague. No. 6266.

449 (bis). **Septoria Dolichos**. *B. & C.*—Maculis albis margine lato flavo cinctis; sporis rectis subfusiformibus triseptatis.

On leaves of cow pea. *Car. Inf.* No. 6187. 1376.

Spots white, orbicular, surrounded by a broad thin yellow halo; spores straight, fusiform, $\cdot 0016$ long, triseptate. In No. 1376 the spores are shorter.

450. **Septoria melanophthalmi**. *B. & C.*—Maculis pallidis margine late rufo circumdatis; sporis allantoideis vel flexuosis brevibus 2-3 nucleatis.

On leaves of *Dolichos melanophthalmus*. *Car. Sup.* No. 581.

Spots pale, surrounded by a broad dark rufous border; spores short, allantoid or waved, with two to three nuclei. Very different from the last.

450 (bis). **Septoria breviuscula**. *B. & C.*—Ramicola; peritheciis epidermide elevato conditis; sporis allantoideis.

On branches of *Robinia*. *Car. Inf.* No. 5028.

Perithecia concealed by the elevated cuticle; spores allantoid, $\cdot 001$ long.

450. **Excipula recurvispora**. *B. & C.*—Maculis fuscis nigro-marginatis; peritheciis erumpentibus; sporis longis angustis 4-septatis; apice in processum longum hyalinum recurvum attenuatis.

On leaves of *Laurus Caroliniensis*. *Car. Inf.* Ravenel.

Spots brown, irregular, with a black margin; perithecia scattered, erumpent; spores narrow, fusiform, 4-septate, attenuated above, with a long recurved hyaline process.

450. (bis). **Cystotricha stenospora.** *B. & C.*—Linearis vel hysteriiformis erumpens sporophoris moniliformibus; sporis lateralibus uniseptatis, breviter fusiformibus.

On elder. Pennsylvania. Michener. No. 3932, 3960.

Linear or hysteriiform, bursting through the fibres of the bleached wood; spore-bearing threads, moniliform, spores affixed laterally, shortly fusiform, hyaline, uniseptate.

[NOTE.—The intermediate numbers have already been published in this Journal, Vol. ii., pp. 98 and 153, to which the reader is referred.

ED. GREV.]

501. **Myxosporium nitidum.** *B. & C.*—Pustulis gregariis epidermide e sporis oblongis minutissimis aurantia tectis.

On *Cornus alternifolia*. Virginian Mountains. Curtis. No. 3346. New England. Oakes. No. 3105. Pennsylvania, Michener. No. 3356. A very pretty species.

Pustules gregarious, black within, orange externally from the spores, which are very minute and shortly oblong. In one of Michener's specimens on thicker branches, the colour is far duller.

502. **Myxosporium Musæ.** *B. & C.*—Pustulis minutis gregariis, sporis oblongis.

On fruit of *Musa*. Car. Sup. Curtis. No. 3435.

Pustules minute, pale orange; spores oblong, $\cdot 000\frac{3}{4}$ long, about $\frac{1}{4}$ as much wide. As the fruit changes colour when ripe, the pustules are not very conspicuous.

503. **Glaeosporium versicolor.** *B. & C.*—Maculis reticulatis griseis; sporis oblongis clavatisque hyalinis.

On apples. Car. Inf. No. 3216, 3334.

Forming patches an inch or more wide; sori reticulated, spores oblong or slightly clavate, greyish, $\cdot 000\frac{1}{4}$ long. Very different in habit from *G. fructigenum*, B., which also occurs on apples. In No. 3334 the spores are $\cdot 0008$ long.

504. **Glaeosporium cinctum.** *B. & C.*—Pustulis minutis gregariis epidermide nigrefacta cinctis, sporis oblongis utrinque obtusis.

On orchids in an orchid house, Massachusetts. Russell. No. 5437.

Forming little scattered patches; pustules minute, surrounded with the blackened cuticle; spores oblong, obtuse at either extremity, sometimes slightly curved, granular within, $\cdot 001$ - $\cdot 006$ long, about $\frac{1}{4}$ as much wide.

505. **Cesatia turbinata.** *B. & C.*—Pustulis minutissimis turbinatis basi augustioribus.

On twigs of *Kerria*. Car. Inf. No. 3284.

Pustules very minute, bursting out and surrounded at the base by the cuticle, convex above, dilated and almost bordered in the middle, narrowed downwards; sporophores confined to the narrow obtuse basal portion. This exactly accords with the genus as proposed in Rabenhorst's Herbarium, No. 1443. The moniliform chains of spores are exactly the same. His species, *C. Spartii*, occurred on the common broom.

506. **Torula brevissima.** *B. & C.*—Floccis brevibus 2-3 septatis, articulis constrictis pedicello crassiusculo brevi oriundis.

On bark of *Hibiscus Syriacus*. Car. Inf. No. 2640.

Threads very short, unbranched, consisting of from three to four joints only, constricted at the septa, slightly incrassated upwards, or of the same size throughout; stem distinct, short, but rather thick.

507. **Torula quaternata.** *B. & C.*—Floccis triarticulatis deorsum attenuatis e mycelio intricato repente oriundis.

On leaves of *Dasylyrion graminifolium*. Texas. Wright. No. 3768.

Far more minute than the last, threads unbranched, springing at once from the creeping intricate mycelium.

508. **Torula æqualis.** *B. & C.*—Floccis epedicillatis 3-4 articulatis; articulis oblongo-ellipticis.

On bark of *Cyrilla*. Car. Inf. No. 5020.

Threads unbranched, equal, springing at once from the bark without any distinct pedicel, consisting of three or four, or more rarely five, oblong-elliptic joints. Very different from either of the foregoing species, and from *T. abbreviata*, Cd.*

509. **Torula colliculosa.** *B. & C.*—Hysteriiformis pulvinata, floccis brevibus æqualibus 4-5 articulatis; articulis globosis.

On bleached wood. Louisiana. Dr. Hale. No. 3651.

Forming little cushions, of a rather firm texture, the cells of which are arranged vertically; threads short, consisting of from four to five nearly globose joints, whose diameter is .00028.

510. **Torula pallida.** *B. & R.*—Late effusa, olivacea, floccis brevibus ramosis, articulis brevibus.

On dead branches of *Hydrangea* and *Citrus*. Charleston. Car. Inf. Ravenel. No. 1438.

Widely spreading over the matrix, olive; threads pale, short, branched. Articulations shorter than broad.

511. **Torula dissita.** *B. & C.*—Effusa tenuis; floccis ramosis, articulis oblongis 1-2 nucleatis.

On dead oak wood. Car. Inf. No. 3696.

Forming a thin stratum on the wood; threads slightly branched; joints oblong, about four times longer than wide, containing one or two nuclei.

* The anomalous *Oidium chartarum*, Lk., which has been referred to many genera is Car. Inf., No. 3721.

512. **Torula sparsa.** *B. & C.*—Pulvillis minutis sparsis ; floccis sursum attenuatis furcatis, articulis variis brevibusque.

On pine wood. Car. Inf. No. 1477.

Forming minute scattered tufts ; threads mostly attenuated upwards, forked, frequently connate at the base ; joints variable, sometimes oblong, sometimes wider than long.

513. **Bispora aterrima.** *B. & R.*—Late effusa aterrima ; floccis brevibus ; articulis ellipticis, 1-2 septatis.

On oak rails. Car. Inf. Ravenel.

Widely-spreading, jet-black ; threads short, articulations elliptic, with one or two septa, .001-.005 long, about $1\frac{1}{2}$ longer than broad. At the base the mycelium is sometimes curiously lobed.

514. **Septonema breviusculum.** *B. & C.*—Tenue, effusum ; floccis simplicibus ; articulis ellipticis, 1-2 septatis.

On living bark of maple. Car. Inf. No. 4956.

Forming a thin black stratum ; threads simple, consisting of elliptic 1-2 septate joints, about .0006 long, $1\frac{1}{2}$ -2 as long as broad. This is just intermediate between *Bispora* and *Septonema*.

515. **Septonema punctiforme.** *B. & C.*—Floccis fasciculatis e macula orbiculari oriundis ; articulis 2-3 septatis.

On leaves of *Liriodendron*. Car. Inf. No. 3805.

Threads tufted, springing from orbicular brownish spots ; thread seated on a distinct hyaline pedicel ; articulations elliptic, .001-.0005 long with from two to three septa, each division with a single nucleus.

516. **Septonema cæspitosum.** *B. & C.*—Floccis cæspitosis, demum furcatis, articulis oblongis triseptatis enucleatis.

On leaves of *Liriodendron*. Car. Inf. No. 4941.

Not seated as the last on an orbicular spot, but forming groups of various sizes, consisting of tufts of short threads without distinct stems, and at length forked above ; articulations oblong when mature, having three septa, without any nuclei, .001-.0005 long. Closely allied to the last, but different in habit.

517. **Septonema obscurum.** *B. & C.*—Tenue sparsum ; floccis simplicibus fragilibus, articulis angustis oblongis biseptatis.

On dead wood. Car. Inf. No. 3852.

Forming a thin stratum, which at first sight looks like an *Helminthosporium* ; threads simple, brittle ; joints oblong, .0006 long, about four times longer than broad, without any distinct nuclei.

* **Septonema spilomeum.** *B.*

On dead wood. Ohio. No. 92. Car. Sup. No. 221, 273, 302. New England. Russell. No. 5868 bis.

518. **Septonema radians.** *B. & R.*—Floccis furcatis, articulis 1-3 septatis, commissuris constrictis.

On living bark of beech. Car. Inf. Ravenel. No. 1399.

Forming thin transverse black patches, consisting of short, slightly branched threads ; joints consisting of from two to four nearly globose cells, without any nuclei.

519. **Septonema connatum.** *B. & C.*—Pulvillis sparsis; floccis ramosis, articulis ellipticis varie septatis.

On *Salix Russeliana*. Pennsylvania, Michener. No. 4089, 4195.

Forming little scattered tufts, consisting of slightly branched threads, springing from a compact mycelium; joints elliptic, with at first a single horizontal septum, which is soon divided vertically so as to form four divisions.

520. **Septonema multiplex.** *B. & C.*—Effusum; floccis varie ramosis, articulis oblongis irregularibus 3-5 septatis.

On oak limbs. Car. Inf. No. 2751, 4033. Ravenel. No. 1563.

Effused, black; threads branched; joints varying in length and in the number of the articulations, rather irregular, more or less oblong.

521. **Septonema dendryphioides.** *B. & C.*—Sparsum, punctiforme; floccis ramosis, articulis subquadriseptatis oblongis angustis.

On pine wood. Car. Inf. No. 2595.

Forming little scattered dot-like tufts; threads branched; joints narrow, oblong, with generally four septa, which are not irregular as in the last, nor are they so large or broad.

522. **Septonema asprellum.** *B. & C.*—Sparsum punctiforme; articulis demum echinatis triseptatis utrinque appendiculatis.

On stems of some herbaceous plant. No. 4120.

Forming little scattered dot-like tufts; threads with an irregular short hyaline stem; joints .0013 long, triseptate, with a short appendage at either extremity, at first even, then with each division contracted in the middle, with short echinulations at the commissures.

523. **Sporidesmium compactum.** *B. & C.*—Effusum, aterrimum; sporis subglobosis irregularibus demum biseptatis.

On ash wood. Car. Inf.

Effused, jet black, consisting of a compact mass of shortly pedicellate irregular subglobose bodies, with a uniform dark endochrome divided at length by two septa.

* **Sporidesmium melanopum.** *B.*

On apple. New England. Sprague. No. 5829.

* **Sporidesmium atrum.** *Lk.*—**HELYSIUM ATRUM.** Cd.

On dead wood. Car. Sup. No. 4448.

* **Sporidesmium Lepraria.** *B. & Br.*

On maple. Car. Inf. No. 3406. On chestnut. Massachusetts. No. 3372, 3374. Pennsylvania. Michener. No. 4146. On some unknown wood. Car. Inf. No. 3403. Virginian Mountains. No. 3306. U.S. No. 5878. On *Taxodium*. Car. Inf. No. 3058.

524. **Sporidesmium stygium.** *B. & C.*—Effusum aterrimum; sporis grossis clavatis valde compactis.

On dead bark. Pennsylvania. Michener.

Forming effused patches, either small or widely spread; spores large, irregular, clavate, so compact as not to shew the cells of which they are composed, supported on the base by a short, slender, articulated pedicel.

525. **Sporidesmium compositum.** *B. & R.*—Effusum nigerrimum; sporis compactis irregularibus subglobosis vel oblongis concatenatis.

On damp rotting wood of *Catalpa cordifolia*. Santee Canal. Ravenel. No. 1801. Cotoosa Springs. On oak. No. 1746. Car. Sup. No. 4441. On oak. Car. Inf. No. 4032.

Widely effused, jet black; spores irregular, springing from a few moniliform threads, irregularly globose, or oblong concatenate; when crushed composed of minute globose cells, each with a nucleus.

p. 48

ON DR. H. A. WEDDELL'S *REMARKS* IN
"GREVILLEA."

Dr. Nylander has sent us a copy of his reply in the "Flora" to the *Remarks* of Dr. Weddell in "Grevillea" ii., pp. 182-185, with a request that it should be translated for this journal. His reply is as follows:—

"The celebrated Weddell has recently made some animadversions in 'Grevillea' upon my note concerning his pamphlets, 'Lichens de Ligugé,' and 'Nouvelle Revue des Lich. du Jard. pub. de Blossac.' In these remarks he would insinuate that, induced by an unfriendly feeling, I found fault with several important points in these pamphlets, which is a very ingenious way of accusing others of a fault which directly touches the accuser himself. I have repeatedly declared that in the practice of science, I deal neither with personal affections nor opinions, for these are foreign to science, which has to deal with truth alone;* and most certainly I have not written a line from any other motive than simple regard for truth. On the contrary, so far as relates to the author of 'Poitiers,' it is especially annoying that he has brought forward very many assertions previously thrown against me (with a well-known *animus*) from Upsala, and to which I have been compelled to reply in the "Flora" and elsewhere ("to act in self-defence," Wedd.) . Accordingly I may legitimately regard the in-

* They who would admit that science consists of a congeries of *opinions* (to which are referable the notions called in German *anschauung*, and in French *intuition*), are ignorant what science really is, or confound it with what is fabulous.

situation of the author* as not a little perfidious; he makes complaint where I with better right might complain. Such a course of conduct may readily be allowed to those who employ such devices. It is sufficient to submit to the reader, and to succinctly examine the new assertions of the author in reference, as he says, to 'some passages quoted from my two last lichenological brochures, misunderstood by my critic, or wrongly dealt with.' Let us follow the heads in the order and the numbers in which they are given in 'Grevillea.'

I. Here, † strange to say, we fall upon a new Algo-lichen hypothesis. "The truth is, it is difficult to deny that many lichens during the first stage of their life are connected parasitically with some of the inferior Algæ. At a later period, however, when the Alga, assuming the form of Gonidia, becomes included within the tissue of the lichen, the connection, if still kept up, can hardly continue to be regarded as parasitical." It pleases the author that it should be so. Thus theories are invented (truly it is an easy matter), which may well be called 'fancies.' To consult nature and rely upon observations is superfluous; it is convenient over and above the personal method of viewing these, to neglect entirely or to regard as but of little value, contrary observations. The author, indeed, seems to be ignorant that very many lichens have gonidia not enclosed, wherefore his opinion would at once have to be largely and widely extended, and by a direct road indeed would lead to the veriest Schwendenerism, of which he himself so plainly indicates that he is an adherent.

II. In the Friesian manner, Dr. W. had contended that it had been incorrectly said that lichens derive nourishment from the

* "I regret that one whom . . . should have thought it needful, on account of some *variance of opinion* on scientific matters, to treat me so much like an enemy."—Wedd. What are the differences of opinion? I bring forward *observations* in science but no opinions. He then appears as an enemy who points out where an author has committed a fault and has published what is contrary to science, though such may not always be passed over in silence. He makes mention of a letter written by him concerning my note inserted in the "Flora." What the intention of this was I know not. It can be regarded only as proper that what is publicly done should be publicly followed up.

† "Dr. N. takes occasion to develop his opinion," &c.—Wedd. I gave not opinions but *observations*, concerning which Dr. W. expresses this opinion:—"As regards Dr. N.'s special objections to an Algo-lichen hypothesis, I do not see that they are in any way conclusive, not one of them really coming to the point." This recalls to memory the Friesian saying, "Amongst all the writings of our age, we are least pleased with those of Nylander." The author evidently strives to attain the Friesian and Lindsayan glory. But I have demonstrated (by *observations* not opinions) that the filamentose elements of lichens are not the same as the hyphæ of fungi. I have demonstrated that the gonidia arise from the first within closed cellules of the thallus, and do not in any way come from any external quarter. This is sufficient, and more than sufficient to refute all Schwendenerism. Dr. W., not without cause, thinking vague and indeterminate arguments the best, speaks also of "many facts lately adduced," but what these are he does not mention, nor, in truth, are there any such existing. The first germs of lichens and fungi are seen affixed in corpuscles of some kind or other. Were it not so, according to an amplification of the Friesian doctrine, the gonidia would constitute parasites of the thalli—another opinion, which would make the thallus and apothecia parasites of the gonidia, is even more absurd.

atmosphere (he says, "rain-water contributes at least an equal part of their nutrition."). I observed that rain is necessarily included in the idea of the atmosphere, and that this water presents nearly all the nourishing matter. The Weddellian discovery is, therefore, a mistake, and of no use.

III. The author had said that it was certain that silicicolous lichens never (*jamaïs*) occurred upon organic substrata. Now, on my admonition, correcting himself in "Grevillea," he confesses that he should have said, "never, or almost never." This, however, is by no means sufficient. Acharius and Fries, whom he says that he consulted on this subject, teach nothing indeed in that respect; but then he might have seen in Schærer that *Lecidea geographica* had been gathered upon Rhododendron, while *Lecanora gibbosa* was cited as lignicole in "Nyl. Scand.," p. 154. Lichens, however, were not very diligently searched for till after the year 1860, whence it follows that the more recent writings of the last ten years ought chiefly to have been consulted. It would then have been easily perceived that very many silicicolous lichens (and especially those very species *Lecanora gibbosa*, *Lecidea geographica*, and *Lecidea contigua*, which the celebrated Weddell has pointed out as being solely silicicolous), are by no means of rare occurrence also upon dead bark or old wood. And if this is not more frequently observed at the present day, it evidently depends, as may be believed, upon the circumstance that those lichens have a slow and very protracted growth, and that scarcely anywhere, at least in Europe, are the trunks of trees preserved intact through a long series of years, so as to present a suitably hard woody, or as if lithoid substratum. For instance, *Lecidea contigua* is sometimes observed upon old bark and wood in lands where such long remain undestroyed. In alpine regions *Lecidea geographica* lignicole (Rhododendricole) occurs in hundreds of specimens. These and other species usually silicicole, are distributed by numerous examples in published collections. All of this may not please Dr. Weddell, for he had his *opinion* formed as to silicicolous lichens, and any opposite observations seem to him to be unfriendly ("like an enemy").

IV. There it is repeated that I have indicated oxalate of lime as characteristic of all lichens, and the hostile author cites "Nyl. Syn.," p. 4, where the sole question is (which he carefully overlooks) concerning this oxalate as distinguishing lichens from fungi, that is with respect to the inferior lichens approaching to fungi; which I have explained in various commentaries, for amongst the Friesian attacks the same thing has long ago appeared.

V. I, indeed, formerly enumerated the few lichens of the Luxembourg garden in Paris (at that time in great part about to be destroyed), with the sole intention that it might be seen what species could grow in the midst of a very large city, and in a garden favourably situated there, which has nothing comparable with the extended vegetation occurring near a town, where rural features

predominate—for the nature of the locality is entirely diverse. “This difference in the relative situation of the two public walks had appeared to me, on the contrary, to be precisely what was suited to give some interest to the comparison of their respective floras.”—Wedd. Certainly it would have been legitimate to produce anything really comparable or analogously noteworthy, if it had been a case of comparison between cities far distant from each other (for example, Paris and Pekin in China), but an urban and suburban truth of the same lichenose region could not differ except in number of species—a matter, indeed, of small importance.

VI. In this paragraph, the author, in the Friesian manner, and supported by a long experience (“an experience of several years,” as he says), *does not entirely disregard* the reactions of lichens (“my wish was to defend the method, as far as I deemed it practicable,”—what benevolence towards the poor reactions, and what a defender!). “There are some things to accept and some to reject,” still says Dr. Weddell. Here we have a judge “making a deeper inspection” (as Fries says of himself), wherefore we may eagerly expect, as I have previously hinted, that we shall learn from his experience how far he considers that the chemical auxiliaries are to be approved of. If he had at least brought forward some examples, where the chemical characters failed, I should have perhaps anew undertaken their defence; but, in the meantime, unless I am much mistaken, the Weddellian opinion, which in this respect also is indeterminate, affects the reactions but very little.

VII. In this last paragraph, I formerly intimated that the experience of the author by no means shines forth. He had found apothecia of “*Lecanora subfusca*,” in which he had affirmed that he had found brown, 1-septate spores. This I immediately declared in a letter was a very wonderful circumstance,* that is entirely absurd, or equivalent to one saying that he had found the kernel of a cherry innate in an apple or a pear, instead of the seeds, which, according to the usual laws of nature, should there be found. Now, by an artifice which he doubtless thinks useful, to my words, “He had indeed submitted to me heterogeneous† apothecia growing

* Now the author transcribes from my letter (1873) the words relating to this, as quoted in “Grevillea,” p. 185 (foot note). So I wrote in jest. Are not these words sufficiently clear, and what else on any faithful rendering do they mean than that “this is a miracle; I know nothing so prodigious.” It was not worth while to make a further examination of the apothecia sent. It was only when I saw the author thus taxing me, “M. N. hesitated to pronounce as to this anomaly,” that I turned myself to the determination of those apothecia, and explained the miracle. Amongst the animadversions of Dr. Weddell, there occurs the following:—He admits the gonidia to be instruments of nutrition, but not organs,—“as instruments (I dare not say organs) of lichen-nutrition”—a distinction which pertains to the physiological discoveries of the author. Vital instruments of this kind are organs, that is, are endowed with vital functions.

† Let it be noted that I did not say that there was sent to me the apothecia of “*Lecanora subfusca*,” but “heterogeneous” apothecia, which Dr. Weddell maintained that he gathered growing mixed with the apothecia of a “*Lecanora subfusca*,” under which name, as is easily perceived, he did not have regard to true *Lecanora subfusca*, but to something indeterminate, belonging to the section of *Lecanora subfusca*.

mixed with the apothecia of some *Lecanora subfusca*," the author adds the following:—"The fact is that I only sent Dr. N. a few halves of isolated apothecia, all with fuscous spores, the existence of which I had taken care to ascertain by a microscopical examination of the halves corresponding. How is it, then, that, being under the *impossibility* of making any comparison whatsoever between the apothecia of the two species from the inspection of *my* specimens, the author should have thought himself authorised to conclude his pamphlet with such a precise affirmation as the following:—"It may be added that, in no respect, either external or anatomical, do the apothecia of both present any likeness?" What an insinuation is here also put forth (namely, that I passed a judgment on apothecia not seen by me!). The most inexperienced at once can see that this is an argument of no weight, not to say captious. There is not even the smallest word in what is cited and what I have written, that is affected by the censure of the author. He had sent me two entire apothecia, and one half (not "a few halves"),* saying, "these apothecia, with brown spores, &c., are the apothecia of *Lecanora subfusca*" ("dont les thèques renferment des spores qui ne devraient pas s'y trouver!"—Wedd.), "and occur amongst other normal apothecia of *Lecanora subfusca*." What need was there of any comparison with these or *his own* specimens, for certifying (for anyone possessed of the least lichenological knowledge ought to know this) that the apothecia of some *Lecanora subfusca* or other (that is, this name also being vaguely assumed) in no respect present any similarity with the apothecia sent, having brown spores, although the author affirmed that the apothecia sent were in all parts (the spores excepted) similar to the normal apothecia of that *Lecanora* ("sans changement dans les autres parties de l'apothecie"). I have already mentioned that the apothecia with brown spores so unluckily referred to by the author to his marvellous *Lecanora subfusca* belong to *Physcia aipolia*, which, from a hundredth part of an apothecium (and even without spores) is to be distinguished at once from every species of the section of *Lecanora subfusca*. I remit the insinuation of the author to his own conscience.

From the preceding seven notes, it is abundantly clear what force there is in the *Remarks* of Dr. Weddell. There we see him rashly taking up a more adverse position than formerly. And truly what appears most astonishing is the circumstance that certain authors, who boast they always act according to right and justice (readily speaking of "a friendly and courteous manner," or of other compliments, which they freely claim for themselves, but still more freely omit to give in their turn), judge whatever pleases themselves to be lawful for them. So the widest license would be opened up for their impairing or railing against the writings of

* Be it observed that a microscopical examination is by no means necessary to distinguish "brown spores" of an apothecium, a double lens is sufficient.

others. Be it so; but where this is done in a manner not agreeable to science, where only personal opinions and arbitrary and fallacious arguments are opposed to sure observations (or "facts," as we now-a-days say), then we but perform a duty in repudiating such a tendency.

DR. W. NYLANDER.

Paris, 1st July, 1874.

NEW BRITISH LICHENS.

Communicated by THE REV. J. M. CROMBIE, F.L.S., &c.

The following *new species* of British Lichens have been described by Nylander, in "Flora," 1874, pp. 305-318:—

1. **Collemopsis oblongans.** *Nyl.*—Thallus olive-brownish, granuloso-crustaceous, thin, confluent; apothecia bright—or red—testaceous, somewhat concave, minute, the margin thickish; spores 8 μ , oblong, simple, or spuriously 1-septate, 0.016-30 m.m. long, 0.006-7 m.m. thick; hymenial gelatine very faintly wine-reddish with iodine.

On the ground, in fissures of rocks, near Haverbrack, in Westmoreland (Martindale). Allied to *C. Arnoldiana* (Hepp.), but differing in the shape of the spores.

2. **Collema terrulentum.** *Nyl.*—Thallus olive-brown, thin, granulose; apothecia spadiceo-reddish, small, margined by the thallus; spores 8 μ , ellipsoid, or oblongo-ellipsoid, 5-septate, submuralidivided, 0.018-24 m.m. long, 0.010-12 m.m. thick; hymenial gelatine, and especially the thecæ, bluish, with iodine.

On the bark of an old ash tree at Loch Katrine, in Scotland (Crombie). A small and easily overlooked species, which, unfortunately, was but very sparingly gathered.

3. **Physcia tribacoides.** *Nyl.*—Subsimilar to *Ph. tribacia* (Ach.), *Nyl.*, but the white soredia arranged as those of *Ph. cæsia*, and the thalline reaction with K +

On the smooth bark of young trees, near Ryde, Isle of Wight (Crombie). In the specimen gathered the apothecia, unfortunately, were not sufficiently developed.

4. **Lecanora subexigua.** *Nyl.*—Similar to *L. exigua*, but the thallus pale-greyish, subsmooth (unequal) rimose; spores 8 μ , 0.012-15 m.m. long, 0.006-7 m.m. thick.

On maritime rocks, near Penzance, in Cornwall (Curnow).

5. **Lecanora leucophæiza.** *Nyl.*—Similar to *L. leucophæa*, with biatorine apothecia, and scarcely any gonidia present within the perithecium; but the hymenial gelatine not bluish with iodine, or only the thecæ thus coloured. Thallus K f. +, yellowish.

On schistose boulders on Morrone, Braemar, and Hill of Ardo, near Aberdeen (Crombie). The spermogones are not visible in any of the specimens gathered, and but for scanty presence of gonidia in the perithecium this species might readily have been referred to the *Lecidei*.

6. **Lecanora austera.** *Nyl.*—Thallus cervine, or cervine-badious, unequal, rimose, thin; apothecia badious-brown, somewhat large, the thalline margin badious, somewhat shining, flexuose, often sub-crenate and proliferous; spores 8 $\text{n}\ddot{\text{a}}$, ellipsoid, about 0.009 m.m. long, about 0.007 m.m. thick; paraphyses moderate, articulated; hymenial gelatine scarcely tinged, but the thecæ bluish, with iodine.

On weathered quartzose stones in gravelly places near the summit of Ben Cruachan, Argyleshire (Crombie). Very rare, and gathered only sparingly on a single boulder.

7. **Lecidea lubens.** *Nyl.*—Thallus effuse, granulose, greyish glaucous; apothecia small, numerous, crowded, at length convex, pale flesh-coloured or livid-brownish; spores very variable, 5-9 septate, 0.028-50 m.m. long, 0.007-11 m.m. thick; hymenial gelatine deep bluish with iodine.

On the bark of trees, near the roots, at Shere in Surrey (Crombie). Allied to *L. sabuletorum*, var. *amoena*, Ohl., but differing in the character of the spores.

8. **Lecidea scopulicola.** *Nyl.*—Thallus greyish-green, verrucoso-unequal, thinnish, effuse; apothecia brownish flesh-coloured, at first obtusely margined, when old convex; spores 8 $\text{n}\ddot{\text{a}}$, acicular, thinly or obsoletely 3-5-septate, 0.032-44 m.m., 0.002 m.m. thick; paraphyses slender, epithecium colourless, hypothecium colourless (but tawny-brown in the subhymenial stratum); hymenial gelatine bluish, and then tawny wine-coloured with iodine.

On maritime rocks, near Penzance in Cornwall (Curnow).

9. **Lecidea phylliscocarpa.** *Nyl.*—Thallus brown, very thin or evanescent; apothecia black, phylliscoid (umbilicately affixed), rosulato-compound, rotundato-diformed, large, above with the margins thin, subradiately and irregularly disposed, slightly costate, and at the circumference sub-crenato-effigurate, within blackish, the hymenial stratum whitish; spores 8 $\text{n}\ddot{\text{a}}$, ellipsoid or oblong, simple, 0.009-11 m.m. long, 0.0035-45 m.m. thick; epithecium bluish-blackish, paraphyses thickish, bluish-black at the clavate apices, hypothecium sordidly dark; hymenial gelatine intensely bluish with iodine.

On quartzose stones, amongst detritus on the summit of Morrone, Braemar (Crombie). A very singular species, readily recognised from the phylliscoid appearance of the apothecia.

10. **Lecidea dealbatula.** *Nyl.*—Thallus white, thin, rimose or subareolate, unequal; apothecia black, small, prominent, margined, umbonate or at length subgyrose in the centre, concolorous within;

spores 8 $\text{n}\bar{\text{a}}$, colourless, ellipsoid, 0.010-12 m.m. long, 0.006-8 m.m. thick; epithecium and hypothecium brown, paraphyses moderate; hymenial gelatine intensely bluish with iodine.

On schistose rocks of Stronaclachan in Killin (Crombie). Allied to *L. deparcula*, Nyl.

11. ***Lecidea confusior***. *Nyl.*—Thallus dark-greyish, thin, rimoso-areolate, indeterminate; apothecia black, convex, immarginate, when young plane, obsolete margined, white within; spores 8 $\text{n}\bar{\text{a}}$, ellipsoid or oblong, simple, 0.010-17 m.m. long, 0.004-6 m.m. thick; paraphyses thickish, not very well discrete, blackish at the apices, hypothecium colourless; hymenial gelatine intensely bluish and then wine-reddish with iodine.

On micaceous rocks, Craig Tulloch, Blair Athol (Crombie). Allied to *L. confusula*, Nyl., but differing in character of thallus and spores.

12. ***Ptychographa xylographoides***. *Nyl.*—Thallus whitish, macular, or nearly obsolete, apothecia black, lanceolate, somewhat prominent, above plane, epithecium usually 1 or 3 plicated, margined, within concolorous; spores 8 $\text{n}\bar{\text{a}}$, colourless, ellipsoid, simple, 0.011-14 m.m. long, 0.006-7 m.m. thick, epithecium nearly colourless, hypothecium with the perithecium black; hymenial gelatine wine-red with iodine.

On decorticated mountain-ash on Craig Calliach, Killin (Crombie). A new genus and species, differing in the arrangement of the hymenia, which are 2 or 4 longitudinal in each apothecium, from *Xylographa* and all the other *Graphidei*.

In addition to the above, the following *new species* may also be mentioned, viz. :—

13. ***Endococcus triphractoides***. *Nyl. in litt.*—Apothecia minute, hemispherical, black, perithecium entire, spores 8 $\text{n}\bar{\text{a}}$, oblongo-fusiform, 3-septate, colourless or pale-brownish, 0.014-18 m.m. long, 0.006-7 m.m. thick.

On schistose boulders, Craig Tulloch, Blair Athole (Crombie). Parasitic on dealbated portions of thallus of *Lecidea Scotinodes*, Nyl.

LICHEN FROM BEN LAWERS.

By DR. STIRTON.

Lecidea subretrusa. *Strn.*—Thallus albidus vix ullus; apothecia nigra mediocria convexa immarginata; sporæ 8 $\text{n}\bar{\text{a}}$ incolores fusiformes, 3-9 (plerumque 7) septate, $\cdot 045\text{-}06 \times \cdot 01\text{-}012$ m.m.; paraphyses non bene discretæ fere conglutinatæ, apicibus cœrulescentibus; hypothecium fusconigrum vel potius fusco-rufum.

Supra Weissiam compactam. Ben Lawers. 1871.

Affinis *Lecidea sabuletorum*. *Fkl.*—The reaction with iodine on the hymenial gelatine has not been ascertained, and as there

are only two apothecia left, I do not care to destroy either; but if one may judge by analogy in the case of another lichen belonging evidently to the same group, and growing on the same moss, this reaction is cœrulescent, then vinous-red.

I cannot recall any lichen belonging to this section with such spores, which in size and shape resemble very much those of *Verrucaria nucula* (Ach.). Perhaps Mr. Crombie may suggest one analogous, if not identical; for although his conjectures (and they are no better) with respect to *Lecidea epiphorbia* and *L. didymospora* being identical with *L. Heerii* (Hepp.) and *L. affinis* var. *melina* (Kphb.) are entirely wrong, as stated in a recent number of the "Journal of Botany," yet, inasmuch as the members of the present group are rather widely diffused throughout Northern Europe, it is possible, in the scattered state of the literature of the subject, that this lichen may have been described in some publication not hitherto accessible to me.

BRITISH HEPATICÆ.

The second part is just issued of Dr. B. Carrington's "British Hepaticæ" (London: Hardwicke), uniform with the third edition of Sowerby's Botany. It will be admitted that this long-promised work is a desirable addition to our cryptogamic literature, and that no one was more calculated to produce such a work with satisfaction than its present author. At present no details or explanation of the system of classification, or introduction to the structure of the group has been given, but we learn that it is in contemplation to issue these introductory observations simultaneously with the descriptive portion, so that students will not have to wait for them till the completion of the work. The following are the species and the order in which they occur in the two parts already issued:—

- Scalius Hookeri*, *Gr. & B.*, pl. i., f. 1.
- Gymnomitrium concinnatum*, *Ca.*, pl. i., f. 2.
- ,, *coralloides*, *N. ab. E.*, pl. i., f. 4.
- ,, *crenulatum*, *G.*, pl. i., f. 3.
- Nardia sphacelata*, *C.*, pl. ii., f. 5.
- ,, *emarginata*, *G. & B.*, pl. ii., f. 7.
- ,, *Funkii*, *C.*, pl. ii., f. 6 (*ex parte*).
- ,, *adusta*, *C.*, pl. ii., f. 6 (*ex parte*).
- ,, *revoluta*, *Lindb.*
- ,, *scalaris*, *G. & B.*
- ,, *Carringtonii*, *Balf.*, pl. x., f. 31.
- ,, *compressa*, *G. & B.*, pl. iii., f. 9.
- ,, *obovata*, (*N. ab. E.*), pl. xi., f. 35.
- ,, *hyalina*, *Lyell*, pl. xi., f. 36.
- Trichocolea tomentella*, *Dum.*, pl. x., f. 32.
- Acrobolbus Wilsonii*, *N. ab. E.*, pl. x., f. 33.
- Saccogyna viticulosa*, *Dum.*, pl. ix., f. 28.

Each part contains four plates, either coloured or plain, and each plate several figures.

ON THE OCCURRENCE OF *DICRANUM FLAGELLARE*,
Hedw., IN BRITAIN.

By E. M. HOLMES.

This species is very nearly allied to *Dicranum Scottianum*, which, in the dry state, it closely resembles in appearance; hence these two mosses have often been confounded. It was first described by Hedwig, who gives an excellent figure of the plant in his *Musc. Frond.*, vol. ii., t. i., fig. 1. The first record of its occurrence as a British moss is by Dickson, in 1793, under the name of *Bryum flagellare*, in his *Plant. Crypt. Brit. fasc. iii.*, p. 6, where he states that he found the moss on rocks on Ben Nevis, and quotes Hedwig's figure. Unfortunately I have not been able to meet with specimens collected by Dickson, but it is probable that they would prove to belong to *D. Scottianum*, as *D. flagellare* occurs almost exclusively on decaying stumps of trees, and never, so far as I have been able to learn, on rocks. In 1804, it was described in Turner's *Musc. Hibern.* (p. 71) as occurring in Ireland on rocks, but no locality was given. In the same year it was published in the *Flor. Brit.* vol. iii., p. 1206, by Smith, as a British species, Dickson's locality being quoted with the additional one of Cromford Moor, near Matlock, where the author states that he found it, but the Irish locality is not mentioned, hence it is probable that at that time Smith had not seen Irish specimens. In 1809, it was figured in *E. B.*, t. 1977, the drawing of fruiting specimens being taken from Irish plants, which was sent to Sir J. E. Smith, by Dawson Turner, and were collected at Lough Bray. The two figures of barren stems in the centre of the plate appear to have been taken from the Cromford Moor specimens, since figures of the barren stems do not occur in the original drawing made from Dawson Turner's Irish specimens. These drawings, as well as Turner's original specimens from Lough Bray, are in the British Museum, and I have been permitted to examine the Irish specimens and to determine that they must be referred to *Dicranum Scottianum*, Turn. In the *Bryologia Britannica*, Wilson refers the left-hand figure of *E. B.* t. 1977 to *D. Scottianum*, and states that the reputed variety of *D. flagellare*, growing on Cromford Moor, is a tall state of *Campylopus flexuosus*. Hence, unless Dickson's plant, of which Wilson takes no notice, was really *D. flagellare*, that species cannot be considered to have been hitherto discovered in Britain.

The specimens from which the present figures are taken were found in Abbey and Bostol Woods in N. Kent, and were growing on the decaying stumps of *Castanea vesca*, which is very abundant in that locality. In the same wood, but generally on taller and less decayed stumps, *Dicranum montanum* also occurs, and is readily distinguished in the dry state from *D. flagellare* by being as much crisped as *Weissia cirrhata*.

The following description of *D. flagellare* is taken from English specimens:—*Stems* $\frac{1}{2}$ to 1 inch high, slightly branched in a forked manner, and matted together by reddish fibres into extensive tufts. *Leaves* yellowish or full green, spreading and slightly arched, forming a tuft at the apex of the branches after the manner of *D. scoparium*. In those specimens which bear *flagellæ* the leaves are nearly erect and straight, and the tufts are more compact and fastigiately branched. All the leaves have the margins connivent from near the base, so that one half of the lamina is folded over the other, the leaf thus presenting a tubular and subulate appearance. Apex minutely serrulate, with about three tolerably distinct teeth on each side; the back of the nerve near the apex is also minutely serrulate. The nerve sometimes appears to vanish just below the apex of the leaf, but is often prolonged to its apex. In the lower half of the leaf the lamina is about $2\frac{1}{2}$ times as broad as the nerve, and consists of oblong cells, which have rounded or sometimes oblique ends. The cells become quadrate above, and only half the size of the oblong cells in the lower part of the leaf. The alar cells are large and quadrate, brown if the leaf has been taken from a comal tuft, and form a distinct patch extending to the nerve. There are generally eight rows of these cells, the two rows nearest the margin of the leaf on either side having narrower cells than the rest. In the young leaves the alar cells are scarcely coloured, and pass gradually into the oblong cells. The nerve is rather flattened, and appears to gradually blend with the lamina on account of having next to it on either side throughout its length one or two rows of very narrow cells.

The fruit has not yet been found in Britain, therefore the following descriptions of it are taken from Hedwig's and Bruch and Schimper's works.

Male flowers—Arranged in terminal heads among the uppermost leaves; the perichetial leaves ovate-lanceolate, containing antheridia mixed with paraphyses, which have the cell at the apex obtuse.

Female flowers—Terminating the stems and adult innovations; the two outer perigonal leaves short, obtuse, and nerveless, the two inner convolute and apiculate, furnished with a slender nerve, the inmost leaf resembling the two outer ones. Archegonia without paraphyses. *Capsule*—Erect and reddish when mature. Operculum pale yellowish-green with a reddish base, incurved, and ending in a long subula. Annulus none. Peristome of sixteen teeth, deeply cloven, the teeth unequal in length, pale but reddish at the base.

The above description is from Hedwig; that of Bruch and Schimper somewhat differs as follows:—Capsule striate, remotely furrowed when dry, and sometimes curved. Annulus very narrow. Male plants mixed with the female ones.

The stems of *D. flagellare* often give off slender flagellæ from

the axils of the leaves. The leaves of these shoots are minute, lanceolate, obtuse, entire, and have a scarcely perceptible nerve when very young. These flagellæ are said by Bruch and Schimper to appear during the period of inflorescence and to fall during the formation of the fruit, to be not always present, nor equally numerous in all tufts.

From the nearly allied *D. montanum* and *D. Scottianum* our plant may be thus distinguished. *D. montanum* has more slender stems, the leaves are narrower, *distinctly curled when dry*, so as to resemble a *Weissia* rather than a *Dicranum*, strongly serrate at the apex and back of the nerve, and *serrulate almost to the base of the leaf*, the back of the leaf is distinctly papillose, the margin straight and erect, not incurved, so that the leaf does not form a subulate tube. The alar cells consist of five rows with generally only one row of narrower cells at the margin of the leaf. The width of the lamina at the base of the leaf is from one and a half to twice that of the nerve.

D. Scottianum may be distinguished in the dry state by the erect leaves which *do not form conical tufts*, but are densely imbricated throughout the whole length of the stem. The leaves are longer, more tapering, have often an excurrent nerve, and are *never perceptibly serrate*, the margins are not connivant but readily flatten out under the microscope, the *cells have thicker walls, and are narrower* than in *D. flagellare*, the *alar cells do not extend to the nerve*, but consist of about six rows of enlarged quadrate cells, with from three to five rows of narrower cells intervening between them and the nerve. The nerve is narrower and thicker than in *D. flagellare*. The habitat is also different, *D. Scottianum* growing in well-defined, rounded tufts on rocks, while *D. flagellare* grows in irregular spreading patches, on decaying stumps of trees.—*Journal of Botany, July, 1874.*

ICONES SELECTÆ HYMENOMYCETUM HUNGARIÆ.

By CHARLES KALKBRENNER.

In Vol. i., No. 13, 1873, of this valuable periodical, I have directed the attention of those interested in Cryptogamic Botany to the above-mentioned interesting work published by the Hungarian Academy; of this the second part has just been published by the "Athenæum" Publishing Society in Pest. This part contains 29 species of Agaricus; amongst these six new species of Schulzer—*A. drepanophyllus, nigrocinnamomeus, dulcidulus, hæmorrhoidarius, thraustus, mamillatus*; nine species of Kalkbrenner—*A. plebejus, piceus, punctulatus, illustris, paradoxus, helobeus, atrovirens, lucorum, capreolaris*; and fourteen old species, mostly of Fries—*A. carne-*

albus, Bongardii, tricholoma, tephroleucus, solstitialis, comosus, terrigenus, nudipes, centunculus, ravidus, obturatus, vitellinus, and hiulcus.

Print and plates are most exquisitely finished, the last even better than those of the first part; the descriptions, as well as the representations, however, merely bear upon the form and colour of the sporocarpium, without touching upon the interior structure and the mycelium of the plant. This may appear strange at a time when the principal object of mycology seems to be observing the various forms of carpium as it is developed from the mycelium. This remark, however, is no blame upon the author, who performed his task perfectly as far as it has been defined to him.

The representations of *A. obturatus* and *hiulcus* are certainly superfluous, they having been given in "Letell. Icones Fungorum;" so is also superfluous *A. atrovirens* (Kalkbrenner), there existing already an *A. atrovirens* (P.)

FR. HAZSLINSZKY.

PALMODICTYON VIRIDE.

I have much pleasure in making known the discovery of *Palmodictyon viride* (Kützing) as a native of this country. I met with it about a week ago in the Exeter Canal, half a mile below the city. Not knowing the plant myself, and after searching all the works on the subject I had at my command, I forwarded specimens to my friend Professor Dickie, of Aberdeen, who kindly writes me this, June 18th:—"The plant is *Palmodictyon viride* (Kützing), and so far as I know new to the British list." The plant, where it has sufficient room to develop itself, spreads over the bottom, in water about six inches deep; beyond this it comes in contact with *Elodes canadensis*, over which it creeps, and extends its growth from branch to branch into deeper water. In this extension it has first the appearance of a *Conferva*, which I at first took it to be; but the moment I touched it, after taking some from the water, I found from the soft slimy feel that if a *Conferva* it was new to me, and the microscope soon revealed the true character. When the plant grows on the bottom it shows one continuous green membrane, stretched tight over the bottom, but when it comes in contact with other plants it throws out filaments, the thickness of which is difficult to make out on account of their adhesive nature; for wherever they touch it is matter of impossibility to separate them. The membrane forming the filaments is structureless, but the spherical cells, which form more or less moniliform threads sometimes running in parallel lines, at other times forming an irregular net work on the inside of the filaments. These cells sometimes divide into two portions, at others into four, and in most of the mature cells may be observed four cellules.

EDWARD PARFITT.

CARPOLOGY OF PEZIZA.

By THE EDITOR.

[Plates XXVII to XXX.]

In the accompanying plates figures are given of numerous species of *Peziza*, drawn by camera lucida from mounted specimens derived from the sources named against each species. The size is about 380 diameters, a scale being given of $\frac{1}{10}$ th of a millimetre divided into hundredths, by means of which the sporidia may be measured. Nuclei are so evanescent in mounted sporidia, as I have elsewhere indicated, that their absence must not be strongly relied upon.

ALEURIA.

- Fig. 1. *P. acetabulum*, *L.*, Rabh. Fungi Eur., No. 316.
 ,, 2. *P. sulcata*, *Pers.*, Rabh. Herb. Myc. ii., No. 627.
 ,, 3. *P. Hindsii*, *Berk.*, Wright Fungi Cub., No. 664.
 ,, 4. *P. tricholoma*, *Mont.*, Wright Fungi Cub, No. 665.
 ,, 5. *P. hesperidea*, *Cooke.*, C. H. Peck, Esq.
 ,, 6. *P. helvelloides*, *Fr.*, Rabh. Herb. Myc. ii., No. 26.
 ,, 7. *P. macropus*, *Pers.*, Cooke Fungi Britt., 289.
 ,, 8. *P. bulbosa*, *Hedw.*, Rabh. Fungi Eur., No. 1308.
 ,, 9. *P. pallidula*, *Cooke*, C. H. Peck, Esq., No. 309.
 ,, 10. *P. melæna*, *Fr.*, Mong. & Nest. Exs., No. 584.
 ,, 11. *P. Drummondii*, *Berk.*, in Herb. Kew.
 ,, 12. *P. Hystrix*, *Berk.*, Sallé St. Domingo.
 ,, 13. *P. protracta*, *Fr.*, from Biernstein's figure.
 ,, 14. *P. aurantia*, *Fr.*, Hampstead.
 ,, 15. *P. onotica*, *Pers.*, Bloxam in Herb. Brit. Mus.
 ,, 16. *P. ochracea*, *Karst.*, Rabh. Fungi Eur., No. 215.
 ,, 17. *P. leporina*, *Batsch*, Fekl. Fungi Rhen., No. 1233.
 ,, 18. *P. macrotis*, *B.*, Sallé in Herb. Brit. Mus.
 ,, 19. *P. cochleata*, *L.*, Cooke Fungi Britt., No. 473.
 ,, 20. *P. venosa* (?) Rabh. Fungi Eur., No. 615.
 ,, 21. *P. venosa*, *Pers.*, Cooke Exs. No. 557.
 ,, 22. *P. reticulata* (?) Fekl. Fungi Rhen., No. 2083.
 ,, 23. *P. ancilis*, *Pers.*, Erb. Critt. Ital., No. 976.
 ,, 24. *P. badia*, *Pers.*, Karsten Fungi, No. 141.
 ,, 25. *P. abietina*, *Pers.*, Fekl. Fungi Rhen., 1226.
 ,, 26. *P. fulgens*, *Pers.*, Rabh. Fungi Eur., 516.
 ,, 27. *P. succosa*, *Berk.*, C. E. Broome, Esq.
 ,, 28. *P. alutacea*, *Pers.*, Fekl. Fungi Rhen., No. 1229.
 ,, 29. *P. repanda*, *W. a.* C. E. Broome; *b.* A. Jerdon; *c.* U. States.
 ,, 30. *P. Darjeelensis*, *Berk.*, ex Herb. Kew.
 ,, 31. *P. vesiculosa*, *Bull.*, Erb. Critt. Ital., No. 773.
 ,, 32. *P. tarzetta*, *Cooke*, Rehm. Ascomyceten, No. 53.
 ,, 33. *P. pustulata*, *Pers.*, Fekl. Fungi Rhen., No. 1227.
 ,, 34. *P. violacea*, *Pers.*, Karst. Fungi Fen., No. 455.
 ,, 35. *P. leiocarpa*, *Curr.*, Rabh. Fungi Eur., No. 622.
 ,, 36. *P. trachycarpa*, *Curr.*, Rabh. Fungi Eur., 620.
 ,, 37. *P. viridaria*, *B. & Br.*, Rabh. Fungi Eur., 1309.
 ,, 38. *P. catinoides*, *Fekl.*, Fekl. Fungi Rhen, 1829.
 ,, 39. *P. carbonaria*, *A. & S.*, Rabh. Herb. Myc., No. 622.
 ,, 40. *P. cupularis*, *L.*, Fekl. Fungi Rhen., No. 1878.
 ,, 41. *P. rhytidia*, *Berk.*, ex Rev. M. J. Berkeley.
 ,, 42. *P. adnata*, *B. & C.*, Wright Fungi Cubensis, No. 658.
 ,, 43. *P. fuliginea*, *Sch.*, ex Herb. Kew.
 ,, 44. *P. undata*, *Sm.*, W. G. Smith, Esq.
 ,, 45. *P. mussiva*, *Fr.*, Prof. Elias Fries.
 ,, 46. *P. microspora*, *B. & C.*, Ravenel, No. 1031.

- Fig. 47. *P. macrocalyx*, *Fres.*, Rabh. Fungi Eur., No. 806.
 ,, 48. *P. cordovensis*, *Cooke*, Sallé Cordova Exs., No. 132.
 ,, 49. *P. lobata*, *B. & C.*, Wright Fungi Cubensis, No. 663.
 ,, 50. *P. omphalodes*, *Bull.*, Rabh., Fungi Eur., No. 267.
 ,, 51. *P. Franzoniana*, *Not. Erb. Critt. Ital.*, No. 184.
 ,, 52. *P. subhirsuta*, *Sch.*, *Desm. Exs. i.*, No. 723.
 ,, 53. *P. melaloma*, *A. & S.*, Rabh. Fungi Eur., No. 723.
 ,, 54. *P. sanguinaria*, *Cooke* (*Crouania carbonaria*, *Fckl.*), Fckl. Exs No. 2482.
 ,, 55. *P. exasperata*, *B. & C.*, *Rev. M. A. Curtis.*
 ,, 56. *P. lætirubra*, *Cooke* (*Crouania ciunabarina*, *Fckl.*), Fckl. Exs., No. 2481.
 ,, 57. *P. globifera*, *B.*, Wright Fungi Cubensis.
 ,, 58. *P. Wrightii*, *B. C. E. Broome*, Esq.
 ,, 59. *P. schizospora*, *Ph.*, *W. Phillips*, Esq.
 ,, 60. *P. murina*, *Fckl.*, Fckl. Fungi, Rhen., No. 1597.
 ,, 61. *P. Crouani*, *Cooke*, *Cooke Fungi Britt.*, No. 285.
 ,, 62. *P. scatigena*, *B.*, Wright Fungi Cubensis, No. 667, in British Museum, and in my copy, = *P. Wrightii*, *B. & C.* The true *P. scatigena*, *B.*, is different, having elliptic sporidia.
 ,, 63. *P. nobilis*, *Karst.*, *Karst. Fungi Fenn.*, No. 635.
 ,, 64. *P. araneosa*, *Sow.*, *C. E. Broome*, Esq.

ON VAUCHERIA.—Professor Leidy recently made some remarks before the Academy of Natural Sciences in Philadelphia on the intra-cellular circulation of plants, as exemplified in the hairs of the Mullein, the leaf cells of *Vallisneria*, &c. The moving streams of protoplasm he likened to amœboid movements, and expressed the opinion that they were of the same character. In the common Alga, *Vaucheria*, the filaments of which consist of very long cells, comparable to those of *Nitella* or *Chara*, he had observed an apparent motion of the cell contents, which is somewhat peculiar, and, at least, is not generally mentioned by writers. The wall of the cells is invested on the interior with a layer of tenacious protoplasm, containing the thinner liquid cell contents as usual. The parietal protoplasm is closely paved with green granules, and these appear very slowly, but incessantly, to change their position in relation with one another. The motion is so slow that it was a question for some time whether it did actually occur, but it appears sufficiently obvious if observed in relation with the lines of a micrometer, and its existence was confirmed by several friends whose attention was directed to it.—“*American Naturalist*,” viii., 444.

[Without calling in question the occurrence of “Amœboid movements” in some Algæ, it may be well to caution our readers against the conclusion that therefore they are allied to *Amœba*. This is the more necessary since so accomplished an observer as Professor De Bary permitted himself to be mistaken as to certain “Amœboid movements” in the *Myxogastres*, and but too hastily declared their affinity with *Amœba*, a position from which he had ultimately to withdraw. The term “amœboid” requires to be accepted with a qualified interpretation.—ED. GREV.]

MYCOTHECA UNIVERSALIS.

No Mycologue of the day enables the student to pursue the study thoroughly without the help of dried specimens. The best proof thereof is the great number of works on exsiccated fungi, which appear and increase in number from year to year. However, the compass of all these compilations is comparatively limited, the series containing either isolated classes of fungi, or fungi of different countries only, or, at the utmost, of one part of the world. Works of this kind have never yet been extended to the fungi of countries beyond Europe, and yet this study is best adapted for the purpose of enlightening the views, of enlarging the insight, and of solving many a problem which now arrests our steps, unable as we are to account for it. All these considerations have stimulated the editor to begin a new work on Fungi-Exsiccates under the title MYCOTHECA UNIVERSALIS.

As is evident from its name, the work is to exhibit fungi from all parts of the world and of all classes of the kingdom of fungi. The editor, already known to Mycologists by his "Fungi austriaci exsiccati" and "Herbarium mycologicum œconomicum," will use the greatest exertions to gain for his undertaking collectors in all countries and continents. The assistance of many of the ablest Mycologists has already been secured; thus for instance the editor has succeeded in procuring the collaboration of the celebrated Dr. George Winter, of Leipzig, who has engaged to contribute chiefly Ascomycetes. Settled and regular contributions have been secured from various parts of Germany, Austria and Hungary; from Great Britain, Switzerland, Italy, Greece, Norway, Denmark, Russia and several states of the United States of North America, together with expectations of contributions from South Africa and Java.

The arrangement of the work will be similar to the one which has proved satisfactory for years in the works on exsiccated fungi produced by the editor; viz.: all the specimens are to be delivered loosely wrapped in paper envelopes. Three centuries (by no means more) will be issued yearly. Orders are to be directed to the editor himself; applications being received by each bookseller with an additional cost.

Every century, ordered from the editor, and upon receipt of the published price, post-free, amounts to 12 Marks German = 4 Thalers = 7 Florins Dutch = 12 Shill. = 6 Florins (Austrian value) in silver = 15 Francs.

In the commencement of 1875 the first century is to be issued.

F. BARON THÜMEN.

Bayreuth (Bavaria), July, 1874.

NEW BRITISH LICHENS.

By DR. J. STIRTON.

Lecidea emphysa. *Strn.*—Thallus albus vel albidus tenuis continuus; apothecia parva adnata sanguineo-atra, convexa immarginata, intus omnino aurantiacea; sporæ 8næ incolores obovatae 1-septatae, $\cdot 01\text{-}\cdot 014 \times \cdot 004\text{-}\cdot 0045$ m.m.; paraphyses valde indistinctæ et irregulares; hypothecium durantiacum. Gelatina hymenialis iodo vinose rubens.

Supra ligna putrida prope Dalwhinnie.

Thallus white, thin; apothecia small, convex, sanguineous-black, orange within; spores 8 colourless, obovate, 1-septate small; paraphyses very indistinct; hypothecium orange. Gel. hym., wine-red with iodine.

Lecidea subvernalis. *Strn.*—Thallus albus tanquam hypophœodes tenuissimus; apothecia parva flavida dein livida demum fusco-nigra, convexa immarginata, intus pellucida vel cœrulee pellucida; sporæ 8næ incolores simplices oblongæ, $\cdot 012\text{-}\cdot 02 \times \cdot 0055\text{-}\cdot 006$ m.m.; paraphyses haud distinctæ conglutinatae; hypothecium incolor. Gelatina hymenialis iodo cœrulescens dein violacea vel vinose violacea.

Ad lignum vetustum vel putridum prope Grantown.

Thallus white, thin, gonidia entangled amongst the woody fibres; apothecia pale yellow, then bluish black, ultimately fusconigricant, small and convex, pellucid within; spores 8, colourless, simple, oblong, moderate; paraphyses conglutinate; hypothecium colourless. Gel. hym., cœrulescent, then violaceous or vinoso-violaceous with iodine.

The habitat as well as other differences appear to warrant a separation of this lichen from *L. vernalis* (Ach.), although, it must be confessed, the variable condition of the latter may extend to this and even include it.

Lecidea sporadiza. *Strn.*—Thallus flavidus granulosus vel granuloso-verrucosus, granulis nonnihil pulverulentis (K flavens dein, C addito, aurantiaco-rubens); apothecia nigra, sessilia parva, vel mediocria plana rugosa, marginata, intus cinerascens; sporæ 8næ, incolores, simplices, ellipsoideæ, $\cdot 006\text{-}\cdot 007 \times \cdot 004\text{-}\cdot 0045$ m.m.; paraphyses irregulares parvæ, indistinctæ; hypothecium incolor. Gel. hym., iodo non tincta.

Ad lignum vetustum cæsum prope Grantown.

Thallus yellow or greenish yellow, granulose, granules often conglomerate and pulverulent (K yellow, C orange red); apothecia black sessile, small or moderate, plane rugose, margined, cinerascens within; spores 8, colourless, simple, elliptical, small; paraphyses, indistinct, not numerous; hypothecium colourless. Gel. hym., not tinted by iodine.

Allied to *L. neglecta* (Nyl.).

Lecidea pammieta. *Strm.*—Thallus (K e flavo ferrugineo-rubens), albidus vel cinereo-albidus crassus, areolate-diffractus, areolis laevibus minute papillois; apothecia nigra adnata plana vel convexiuscula, margine undulato interdum pallidiore cincta, epithecio sæpissime gyroso-plicato, intus pallida; sporæ 8næ, incolores simplices ellipsoideæ, $\cdot 008\text{-}01 \times \cdot 005\text{-}006$ m.m.; paraphyses crassæ irregulares indistinctæ apicibus clavatis nigricantibus; hypothecium incolor. Gel. hym., iodo cœrulescens deia violascens.

Ad saxa, Ben Arthur.

Thallus (K yellow, then orange red) whitish or cinereo-albescent, thick, areolato-diffract, areolæ smooth, minutely papillose; apothecia black, sessile plane, or somewhat convex with an undulated, at times paler margin, pale within; epithecium almost constantly gyroso-plicate; spores 8, colourless, simple elliptical, rather small; paraphyses thick, not distinct with clavate nigricant apices; hypothecium colourless. Hymeneal gelatine blue, then violet with iodine.

This lichen partakes of the characters of *L. mollis* (Whlnb.) and *L. tessellata* (Flk.).

Lecidea scutulata. *Strm.*—Thallus (K—C—) pallide cervinus vel pallide infescens tenuisculus diffracto-areolatus, areolis planis vel nonnihil convexis; apothecia mediocria vel majuscula fusconigra vel nigra innata vel interdum paulo emersa, tenuiter marginata, epithecium concavo; sporæ 8næ, simplices incolores ellipsoideæ, $\cdot 024\text{-}032 \times \cdot 012\text{-}015$ m.m.; paraphyses crebræ fragiles apicibus fuscercantibus; hypothecium crassum fusconigrum. Gel. hym. iodo cœrulescens dein pars media vinose fulvercens, apicibus persistenter cœrulee tinctis.

Ad saxa apud, Ben Lawers.

Thallus (K—C—) pale cervino-rufescent thinnish diffracto-areolate, areolæ, somewhat convex; apothecia rather large, fusconigricant or black, innate, or a little elevated, thinly marginate; epithecium concave; spores 8, simple, colourless, elliptical, large; paraphyses numerous filiform, apices, fuscescens; hypothecium thick, fusco-nigrum. Gel. hym. cœrulescent, then the middle of the hymenium vinoso-fulvescent, the upper extremity remaining cœrulescent with iodine.

This is closely allied to *L. pansæola* (Ach.), but the reactions are constantly as indicated above. None of the reddish cephalodia, usually present on the latter, have been seen on any of the specimens.

Lecidea callista. *Strm.*—Thallus fusco-niger granulosus granuliæ dispersis vel conglomeratis; apothecia conferta sæpissime contigua parva nigra adnata cæsio-pruinosa, margine prominulo inflexo cincta; sporæ 8næ simplices incolores elongato-ellipsoideæ vel cylindraceæ, $\cdot 012\text{-}014 \times \cdot 003$ m.m., forsitan non bene evolutæ;

paraphyses crassiusculæ satis bene distinctæ pellucidæ, apicibus fusces centibus clavatis granuloso-inspersis; hypothecium tenue fusco-nigrum. Gel. hym. iodo intense, cœrulescens fere nigra.

Ad Saxa granitica prope Grantown.

Thallus brownish black granulose, granules either dispersed or conglomerate; apothecia closely set, very frequently contiguous, small black sessile cæsio-pruinose with a prominent inflexed margin; spores 8, simple colourless, almost cylindrical small, perhaps not matured; paraphyses thickish, not very distinct pellucid with brownish clavate apices; hypothecium thin nigro-fuscous. Gel. hym. intensely blue, almost black with iodine.

Lecidea lyperiza. *Strn.*—Thallus cinerascens vel plumbeo-cinerascens tenuis levis continuus (K—C—) obscure limitatus; apothecia adnata nigra plana vel nonnihil convexa, obtuse marginata, mediocria vel majuscula, intus cinerascens; sporæ 8næ fuscae ellipsoidæ 1-septatæ et sæpissime nucleatæ, $\cdot 016\text{--}\cdot 022 \times \cdot 009\text{--}\cdot 012$ m.m.; paraphyses graciles nonnihil irregulares granuloso-inspersæ, apicibus bis tervis ramosis et interdum articulatis; hypothecium fuscescens gramosum. Gel. hym. iodo intense cœrulescens fere nigra.

Ad corticem lævem prope Killin.

Thallus cinerascens or bluish-cinerascens, thin, smooth, continuous (K—C—), obscurely limited; apothecia sessile, black, plane or somewhat convex, rather large, bluntly margined, cinerascens within; spores 8, fuscous ellipsoid, 1-septate, and very often with 3 or 4 nucleæ, rather large; paraphyses distinct, filiform, with numerous granules interspersed, apices twice or even thrice divided and often articulated; hypothecium fuscescens grumous. Gel. hym. intensely blue, almost black with iodine.

Xylographa scaphoidea. *Strn.*—Thallus macula alba vel obsoleta indicatus; apothecia prominula fusca oblonga, rotundata vel flexuosa, parva, epithecio rimiformi, margine prominulo crasso; sporæ 8næ, incolores simplices ellipsoideæ, $\cdot 012\text{--}\cdot 016 \times \cdot 006\text{--}\cdot 008$ m.m.; paraphyses irregularis, indistinctæ, apicibus fuscis conglutinatis; hypothecium incolor. Gel. hym. iodo obsoleto cœrulescens dein fulvescens.

Ad alnum decorticatam prope Dalwhinnie et Grantown.

Thallus indicated by a white spot, often almost obsolete; apothecia prominent, fuscous, oblong, roundish or even flexuose, small, epithecium rimiform, with a prominent round border; spores 8, colourless, simple, ellipsoid, moderate; paraphyses not distinct; hypothecium colourless. Gel. hym. obsoletely cœrulescens, then fulvescent with iodine.

The gonidia interspersed amongst the fibres of the wood are large, green, $\cdot 012\text{--}\cdot 018$ m.m. in diameter.

Opegrapha contexta. *Strn.*—Thallus rufo-cervinus tenuis fusco-

limitatus; apothecia nigra parva plerumque aggregata fere leicideiformia, epithecii rimiformibus, in acervulis (latit. circa. 2 m.m.), appositis gyroso-plicatis, intus cinereo-fusca; sporæ 8næ, incolores fusiformes (apicibus obtusis), 3-septatæ, $\cdot 017\text{-}\cdot 025 \times \cdot 0045$ m.m.; paraphyses valde indistinctæ, hypothecium fusco-nigrum. Pars. inferior hymenii iodo cœrulescens dein omnino vinose rubens.

Ad corticem Ulni prope Grantown.

Thallus reddish, buff-coloured, thin, hypothallus brown; apothecia black, small, for the most part aggregate, almost patelliform; epithecia rimiform arranged, parallel or contorted manner in the aggregations, cinereo-fuscous within; spores 8, colourless fusiform with blunt apices, 3-septate moderate; paraphyses very indistinct; hypothecium nigro-fuscous. The lower half of the hymenium at first only cœrulescent with iodine, then the whole wine red.

This lichen bears a certain affinity to the Arthonia, but the epithecium is rimiform, and in a small proportion of cases single apothecia are seen somewhat elongated.

Opegrapha prosiliensis. *Strn.*—Thallus albus vel albidus tenuissimus chrysogonidiens; apothecia prominula nigra ovata vel oblonga, epithecio rimiformi marginibus prominulis rotundatis; sporæ 8næ incolores fusiformi-ellipsoideæ, 3-septatæ et 4-nucleatæ, halone cinctæ, $\cdot 02\text{-}\cdot 028 \times \cdot 006\text{-}\cdot 007$ m.m.; paraphyses satis bene distinctæ irregulares ramosæ, apicibus fusciscentibus; hypothecium fuscum. Gel. hym. iodo vinose rubens cœrulescentia præcedenti fere obsoleta.

Ad arbores decorticatas et emortuas prope Grantown.

The gonidia are large and thickly entangled amongst the fibres of the wood. Scattered here and there over the thallus are seen pretty large nearly spherical Verrucæ (latit. as much as $\cdot 25$ m.m.), containing spermatia ($\cdot 0045\text{-}\cdot 006 \times \cdot 0015$ mm.). On short, simple sterigmata. Thallus white or albicant, very thin, with orange-coloured gonidia; apothecia prominent, black, ovate, or oblong, epithecium rimiform, with prominent rounded margins; spores 8, colourless fusiform-ellipsoid, 3-septate and very generally 4-nucleate, surrounded by a gelatinous halo, rather large; paraphyses pretty distinct, branching with brownish apices; hypothecium fuscous. Gel. hym. wine-red with iodine.

Verrucaria aphorisasa. *Strn.*—Thallus maculis segregatis fusconigris determinatis indicatus; apothecia nigra, compluribus in quavis maculæ aggregatis, fere innata et hemisphærica, perithecio dimidiato; sporæ (4-8) næ, incolores demum fusæ, oblongæ, 1-septatæ, $\cdot 02\text{-}\cdot 028 \times \cdot 005\text{-}\cdot 007$ m.m.; paraphyses numerosæ, divaricato-ramosæ, nonnihil indistinctæ. Gel. hym., iodo levite, cœrulee vel violacee tineta.

Ad corticem Ulni prope Grantown.

Thallus indicated by brownish black detached well defined spots; apothecia black almost innate and hemispherical, many being closely congregated in each spot, epithecium dimidiate; spores 4 to 8 colourless, at length brown oblong, 1-septate rather large; paraphyses numerous, branching not very distinct. Gel. hym. tinted blue or violet, with iodine.

Verrucaria peltophora. *Strn.*—Thallus squamulosus, squamulis tenuibus viridibus lævibus appositis vel sejunctis margine recurvis; apothecia nigra mediocria vel majuscula prominula hemisphærica, perithecio dimidiato; sporæ 8næ, fuscæ, ellipsoideæ muralidivisæ, $\cdot035\text{-}\cdot048 \times \cdot02\text{-}\cdot03$ m.m.; paraphyses parvæ graciles, guttalis oleosis inspersæ, filamentis osteolaris numerosis. Gel. hym. iodo vinose rubens.

Supra terram apud, Ben Lawers.

Thallus squamulose, squamules thin green, smooth, either approximated or scattered; apothecia black, large, prominent perithecium dimidiati; spores 8, fuscous elliptical, muralilocular, rather large; paraphyses few, filiform, interspersed with oily globules, osteolar filaments numerous. Gel. hym. wine red with iodine.

Verrucaria colleta. *Strn.*—Thallus niger tenuis continuus; apothecia nigra parva, latit. ($\cdot1\text{-}\cdot2$ m.m.), sphærica interdum fere aggregata, perithecio integro, epithecio poriformii; sporæ, 8næ, incolores fusiformes constrictæ, 1-septatæ interdum curvulæ, $\cdot032\text{-}\cdot045 \times \cdot01\text{-}\cdot013$ m.m.; paraphyses valde indistinctæ fere conglutinatæ. Gel. hym. intra thecas iodo vinose rubens.

Supra Gymnomitrium concinnatum apud, Ben Lawers.

Gonidia are seen interspersed, having, in many instances, a diameter from $\cdot016$ to $\cdot02$ m.m., but it is questionable whether they belong to the thallus of this lichen.

Thallus black, thin, continuous; apothecia black, small, diameter from $\cdot1$ to $\cdot2$ m.m., sphærical, at times almost aggregate, perithecium entire; spores 8, colourless, fusiform, often constricted at the middle, 1-septate, large; paraphyses very indistinct. Gel. hym. within the asci, wine-red with iodine, the rest untinted.

Lecideia alpicola. *Schær.* Ben Lawers.—Mr. Leighton adduces this lichen, in his "Lichen Flora," as having been gathered by Mr. Crombie on Ben Nevis, but as the latter omits it in his "Lich. Brit.," and inserts in its place, *L. galbula*, there is evidently some mistake. Mr. Leighton, besides, speaks of the spores as colourless; now it is only at an early stage they are so; when mature, they are of a beautiful green colour, merging ultimately to brown.

CRITICAL NOTES ON SOME SPECIES OF
DIATOMACEÆ.

Amphiprora (?) complexa, Gregory, Clyde Diatoms.—This very singular form was doubtfully placed in the genus *Amphiprora*, by Dr. Gregory, who remarks that the remarkable structure of this species may render necessary the establishment of a new genus.

It is somewhat surprising that so acute an observer as the late Dr. Gregory should have placed this form in the genus *Amphiprora*, to which it bears no structural affinity. He was also in error in describing it as complex. His specific character is as follows: "frustule, composed of two arcuate and constricted segments, which are broad and thick at the outer margin, thin at the inner margin, and placed opposite each other with a narrow interval between them. Over the middle of these two lateral segments a complex mass, formed of five or six segments, converging inwards and on the ends, like the segments of an orange or melon."

FIG. 1.



FIG. 2.

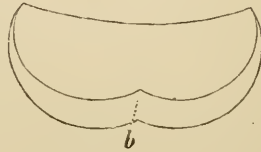
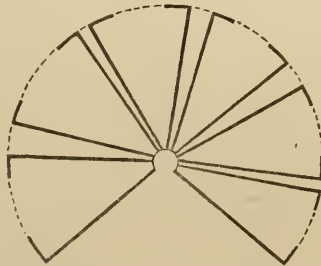


FIG. 3.



This description of the frustule is correct to a certain extent; the valve is not thicker at the convex than at the concave margin. An ideal transverse section of a single frustule (fig. 1) will explain the apparent thickness of the convex margin, *a a'* valves, the dotted lines *b b'*, the cingulum or connecting zone, as the greatest development of the cingulum takes place at *b* (fig. 2), the frustule gradually assumes a spherical form; in the meantime new valves are being formed within the frustule, the margins of which produce the complex appearance previously alluded to. Fig. 3 represents

a transverse section of a series of frustules, the thick lines indicating the valves and the dots the cingulum.

In the unequal development of the cingulum, this species resembles genus *Amphora*, but it possesses neither a median line or central nodule. Its proper place is doubtless in the genus *Palmeria* (Greville in the "Ann. and Mag. of Nat. History," 1865), in which genus I propose to place it with the following specific characters :—

Palmeria vulgare (Kitton) = *Amphiprora complexa*, Gregory. Frustule cuneate in f. v., frequently cohering after self-division. Valve broadly lunate, convex margin, generally constricted at the centre, striæ radiant and slightly curved towards the rounded apices.

Marine or brackish water. The Clyde and Loch Fenn. Dr. Gregory. Sharks Bay, Australia, M. J. Norman. Harwich and Felixstowe, F. Kitton. Dundee, Mr. Rattray. Peruvian guano, and fossil in the Baldjik deposit.

It will be seen from the above list of habitats that this form is widely distributed, but with the exception of the Dundee gathering (for which I am indebted to Mr. Rattray) I have never found it in abundance.

Grammatophora islandica, Ehr.—I have lately detected this species in a gathering made off the coast of Scotland, mixed with *G. mauna* and *G. serpentina*. I do not feel sure that it is specifically distinct from the latter form ; it is probably only a variety with more distant striæ.

Nitzschia curvula, Smith.—Some confusion seems to exist amongst foreign observers as to the form described in the Synopsis. The species so named in the "Typen Plate" list is not Smith's *N. curvula*, but his *N. sigma*. In a paper on the structure of Diatoms, by G. W. Morehouse, U.S.A. ("Monthly Mic. Journal," vol.-xii., p. 23), he alludes to the extreme difficulty of resolving the longitudinal, as compared with the transverse striæ of *N. curvula*, Sm. I suspect that he is also unacquainted with the true form.

This form is, however, not a *Nitzschia*, but a *Surirella* (*Surirella intermedia* of Dr. Lewis) ; the surface is striate, but the striæ are not difficult to resolve. The striæ on *N. sigma*, like those on *Grammatophora*, are more easily resolved when mounted in balsam than when mounted dry.

Cymbella Ehrenbergii, Agaridh.—Professor Smith, in his Synopsis, remarks that "It is difficult to discriminate between the *Cocconemeta* and *Cymbellæ* when the specimens are prepared. In a living state the presence of a stipes at once removes the difficulty."

Recent observations prove, however, that their presence or absence are of no generic or specific value. In a gathering from Aberdeen I found *Cocconema lanceolatum* living, and in a vigorous state, without the vestige of a stipes.

The markings on *Cymbella*, however, differ from those on the *Cocconeis* sufficiently, perhaps, to warrant their separation; those on the latter are distinctly moniliform, whilst those on the former are apparently costate. I say apparently costate; they are really not so; when examined with a high power and oblique light they will be found to be composed of a series of compressed beads.

C. Ehrenbergii, when thus illuminated, is an object of considerable beauty.

Synedra robusta (Ralfs).—The conspicuous striæ on this species, when examined with the oblique light, will be found to be composed of a series of beads very much compressed. F. KITTON.

NOTE OF THE OCCURRENCE IN IRELAND OF THE MINUTE ALGA, *CYLINDROCAPSA INVOLUTA*.

By W. ARCHER.

The occurrence in this country of *Cylindrocapsa involuta*, Reinsch. ("Die Algenflora des mittleren Theiles von Funken," p. 66, t. vi., f. 1), will possibly interest the algological readers of this journal, although the plant itself is not one of any striking appearance.

Admitting the identity, of which I myself do not doubt, though not previously having seen examples, that author's description of this minute alga does not appear quite complete, as he omits to mention that the cylindrical hyaline envelope of the cells, combining them into a frond, is closed at both extremities, rounded off at the upper, and somewhat produced, tapered and thin, slightly dilated into a scutate organ of attachment (to foreign objects) at the lower extremity. Thus the extremities appear to be differentiated into a basal and apical. The Irish plant agreed with Reinsch's in the dimensions of the cells, their oval figure (truncate after division, whilst closely apposed, and until full size is again attained), their longer diameter posed in the direction of the length of the cylindrical filament and in their being involved by a number of concentric hyaline investments standing off from the cells at the poles, closely applied at the sides; not, however (as Reinsch shows) uniformly four, but two, three, or four, and standing off from the cells, not equidistantly, but at different distances. It is, however, quite possible that where the fewer number only of laminæ of the envelopes were apparent, others may have been present, but so closely applied to the cells (and to each other) as to appear as if absent. Just as depicted by Reinsch (though his figure be rather stiff). I saw some of the cells undergoing self-division, the fission always taking place through the shorter diameter, the new cells, at first flattened at the ends, then growing as long as the older, and becoming rounded off, and thus the longitudinal direction of the cells is maintained. Thus this form is unlike *Cylindrocapsa nuda* (Reinsch), in which the oval cells are placed transversely, and

appear to be without the loose outer envelopes. The author does not state that the contents are not a bright, but a dull lurid green, very opaque. On endeavouring to preserve this plant, it "kept" not at all, colour became lost, envelope shrivelled, and even after a couple of days the examples did not represent the same thing as when fresh.

Thus the morphology of the plant points to an affinity with *Hormospora*, Bréb., which, too, has its forms with the elliptic cells placed longitudinally (*H. mutabilis* and others) and transversely (*H. transversalis*), but no *Hormospora*, except *H. ramosa*, Thwaites, appears attached; the contents, too, are bright green, and seem to show a characteristic internal arrangement not seen in *Cylindrocapsa*; the outer investment is also more mucous. As a form or a form-species (for, doubtless, such as those belonging to *Cylindrocapsa* and *Hormospora* can all be accounted no more, so long as no reproductive process is known) the present plant (*Cylindrocapsa involuta*) is, *per se*, abundantly distinct. It appears to be very rare, so does *C. nuda*, which I only once met with; neither is recorded by Rabenhorst in "Flor. Europ."

But whether these *Cylindrocapsa*-forms be mere stages of other growths—mere form-species—or permanent parthenogenetic species—at least, just as well as *Dictyosphærium*, *Palmodactylon*, *Cosmocladium*, *Mischococcus*, *Nephrocytium*, etc., etc., which keep recurring again and again—some very frequently, others very rarely—but all examples of each form always *alike*—they are entitled to hold a place for purposes of reference until happily more be, if ever, known as to their development and their right to rank as independent plants.

HOLLYHOCK DISEASE.

A writer in the "Gardener's Chronicle" has proposed a remedy for the Hollyhock disease, which, he hopes, will prove effectual. He says "this terrible disease has now for twelve months threatened the complete annihilation of the glorious family of Hollyhock, and to baffle all the antidotes that the ingenuity of man could suggest, so rapidly does it spread and accomplish its deadly work. Of this I have had very sad evidence, as last year at this time I had charge of, if not the largest, one of the largest and finest collections of Hollyhocks any where in cultivation, which had been under my special care for eleven years, and up to within a month of my resigning that position, I had observed nothing uncommon amongst them, but before taking my final leave of them I had to witness the melancholy spectacle of bed after bed being smitten down, and amongst them many splendid seedlings, which had cost me years of patience and anxiety to produce. And again, upon taking a share and the management of this business, another infected collection fell to

my lot, so that I have been doing earnest battle with this disease since its first appearance amongst us, and I must confess that, up to a very short time back I had come in for a great deal the worst of the fight, although I had made use of every agent I could imagine as being likely to aid me, and all that many competent friends could suggest. But lately I was reminded of Condy's patent fluid, diluted with water, and at once procured a bottle of the green quality and applied it in the proportion of a large tablespoonful to one quart of water, and upon examining the plants dressed, twelve hours afterwards, was delighted to find it had effectually destroyed the disease (which is easily discernible, as when it is living and thriving it is of a light grey colour, but when killed it becomes of a rusty black). Further, to test the power at which the plant was capable of bearing the antidote, without injury, I used it double the strength. This dose was instant death to the pest, leaving no trace of any injury to the foliage. As to its application, I advocate sponging in all dressings of this description. Syringing is a very ready means but very wasteful. No doubt sponging consumes more time, but taking into consideration the more effectual manner in which the dressing can be executed, alone, it is in the end most economical, especially in regard to this little parasite. I have found it difficult by syringing, as it has great power of resisting and throwing off moisture, and if but a very few are left living it is astonishing how quickly it redistributes itself. I feel confident that by the application of this remedy in time another season to keep this collection clean. I believe planting the 'Hollyhock in large crowded beds should be avoided, as I have observed the closer they are growing the more virulently does the disease attack them, whereas isolated rows and plants are but little injured."*

* "Gardener's Chronicle," August 22nd, 1874, p. 243.

NORTH AMERICAN FUNGI.

It is in prospect to publish a series of lists of the Fungi of the United States, each list to comprise an order, or suborder, or family, and such lists will be presented in one of the Botanical Journals of the United States. It is intended that these lists should be preliminary to the preparation of a Mycologic Flora of the States, and to render such a work moderately complete up to the period of its issue, it will be necessary to secure the co-operation of American Naturalists in correcting or adding to the preliminary lists, and in forwarding specimens to the editor. All Botanists willing to assist in this undertaking, are solicited to forward specimens and drawings of Fungi from their respective States. The editor guarantees that honour shall be accorded to whom honour is due, and that as well for authentication as in acknowledgment of service, the names of such contributors shall be as-

signed to the localities in the proposed lists and Flora. For Agarics and other fleshy fungi, drawings and sections will be necessary, accompanied by spores. For known and named species, some method of compensation will be devised, in the form of an equal number of named European species, to be sent to contributors. As so much depends on the co-operation of American Botanists to render this venture successful, it is hoped that they will make an effort in such a national work, and place themselves at once in communication with the Editor of this Journal.

NOSTOC AND COLLEMA.

By Professor HORATIO WOOD, M.D.

In his work on the Freshwater Algæ of the United States Dr. Wood thus alludes to the Collema question:—

As no sexual reproduction has as yet been shown to exist amongst the *Nostochaceæ*, it is very evident that their whole life-history is not comprised within the changes detailed. It has long been known that the gonidia of many lichens have the power of independent existence, *i.e.*, that when they are discharged from their thallus they can continue to live and multiply, if circumstances favour them, without giving origin to a new thallus. This and the great similarity of structure between the Nostocs and the lichen genus *Collema* has suggested a possibly close relation between the two. The first observer, I believe, who asserted that they were different stages of the same plant was Dr. Hermann Itzigsohn. His observations are, however, rendered of little value by his own statements. The most weighty observations upon this subject are those of Professor Julius Sachs and of J. Baranetzky, the former published in the "Botanische Zeitung" for 1855, the other in the "Bulletin of the St. Petersburg Academy" for 1867.

Professor Sachs states that he watched a whole bed of *Nostoc commune* developing into *Collema pulposum*. He says that the peculiar collemoid threads first appeared as little lateral offshoots or prolongations from the cells of the Nostoc filament, and rapidly developed into well formed collemoid filaments. Every possible stage from the typical Nostoc to the typical Collema was seen repeatedly. The development of the distinguishing threads of the *Collema* out of the ordinary Nostoc-cell has never been confirmed by any other observer; but it seems to me that it must be at least provisionally accepted, although De Bary expresses some doubt of it.

The researches of M. Baranetzky were directed to the developing of a Nostoc out of a Collema. Hicks and other observers had previously stated that they had seen this, but none of them had given sufficient details as to the method of their observations to be fully convincing. M. Baranetzky placed sections of actively growing fronds of *Collema pulposum* upon smooth damp earth, using all

proper precautions to prevent external influence. After some days the sections became less transparent, and intensely green from the crowding of the gonidia, which were now arranged in curved rows closely rolled together into balls. Upon the upper surface of the section appeared little gelatinous balls or warts, which contained gonidia in rows, and gradually developed typical Nostoc forms; whilst on the edges of the sections appeared little colourless wart-like masses of jelly, in which, after some time, appeared gonidia, some of which developed into the typical Nostoc form, others into true Collemoid plants.

M. Baranetzky further states that he watched the body of the section gradually change by the continual growth and increase of the rows of gonidia before alluded to, and by the disappearance of the Collemoid threads, until at last the whole mass of the tissue of the lichen had been converted into a true Nostoc, which was finally identified as *Nostoc vesicarium*, D.C.

I have no observations of my own to offer on this subject; but think enough has been done to show not only that the Nostocs proper have very close relations with the Collemoid lichens, but that they are probably a peculiar phase in their life history. This being the case, it may seem a superfluous work to indicate species among the Nostocs. To anyone who has given much study to the fresh-water algæ, the reply to this will immediately suggest itself, namely, that in the present state of the science it seems impossible to avoid it; they are so commonly thrust at one by collectors, amateurs, &c., are so distinct, are so often the subject of tongue and pen, that they must have a name. The idea that attaches to the term species is at present not a very definite one; that there are, however, among the Nostocs fixed forms, which do not change into one another, and can readily be distinguished, I have no doubt. Such forms are herein described. If they be only life stages of Lichen, I have no doubt that it will finally be found that each so-called species of Nostoc has its own peculiar so-called species of Lichens, from which it alone springs, and into which alone it can develop. It seems to me, then, that as yet no cause for abandoning the specific names of the Nostocs has been shown, but only reason to study also their relations with the various Collema.

SPHAGNUM TERES.—*Angstrom.*

This species is described and figured by Dr. Braithwaite in "Monthly Microscopical Journal," for July, 1874, plate 68.

Sphagnum teres.—Angs. Hartm. Shand. Fl., ed. 8, p. 417 (1861). *Sphagnum squarrosum* var. γ *teres*, Schimper Torfm., p. 64 (1858); Synop., p. 677 (1860).—Dioicous, in small tufts or intermixed with other species, soft, pale yellowish green, often with a ferruginous tint. Stems slender, 4-8 inches high, pale rufous red; the cortical cells non-porose, in three strata, the

woody zone red. Cauline leaves precisely like those of *Sphagnum squarrosum*. Ramuli distant, 4-5 in a fascicle, 2-3 divergent, terete; the leaves imbricated throughout, and only having the apices slightly recurved; broadly ovate, pointed, three-toothed, in structure agreeing with those of *S. squarrosum*. Cortical cells of branches in a single stratum.

Male amentula elongated, brownish, fertile, and thickened in the lower part, and beyond this extended into a slender sterile branch; the bracts broadly ovato-lanceolate, pointed, agreeing in structure with the branch leaves.

Fruit seated in the coma, or in the upper fascicles; the bracts resembling those of *S. squarrosum*.

Habitat:—About the edges of bogs and springs, in sub-alpine districts; sparingly distributed. In this country it has been found by Mr. Wilson at Knutsford Moor, Wybunbury Bog, and Newchurch Bog, in Cheshire; by McKinlay at Doune; and by Mr. Stabler at Staveley, Westmoreland.

This plant has usually been regarded as a variety of *Sphagnum squarrosum*, and Professor Lindberg, has recently expressed to me his coincidence with this view; structurally there is absolutely no distinction between them, but in external aspect *Sphagnum teres* closely resembles *Sphagnum strictum*. The beautiful and instructive specimens collected by Limpricht at Bunzlau, and distributed under No. 1,153 of Rabenhorst's Bryotheca, combine the characters of both, the upper part having the imbricated leaves of *S. teres*, the lower part the squarrose leaves of typical *S. squarrosum*. There is thus left to us only the dioicous position of the inflorescence, and the slight difference in the male amentula.

ON DICHÆNA RUGOSA.

By F. C. S. ROPER, F.L.S.

Mr. F. C. S. Roper has recently communicated his views on this somewhat anomalous plant to the Eastbourne Natural History Society, to the following effect. He says that the whole surface of the patches, when viewed with a low power, are granular or minutely tubercular, of a dull brownish-black colour, and in some cases tinged here and there with green. On making a section, it is found that these granular bodies arise from below the cuticle of the bark, but without any trace of mycelium penetrating the bark itself, as is commonly the case with fungi; they are of irregular outline, and enclose a cavity, opening by a pore, or rather slit, at the summit. This cavity is more or less filled with asci, or small sac-like bodies, which contain spores, surrounded with a mass of filaments called paraphyses, which are septate or jointed, and curiously bent or hooked at the summit. The number of spores in each ascus is variable, generally from two to six, though as the

spores are large, it is not improbable that the normal number is eight. The spores are oval, and the largest about .001 inch in length; they are filled with granular matter, of a pale brownish tinge, variegated by a mixture of bluish-green. These spores when mature escape through the aperture at the summit of the granules. Scattered over the edges, and at times imbedded between the plants, we find the masses of green bodies (gonidia) which are very minute, varying in shape from distinct circles to ovals or oblongs, encircled by a hyaline or transparent border with a double-cell wall. The green matter in the smaller of these bodies (which is probably chlorophyl) is homogeneous. In the larger we find segmentation commenced, and they are divided into two, four, or eight masses, separated by a distinct partition, but still enclosed in the hyaline cell wall. It must be remembered that each of these granular brownish-black bodies is a separate plant, and it is only by their rapid increase and aggregation into masses that the patch we see on the tree is produced. It is a matter of considerable difficulty to convey in writing a clear description of these minute forms of life. I may mention that no reaction is found on the contents of the perithecium either by potash or iodine.

The question first arises, after having ascertained its structure, Where are we to look for it? The general appearance is certainly that of a lichen, and the black oblong, or ovoid perithecia have much the appearance of some of the Graphideæ. The spores and asci give us no help, as they may belong either to a lichen or a fungus. The great difficulty arises from the presence of the green particles, termed gonidia, which are identical* with some of the Algæ, and have been figured and described under various names by Kutzing, Hassal, and others, as separate and distinct plants; but similar bodies are also found in lichens; and we find the Rev. M. J. Berkeley, one of our greatest authorities, in his "Introduction to Cryptogamic Botany" defines Fungi as "plants Hysterophytal (that is, living upon dead or living organic matter), or Epiphytal (that is, growing upon another plant) nourished by the matrix, never producing gonidia," whilst his definition of Lichens is, "Aerial, nourished by air, and not by the matrix, producing gonidia." Of course, with these definitions, anyone would naturally expect to find our plants amongst the Lichens, but a most careful examination of Leighton's "Lichen Flora," the latest and best work on this tribe, together with Mudd's "Manual" and other works, failed to show me any description that would agree in all respects with the appearance shown by the plant I have described. I then asked Mr. Muller to examine it, and ascertain if it could be a Fungus. The mixture of distinguishing

* If these bodies are free Algæ, similar to the bodies found in lichens, it certainly may lead to a wrong conclusion to apply the term "gonidia." Are they ever found enclosed in the substance or developed from the *Dichena*?—*Ed. Grevillea.*

characters was as great a puzzle to him as it had been to me, and he was unable to make out from Cooke's "Handbook" its exact position, but on carefully going through the Ascomycetous Fungi in Hooker's "English Flora," he found *Hysterium rugosum* described as "Stroma crust-like innate, brown-black, perithecia elliptic, bursting through the living bark, at length running together into irregular spots." This is said to be extremely common on the smooth branches of birch and oak. And Mr. Berkeley, who prepared this portion of the "British Flora," states also that it is usually referred to the order Lichens, from which, however, Messrs. Boorer and Hooker, in accordance with the views of Chevalier, Wallroth, and Fries consider it extraneous. Sir James Smith long since perceived its affinity with *Hysterium*, from which it differs in the presence of a stroma, and in its being produced on living bark. Reference is made to "English Botany," t. 2282, and on looking at the figure and description there given, as well as to the works of Fries, Acharius, and others, it was evident this was undoubtedly the plant we were in search of. The synonymy is curious, and well exemplifies the difficulty cryptogamic botanists find in clearly defining the limits of these lowly organized plants; for I find that ten well-known authors describe it as a Lichen, and six equally well-known place it amongst the Fungi, whilst it is rejected by both our latest authors on these plants, Mr. Cooke, in his "Handbook" (1871), merely mentioning the name of *Dichæna rugosa*, with the remark, "I think it should be included with Lichens," and the Rev. W. A. Leighton, in his "Lichen Flora," published the same year, taking no notice of it whatever.—*Monthly Micro. Journ.*

To these remarks of Mr. Roper on a very curious, and somewhat anomalous plant, we may at first suggest that his observations seem to strengthen the case in favour of regarding *Dichæna rugosa* as a Lichen. Unfortunately only part of the life history of the plant is given, as there is more than one form of fruit, one of which, the stylosporous condition which Rabenhorst calls *Psilospora*, is far more common than the ascigerous. There are two views taken of *Dichæna*, each supported by some plausibility. Assuming the presence of gonidia as a portion of the plant, its Lichenoid character is incontestible. Doubting the gonidia, but accepting the polymorphic fructification, its affinities are with Fungi. It is because we cannot convince ourselves that the so-called "gonidia" really belong to the plant, that we hesitate to exclude it wholly from association with Fungi. Since the publication of the "Handbook" we are by no means so strongly of opinion that its affinities are more with Lichens than Fungi. If with the latter, then its place in a systematic arrangement would undoubtedly be amongst the *Hysteriacei*, but most certainly not in the genus *Hysterium*. If Mr. Roper will carefully examine the plant again under various conditions, especially the other forms of

fruit, we think that he will arrive at the conclusion that the so-called "gonidia" in his communication are extraneous Algæ, and do not deserve the appellation he has given them. *Dichæna rugosa* is so very commonly covered with green algæ that an error of the kind is likely to occur.—[ED. GREVILLEA.]

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Grevillea,

A QUARTERLY RECORD OF CRYPTOGAMIC BOTANY
AND ITS LITERATURE.

NOTICES OF NORTH AMERICAN FUNGI.

By the REV. M. J. BERKELEY, M.A., F.L.S.

(Continued from page 32.)

526. **Sporidesmium sarcinula.** *B. & C.*—Minutissimum punctiforme; sporis quaternis nucleatis.

On bleached wood of *Liriodendron*. Pennsylvania, Michener. No. 6350.

Punctiform, very minute; spores consisting of four globose cells forming a square, each of which has a large nucleus.

527. **Sporidesmium pallidum.** *B. & C.*—Minutissimum punctiforme; sporis globosis e cellulis globosis compositis.

On fir. New England, Russell. No. 5945.

Punctiform very minute; spores pale, subglobose, composed of a number of globular enucleate rather loosely compacted cells.

528. **Sporidesmium aurantiacum.** *B. & C.*—Effusum aurantiacum; sporis subglobosis pedicellatis e cellulis globosis compositis.

On willow. Car. Inf. No. 1977.

Effused, orange; spores subglobose, seated on a hyaline, curved pedicel, composed of globose cells.

529. **Sporidesmium acinosum.** *B. & C.*—Tenue effusum nigrum; sporis globosis pedicellatis e cellulis globosis laxè compactis.

On oak wood.

Effused, black, punctiform under a lens; spores globose, seated on a hyaline pedicel, composed of loosely compacted globular cells, which are much larger than in the last species.

* **Sporidesmium nigrum.** *B.*—On oak rails. Car. Sup. Ravenel. No. 1496.

* **Sporidesmium antiquum.** *Cl.*—On pine logs. Car. Inf. Ravenel. No. 1537. Car. Sup. No. 728, 888. No. 2458, on pine, is a curious state of this species, with an incrassated hyaline base.

530. **Sporidesmium epicoccoides.** *B. & C.*—Effusum nigrum; sporis placentæformibus basi floccis brevibus radiantibus suffultis.

On plane. New England, Sprague. No. 6322.

Effused, black; spores globoso-depressed, sometimes irregular, with a few short radiating fibres at the base. No. 3054, Car. Inf., on *Baccharis*, seems to be an early state of the same species.

531. **Sporidesmium chartarum.** *B. & C.*—Maculis concentricis; sporis ellipticis triseptatis, iterumque verticaliter divisis. *Macrosporium chartarum*, Curt.

On decayed paper. Hillsborough. Car. Sup. No. 6419.

Forming little round velvety patches, which are made up of concentric flat spots; spores elliptic, with a short rather thick hyaline pedicel, at first horizontally septate, then divided vertically. In the first there are distinct nuclei, but not in the second.

532. **Sporidesmium sticticum.** *B. & C.*—Punctiforme; sporis oblongis triseptatis e basi cellulosa hyalina oriundis.

On the under side of plane leaves. Car. Sup. No. 661.

Dot-shaped, very minute; spores collected in little fascicles, tri-septate, oblong, nucleate, arising from a number of pedicels crowded into a common mass.

* **Sporidesmium concinnum.** *B.*—On dead wood. Car. Inf. No. 2268, 2269. Car. Sup. Ravenel. No. 1015. Ohio.

533. **Sporidesmium fusum.** *B. & C.*—Punctiforme; sporis fusiformibus multiseptatis.

On wood of *Magnolia acuminata*.

Dot-shaped, black; spores spindle shaped, .003 long, acuminate at either end, with many horizontal vertical and oblique septa.

534. **Sporidesmium asteriscus.** *B. & C.*—Punctiforme; sporis liguliformibus e duplici serie cellularum compositis.

On leaves of *Pycnanthemum*. Car. Inf. No. 1460.

Very minute, dot-shaped; spores radiating, strap-shaped, minutely pedicellate, composed of a double row of cells.

535. **Sporidesmium epiphyllum.** *B. & C.*—Punctiforme; sporis utrinque longe attenuatis sursum curvatis multiseptatis. *Coryneum epiphyllum*, Schwein.

On leaves of chestnut.

Dot-shaped; spores flexuous, attenuated below into a slender pedicel, above into a long hyaline curved process, .006 long; septa horizontal; enucleate.

* **Sporidesmium adscendens.** *B. Fungi of the Beagle.* On oak. Car. Inf. No. 2415. On *Nyssa*. No. 2170.

536. **Sporidesmium curvatum.** *B. & C.*—Punctiforme, congestum; sporis curvatis deorsum, sursum subfusiformibus multiseptatis.

On leaves of *Crataegus*. Car. Sup. No. 2561.

Dot-shaped, crowded; spores curved below, somewhat fusiform above, with numerous horizontal septa at the base, and divided vertically above. This is very like *S. vagum*, Nees, Cd., and I should

at once have referred it to that species, were not the habit and matrix so very different. In Corda's plant I find a nucleus in every cell, but not in this.

* **Dictyosporium elegans.** *Cd.*—On twigs of *Magnolia glauca*. Car. Inf. No. 4878.

537. **Gymnosporium fulvum.** *B. & C.*—Effusum tenue; sporis obovatis peroxydatis e strato pallido membranaceo oriundis. Journ. Linn. Soc., vol. x., p. 355.

On decayed wood. Car. Inf. Ravenel. No. 106, 601. Curtis. No. 2296. On *Peziza psammophila*. Alabama, Peters. No. 5224.

538. **Bactridium Ellisii.** *B.*—Pulvillis melleis; sporis late fusiformibus maximis.

On bleached maple. Potsdam. New York. Ellis. No. 204.

Forming little honey-coloured tufts, consisting of large trisepitate, short, pedicellate, fusiform spores, swelling in the middle. Externally closely resembling *B. flavum*, but the spores are very different, approaching those of *B. clavatum*, *B. & Br.*

539. **Helicosporium fuscum.** *B. & C.*—Effusum fuscum; sporis cirrhæformibus; spiris quinis tenuibus.

On pine wood. Car. Inf. No. 4960.

Forming a thin brown stratum; spores with about five whorls, continuous with a slender pedicel.

540. **Helicosporium brunneolum.** *B. & C.*—Parasiticum brunneolum; spiris binis crassiusculis.

New England, Sprague. No. 5404.

Parasitic on some *Helminthosporium*; spores scarcely forming two whorls, rather thick, with one or two septa, attenuated at the base. Approaching *Helicoma*.

* **Helicosporium aureum.** *Cd.*—On Pine wood. Car. Inf. No. 1777. On oak. No. 2239.

541. **Helicosporium griseum.** *B. & C.*—Parasiticum; sporis griseis tenuibus; spiris subbinis.

On dead wood. Car. Inf. No. 2446.

Forming a thin grey stratum; parasitic on some *Rhinotrichum*; spores grey, slender, spire with about two turns.

* **Aregma speciosum.** *Fr.*—On rose. Sartwell. No. 3075.

542. **Aregma triarticulatum.** *B. & C.*—Sporis clavatis triarticulatis pedicello æquatis.

On leaves of *Potentilla Pennsylvanica*. Pennsylvania, Michener. No. 4833. (*Aregma breve* MSS.). Canada, Poe. No. 6125.

Spores biseptate, articulations at length constricted, about equal to the pedicel, which is attenuated downwards. Accompanied by the imperfect form, which is *Uredo Potentillarum*, D.C.

* **Aregma mucronatum.** *Fr.*—On some species of *Ribes*. Texas, C. Wright. No. 3896.

* **Puccinia Graminis.** *P.*—On *Andropogon ciliatum*. Car. Inf. No. 1994. On *Phragmites*. No. 2319. On *Hordeum pratense*. Santee Canal. Ravenel. No. 1660. Car. Sup. No. 1754. Ohio, on *Dulichium spathaceum*. In a young abnormal state on *Andropogon*. Car. Inf. No. 1519. On *Bryzopyrum*. Rhode Island. Olney. No. 1835.

* **Puccinia striola.** *Lk.*—On grasses. Car. Sup. No. 146, 773. Canada, Poe. No. 6139. Santee River, Ravenel. No. 1662. On *Mariscus cylindricus*.

* **Puccinia Sorghi.** *Schwein.*—On Indian corn. Santee Canal, Ravenel. No. 1654.

* **Puccinia Arundinariæ.** *Schwein.*—Car. Inf. No. 2058, 2702.

* **Puccinia caricis.** *D.C.*—Car. Inf. No. 1497.

543. **Puccinia Aletridis.** *B. & C.*—Maculis nullis; sporis elongatis subfusiformibus apice papillæformi membranæ concentricis insigni.

On dying leaves of *Aletris aurea*. Car. Inf. No. 1766.

Spots none or obsolete, sori scattered over the surface; spores subfusiform, elongated, with a papillæform apex, which is composed of many concentric membranes.

544. **Puccinia mesomegala.** *B. & C.*—Epiphylla; maculis pallidis; seris circumantibus medio majoribus; sporis oblongis obtusis quandoque apiculo minuto, lævibus.

On leaves of *Clintonia borealis*. N. Hampshire, Sprague. No. 6254.

Spots pallid; sori concentric, those in the centre larger, rust-coloured; spores with a short pedicel, oblong, obtuse, with occasionally a minute apiculus.

* **Puccinia Smilacis.** *Schwein.*—On leaves of *Smilax pumila*. Car. Inf. Ravenel. No. 1401.

* **Puccinia Vaginalium.** *Lk.*—On *Polygonum Virginianum*. Canada, Poe.

* **Puccinia Bupleuri.** *Cd.*—On *Osmorhiza*. Car. Inf. No. 1815.

545. **Puccinia Astantiæ.** *B. & C.*—Hypophylla; maculis flavis; sori rubiginosis; sporis brevibus acutis.

On leaves of *Astrantia*. Canada, Poe. No. 6143.

Spots yellow; sori rust-coloured; spores short, acute, .0013 long. The spores of *P. saniculæ* are very obtuse.

* **Puccinia Saniculæ.** *Grev.*—Car. Inf. Ravenel. No. 1525.

* **Puccinia Menthæ.** *P.*—On *Monarda fistulosa*. Car. Sup. No. 772. Car. Inf. On *Ruellia*. On *Mentha canadensis*. New York. Sartwell. No. 3461.

546. **Puccinia lateripes.** *B. & R.*—Epiphylla maculis flavis vel nullis; sporis brevibus utrinque obtusis pedicello longo flexuoso laterali.

On leaves of *Ruellia*. Car. Inf. Ravenel. No. 1641.

Spots yellow or quite obsolete; sori scattered; spores short, obtuse at either end, almost horizontal, with a long lateral flexuous stem.

* **Puccinia Hyssopti.** *Schwein.*—On *Hyssopus nepetoides*. Pennsylvania, Michener. No. 4359.

* **Puccinia Compositarum.** *Schlecht.*—On *Cirsium lanceolatum*. Pennsylvania, Michener. No. 3519. Canada, Poe. No. 6145.

* **Puccinia Asteris.** *Schwein.*—Canada, Poe. No. 6154, 6155. 6136.

* **Puccinia Verbesinæ.** *Schwein.*—On *V. Siegesbeckia*. Car. Sup. No. 586. Santee River, Ravenel. No. 1667.

* **Puccinia Xanthii.** *Schwein.*—Car. Sup. No. 589. On *Ambrosia*. Car. Inf. No. 1337. Ravenel. No. 1644.

* **Puccinia Centaureæ.** *D.C.*—On *Conoelinium*. Car. Inf. No. 3788.

* **Puccinia investita.** *Schwein.*—On *Gnaphalium*. Pennsylvania, Michener.

* **Puccinia Helianthi.** *Schwein.*—On *H. decapetalum* and *H. tuberosum*. Car. Sup. No. 611. Car. Inf. No. 1458.

547. **Puccinia stromatica.** *B. & C.*—Soris effusis rubiginosis; sporis lævibus brevibus utrinque obtusis pedicello longo flexuoso.

On stems of *Clematis*. Peters. No. 3820.

Sori effused, rust-coloured; spores short, even, obtuse at either end, seated on a long flexuous pedicel, which is attenuated downwards.

* **Puccinia aculeata.** *Lk.*—On leaves of *Podophyllum*. Pennsylvania, Michener. No. 4411, with *Æcidium*. Signor Pasterini, has sent a somewhat similar species from Parma, on *Tulipa sylvestris*, which has oblong, not clavate spores, with sharper prickles.

548. **Puccinia spermacocis.** *B. & C.*—Hypophylla, maculis flavis parvis; soris rubiginosis; sporis brevibus lævibus utrinque obtusis pedicello brevioribus.

On leaves of *Spermacoce glabra*. Alabama, T. M. Peters. No. 3786.

Spots yellow, small, orbicular; sori rust-coloured; spores short, obtuse at either end, even, very slightly constricted, shorter than the hyaline stems.

* **Puccinia violæ.** *D.C.*—Canada, Poe. No. 6120.

549. **Puccinia tiarella.** *B. & C.*—Maculis pallidis; soris magnis rufis; sporis clavatis apice papillatis, pedicello brevi.

On leaves of *Tiarella*. Canada, Poe. No. 6146.

Spots diffuse, pale; sori large; spores clavate, .0002 long, obtuse, with a terminal papilla.

* **Puccinia saxifragarum.** *Schlecht.*—On leaves of *Tiarella*. Canada, Poe. No. 6128.

Spores .0013 long, much shorter and differently shaped from those of the last, though the species is very nearly allied.

* **Puccinia prunorum.** *Lk.*—On *Cerasus serotina*. Car. Inf. No. 3186. On plum. No. 2689. Texas, C. Wright. No. 3904.

550. **Puccinia lobata.** *B. & C.*—Sporis longe pedicellatis demum mitraformibus episporio hyalino crasso.

On *Sida lepidota*. Texas, C. Wright. No. 6400.

Spores with very long pedicels, at length divided above so as to be mitraform; episporium thick and hyaline. It is in fact the episporium which divides at the apex.

551. **Puccinia Waldsteinia.** *Curt.*—Maculis parvis roseis; soris magnis ut plurimum solitariis; sporis sursum incrassatis obtusissimis; pedicellis fuscis.

On leaves of *W. fragarioides*. New York, C. E. Howe. No. 6504.

Spots rose-coloured; sori large, generally solitary, firm; spores very obtuse, strongly constricted, upper cell large; pedicel brown.

* **Puccinia gentianæ.** *Strauss.*—Wisconsin, Dr. Sartwell. No. 3262.

552.—**Puccinia Ledi.** *B. & C.*—Maculis nullis; soris irregularibus congestis epidermide tectis; sporis pallidis, pedicellis elongatis crassis flexuosis.

On leaves of *Ledum latifolium*. New Hampshire, Sprague. No. 5771.

Epiphyllous, sori pale minute, often hysteriiform, nearly covered with the cuticle; spores oblong, linear, obtuse springing from thick hyaline pedicels which are attached to a cellular base. Sometimes two spores are borne by the same pedicel. This curious species at first looks like some *Uredo*.

553. **Puccinia crassipes.** *B. & C.*—Hypophylla; maculis obsolete; sporis pedicellis æquatis brevibus obtusis centro constrictis uninucleatis.

On leaves of *Ipomæa trichocarpa*. Santee Canal, Ravenel. No. 1656.

Spots obsolete; spores as long as the pedicel, obtuse, constricted in the centre, uninucleate. The spores are very different from those of *P. Convolvuli*, where the upper cell is much the broader, and very obtuse.

554. **Puccinia gonolobi.** *Rav.*—Hypophylla; maculis flavis, soris circinantibus; sporis brevibus utrinque obtusis medio constrictis, pedicellis basi sæpe obliquis. *Puccinia cynanchi*, Schwein. MSS. (Surinam.)

On leaves of *Gonolobus*. Santee Canal. No. 1671. Ravenel.

Spots yellow; sori circinating; spores short, obtuse, consisting of two nearly globose cells, constricted in the middle; pedicels sometimes incrassated at the base, oblique.

555. **Puccinia amorphæ.** *Curt.*—Maculis flavis; sporis brevibus obtusis, medio contractis; membrana separabili echinulata involutis.

On leaves of *Amorpha*. *Car. Inf.* No. 1990. *Ravenel.* No. 1672. Spots yellow; spores short, obtuse, contracted in the middle, covered with a distinct separable echinulate membrane. The membrane in *P. lobata* appears to be of the same nature.

556. **Puccinia suffulta.** *B. & C.*—Maculis pallidis orbicularibus; soris minutis; sporis articulo infero clavato, supero obovato.

On leaves of some undetermined plant. *Cotoosa Springs.* *Ravenel.* No. 1727.

Spots pallid, orbicular; sori minute, spores with the lower cell clavate and continuous with the pedicel, the upper cell obovate, with occasionally a terminal papilla; episporium made of three concentric membranes towards the apex. A very curious and anomalous species, of which further information is desirable.

557. **Puccinia microsperma.** *B. & C.*—Hypophylla; maculis roseis; soris minutis; sporis brevibus subfusiformibus, pedicellis brevibus.

On *Lobelia puberula*. *Car. Inf.* No. 2265.

Spots rose-coloured; sori minute; spores short, somewhat spindle-shaped; pedicels short.

558. **Triphragmium clavellosum.** *B.*—Soris in maculas orbiculares congestis epidermide cinctis nigris; sporis truncato-obovatis biseptatis; septo superiore verticali, processibus apice incrassatis emarginatis asperis.—“*Gard. Chron.*,” 1857.

On leaves apparently of *Amygdaleæ*. *St. Lawrence.* No. 5467. *Montreal, Dr. Maclagan.*

Forming orbicular black patches; sori surrounded by the cuticle. Spores at first oblongo-obovate, even, then truncato-obovate, with one horizontal and one vertical division, rough with clavate processes, emarginate at the tips.

559. **Triphragmium deglubens.** *B. & C.*—Soris sparsis nigris epidermide cinctis; sporis ellipticis pedicello crassiusculo brevi biseptatis; membrana exteriore echinulata deglubente.

On leaves of some leguminous plant. *Texas, C. Wright.* No. 3897.

Sori scattered; spores elliptic, with two horizontal septa; outer membrane minutely echinulate, peeling off.

* **Gymnosporangium juniperi.** *Lk.*—On *Juniperus Virginiana*. *Pennsylvania, Michener.* No. 4830.

* **Podisoma juniperi.** *Lk.*—On *Juniperus Virginiana*. *Car. Inf.* 1875. *New England, Sprague.* No. 5293.

* **Podisoma macropus.** *Schwein.*—On *Juniperus Virginiana.* Car. Sup. No. 38. Car. Inf. Ravenel. No. 960, 3028, 4951.

560. **Podisoma Ellisii.** *B.*—Filiformis pallescens, sporis 1-2 septatis longissimis fusiformibus.

On living white cedar in the Swamp, Newfield, N. Jersey, May, 1872, Ellis. No. 889.

Filiform, scattered, or two or three together, 1-1½ line high, white when dry, pale-orange when moistened; pedicels very long, flexuous, terminated by the long fusiform spores with one or sometimes two septa, .0038 long.

561. **Ravenelia glandulæformis.** *B. & C.*—Sporis urnæformibus deorsum hyalinis plicato-lobatis, sursum lævibus margine excedente.

On leaves of *Tephrosia spicata.* Car. Inf. No. 483. On *T. hispidula.* No. 459, 1461. On *T. hispida.* No. 1926. On *T. Virginiana,* Ravenel, and Upper Georgia. No. 1999.

Spores urnshaped, with a short pedicel, hyaline below and lobed or striate; even above, cellular, coloured, projecting beyond the lower division. In some specimens the lower division is even, and the cells of the upper part larger, but it is probably a mere form.

562. **Uromyces toxicodendri.** *B. & R.*—Effusus rufus; sporis ovatis obtusis apiculatisve lineis brevibus notatis.

On the stem, petioles and leaves of *Rhus toxicodendron.* Aiken. Ravenel. No. 1688.

Effused, rufous; spores ovate, obtuse or apiculate, marked with short lines somewhat like the sporidia of *Ascobolus furfuraceus.*

* **Uromyces staticis.** *B. & C.*—Fungi U. S. Exp., Exp. On leaves of *Statice.* California.

563. **Uromyces texensis.** *B. & C.*—Soris sparsis epidermide cinctis; sporis obovatis hispidis fuscis, nucleo magno cytoblasto addito.

On leaves of *Ruellia.* Texas, C. Wright. No. 3879.

Sori scattered, brown, surrounded by the cuticle; spores .0013 long, obovate, hispid, with a large nucleus which contains a cytoblast.

564. **Uromyces triannulatus.** *B. & C.*—Maculis nullis; soris fuscis epidermide cinctis globosis ellipticisve episporio triplici.

On leaves of *Borrchia frutescens.* Car. Inf. No. 2270.

Spots none; sori brown, surrounded by the cuticle; spores globose or elliptic; episporium consisting of three membranes.

565. **Uromyces pulcherrimus.** *B. & C.*—Soris fuscis in orbiculas congestis; sporis obovatis uninucleatis, pedicellis tenuibus longissimis.

On leaves of *Abutilon texense.* Texas, C. Wright. No. 3771.

Sori brown, collected into orbicular patches; spores obovate, .0006 long, or with the pedicel, .004.

* **Uromyces spermacocis.** *Schwein.*—On *Diodia teres.* Car. Sup. No. 578.

566. **Uromyces pluriannulatus.** *B. & C.*—Maculis nullis; soris cuticula arcte inclusis; sporis magnis nucleatis globosis, episporio concentric membranaceo.

Apparently on leaves of *Sanicula*. Alabama, Peters.

Spots none; sori closely imprisoned in the cuticle; spores globose, .0024 in diameter, the episporium consisting of many concentric membranes; outer membrane splitting off.

567. **Uromyces solidus.** *B. & C.*—Maculis nullis; soris punctiformibus; sporis compactis brunneis obovatis pedicello longo crasso.

On leaves of *Desmodium strictum*. Car. Sup. Ravenel. No. 1402, 1522. On *Desmodium*. Texas. C. Wright. No. 3882.

Spots none; sori dot-like, scattered; spores closely compacted, brown, obovate, with a long thick pedicel.

* **Uromyces apiculosus.** *Lér.*—On *Rumex verticillata*. Santee Canal, Ravenel. No. 1655. On *Eysenhardtia amorphoidea*. New Mexico, Dr. J. M. Bigelow. No. 6374. On *Trifolium Caroliniense*. Santee River, Ravenel. No. 1673. Pennsylvania. No. 3425. St. Lawrence, D. A. Poe. No. 5470.

* **Uromyces Lupini.** *B. & C. Fungi U.S. Exp., Exp.* On Lupine. California.

* **Uromyces Phaseoli.** *Strauss.*—On leaves of *Galactia pilosa*. No. 666. On *Phaseolus helvolus*. No. 1666. Santee River. Ravenel. No. 1377. Texas, C. Wright. No. 3888.

* **Uromyces Leguminosarum.** *Lk.*—On leaves of *Leguminosae*. Texas. C. Wright. No. 3886.

* **Uromyces appendiculosus.** *Lér.*—On leaves of *Desmodium canescens*. Car. Sup. No. 583. *D. Dillenii*. No. 606. *D. rhombifolium*. No. 610. *D. Marylandicum*. No. 608.

* **Uromyces leguminum.** *Desm.*—On pods of some leguminous plant. Connecticut, C. Wright. No. 5621.

568. **Uromyces myristica.** *B. & C.*—Maculis nullis; soris sparsis congestisve brunneis; sporis breviter pedicellatis ovatis punctatis.

On leaves of *Euphorbia bicolor*, with *Darlucalium*. Texas, C. Wright. No. 3890.

Spots none; sori scattered or crowded, brown; spores ovate, shortly pedicellate, dotted, .001 long, resembling miniature nutmegs.

569. **Coleosporium Vernoniae.** *B. & C.*—Maculis pallidis; soris parvis sparsis melleis; sporis ex obovatis subfusiformibus triseptatis.

On leaves of *Vernonia*. Alabama, Beaumont. No. 4643.

Spots pallid; sori small, scattered, honey-coloured, at first obovate, then subfusiform, triseptate, resembling those of *Bactridium*. There is a *Coleosporium* on *Rubus villosus*, Car. Inf., No. 1459, which may possibly prove new, but I have not sufficient materials. The joints are obversely wedge-shaped, and are sometimes alternately larger, projecting above on either side.

569a. **Pileolaria brevipes.** *B. & Rav.*—Pedicellis brevibus; sporis depresso globosis.

On leaves of *Rhus toxicodendron*. Cotoosa Springs, Georgia. Ravenel. No. 1722. Alabama, Beaumont. No. 4020.

Forming little specks on the underside of the leaves; stem short, flexuous; spores at first globose, with three coats, then depressed with a central nucleus, .00114in. diameter.

* **Graphiola Phœnicis.** *Poit.*—On *Chamærops humilis*. Texas, Wright. No. 4780.

569b. **Graphiola congesta.** *B. & Rav.*—Pseudoperidiis congestis elongatis.

On *Chamærops palmetto*. Coast of South Carolina. Ravenel. No. 1782.

Pseudoperidia forming a small mass, elongated. This is clearly a distinct species, but it is impossible to describe it properly from the specimens before me.

570. **Thecaphora pilulæformis.** *B. & C.*—Spores globoso-quadratis echinulatis argillaceis.

Infesting the achenia of some *Compositæ*. California, Coulter. Spores clay-coloured, containing four cells, echinulate.

570a. **Thecaphora carcinodes.** *B. & C.*—Soris maximis ellipticis e ramulis tumentibus; sporis globosis cellulis 4-6 hyalinis cinctis.

On stems of *Cimicifuga racemosa*. Pennsylvania, Michener. No. 4829.

Sori large, swelling out in elliptic masses; spores globose, surrounded by from four to six hyaline cells.

* **Cystopus candidus.** *Lév.*—On *Capsella*. Car. Inf. No. 283. Car. Sup. On *Dentaria epiphylla*. Kingston, Canada.

571. **Cystopus Amaranthi.** *Schwein.*—Pedicellis sursum incrassatis; sporis globosis concatenatis.

On leaves of *Amaranthus*. Car. Inf. No. 1225.

Pedicels incrassated upwards; spores concatenate, globose.

* **Cystopus cubicus.** *Mart.*—On leaves of *Convolvulus panduratus*. Car. Sup. No. 551. On *Ipomœa trichocarpa*. Car. Sup. No. 584. On *Convolvulus macrorhiza*. Ohio.

* **Ustilago Maydis.** *Lév.*—On Indian corn, causing great swellings. Car. Sup. No. 438.

* **Ustilago segetum.** *P.*—On oats. Car. Sup. No. 254. On *Syntherisma sanguinale*. No. 542.

* **Ustilago hypodytes.** *Tul.*—On *Arundinaria*. Car. Inf. No. 2385.

572. **Ustilago Maclagani.** *B.*—Sporis in spicis nidulantibus obovatis lævibus angulatisque.

On *Panicum virgatum*. Montreal, Dr. Maclagan. No. 545.

Not only altering the individual flowers, but making the whole

panicle shorter. Spores obovate, or somewhat angular, even, .0008-.00086 long.

573. **Ustilago fætens.** *B. & C.*—Fætidus; sporis incarcerationis globosis obovatisve lævibus.

On the seeds of wheat, which it infests exactly like *Tilletia caries*, with which it is equally fætid.

Spores globose, .0006 in diameter, quite even, and not reticulated as in *T. caries*, the spores of which, moreover, are larger, .0008in. diameter.

* **Ustilago Montagnei.** *Tul.*—On *Rhynchospora*. Car. Inf. No. 3015.

* **Ustilago axicola.** *B.* var.—On *Cyperus*. Alabama, Beaumont.

Spores elliptic, .0005 long.

574. **Ustilago Junci.** *Schwein.*—Soris e pedunculis tumentibus effusis nigris; sporis oblongis angulatisque irregularibus.

On *Juncus tenuis*. New York, Sartwell. No. 3451.

Forming circumambient black patches on the peduncles; spores irregular or angular, .0004 long.

* **Ustilago utriculosa.** *Tu'.*—On *Polygonum Pennsylvanicum*, Rhode Island, Bennett. No. 6330.

Var. **Rumicis.**—On *Rumex acetosella*.

Spores .00057in. diameter.

575. **Cronartium asclepiadium.** *Tul.* var. **Quercium.**—Valde elongatum curvum sparsum.

On leaves of *Quercus nigra*. Car. Inf. No. 3178. On *Quercus tinctoria*. Pennsylvania, Michener. No. 3521.

It is possible that this may be a distinct species, but I have not materials to decide the point.

* **Ræstelia lacerata.** *Tul.*—On *Cratægus punctata*. Car. Sup. No. 161, 182, 350. *C. crus galli*. No. 180. *C. cordata*. No. 243. On *Pyrus angustifolia*. No. 277. Car. Inf. 1198, 1226. *C. coccinea*. Canada West, Dr. MacLagan. No. 427. Missouri, Engelmann. On quince. New England, Russell. No. 5934.

576. **Peridermium Pini.** *Chev.* var. **minor.**—Pseudoperidiis subcylindricis brevibus nec inflatis ambientibus innumeris.

On *Ephedra antisiphilitica*. Texas, C. Wright. Dr. Woodhouse. On *Abies*. New York, Catskill. No. 3987.

Distinguished from the common form by the far more numerous, shorter, and smaller subcylindrical pseudoperidia.

* **Æcidium Dracontiatum.** *Schwein.*—On spathe and leaves of *Arum triphyllum*. Hickory Island. Dr. MacLagan. No. 469.

* **Æcidium Ari.** *B.*—Rhode Island. No. 1793.

* **Æcidium Podophyllatum.** *Schwein.*—Ohio.

577. **Æcidium proserpinacæ.** *B. & C.*—Hypophyllum; pseudoperidiis sparsis margine radiatis; maculis nullis.

On leaves of *Proserpinaca*. Alabama, Beaumont. No. 5099.

Scattered over the surface of the leaves; margin of pseudoperidia radiated, spots none.

* **Æcidium cressa.** *D.C.*—On *Evolvulus*. New Mexico, Dr. Bigelow. No. 6373.

* **Æcidium Ipomææ.** *Schwein.*—On leaves of *Ipomæa trichocarpa*. Santee River. No. 1656.

* **Æcidium compositarum.** *Mart.*—On *Lechea major*. Car. Inf. No. 1659. Alabama, Peters. No. 3992. On leaves and petioles of *Mikania*. Car. Inf. No. 1922.

* **Æcidium compositarum.** *Mart.* β **Eupatoriæ.** *Schwein.*—On *Eupatoria maculata*. Santee River. Ravenel. No. 1644. On *E. purpurea*. Grosse Isle, Detroit River, Dr. Maclagan. No. 328.

578. **Æcidium Bahiæ.** *B. & C.*—Totam frondem deformans, pseudoperidiis gregariis innumeris radiatis.

On leaves of *Bahia*, which are entirely covered by the radiated pseudoperidia, and deformed.

* **Æcidium gnaphaliatum.** *Schwein.*—On *Gnaphalium polycephalum*. Pennsylvania, Michener.

* **Æcidium sambucinum.** *Schwein.*—On leaves of *Sambucus canadensis*. Alabama, Peters. No. 4541.

When it occurs on branches they are strangely distorted.

* **Æcidium cimicifugatum.** *Schwein.*—Mountains of Virginia. No. 3693. Amherstburg, Dr. Maclagan. No. 429. On *Actæa racemosa*. Ohio.

* **Æcidium ranunculacearum.** *D.C.*—On *Ranunculus abortivus*. Amherstburgh, Dr. Maclagan. No. 513.

Occupying the whole under surface.

* **Æcidium thalictri.** *Grev.*—Montreal, Dr. Maclagan. No. 530. Canada, Poe. No. 6163.

* **Æcidium leucospermum.** *D.C.*—On *Anemone nemorosa*. Dr. Maclagan. No. 462.

* **Æcidium barbareae.** *D. C.*—Carlton. Palliser's Expedition.

* **Æcidium clematidis.** *D.C.*—On *Clematis angustifolia*. Columbia River, Lyall.

Distorting the petioles.

* **Æcidium geranii.** *D.C.*—On *Geranium maculatum*. Sugar Island. Detroit River, Dr. Maclagan. No. 320.

579. **Æcidium pteleæ.** *B. & C.*—Maculis pallidis hypophyllis extrorsum bullatis; pseudoperidiis congestis brevibus radiatis.

On leaves of *Ptelea*. Alabama, Peters. No. 4614.

Spots pallid, in a hollow on the underside of the leaves ; pseudoperidia crowded, short, radiated.

* *Æcidium violæ*. D.C.—Canada, Poe. No. 6162. Hickory Island. Detroit River, Dr. Maclagan. No. 482.

580. *Æcidium Petersii*. B. & C.—Pseudoperidiis gregariis cylindricis e macula flava oriundis.

On petiole of violet. Alabama, Peters. No. 4007.

Pseudoperidia gregarious, cylindrical, seated on a yellow spot. Distinct from the last.

581. *Æcidium hypericorum*. B. & C.—Hypophyllum ; maculis nullis ; pseudoperidiis paucis in orbiculas parvas dispositis.

Alabama, Peters. No. 4577.

Hypophyllous ; spots none ; pseudoperidia few, short, collected into little orbicular patches ; not the same with *Æ. hypericatum*.

* *Æcidium epilobii*. D.C.—On *Ludwigia*. Santee River. Ravenel. No. 1722. On *Isnardia alternifolia*. Ohio.

* *Æcidium Claytoniatum*. Schwein.—On *Claytonia Caroliniana*. Montreal, Dr. Maclagan. No. 541.

* 582. *Æcidium hydnoideum*. B. & C.—Maculis orbicularibus rufulis ; pseudoperidiis albis obtusis circinantibus sero apertis.

On *Dirca palustris*. Alabama, Peters. No. 3994.

Spots pale rufous, orbicular ; pseudoperidia circinating, white, obtuse, at length opening.

* *Æcidium hibisciatum*. Schwein.—On *Hibiscus moschatus*. Alabama, Peters. No. 3999.

* *Æcidium grossulariæ*. D.C.—Canada, Poe. No. 6161. On *Ribis cynosbata*. Kingston.

583. *Æcidium pulcherrimum*. Rav. — Pseudoperidiis niveis cylindricis totam superficiem occupantibus obtusis dein apertis nec radiatis.

On *Berchemia*. Car. Inf. No. 1799.

Pseudoperidia occupying the whole surface, snow-white, cylindrical, obtuse, at length open ; edge not radiated.

* *Æcidium Orobi*. D.C.—On *Psoralea floribunda*. Texas, Capt. Pope. No. 4844. On *Desmodium*. Alabama, Peters. No. 4582. On *Trifolium*. Canada, Poe. No. 6158.

Var. *leucostictum*, pseudoperidiis minutis sparsis vel parce congestis. On *Lespedeza angustifolia*. Minute, scattered, or collected into small patches. Var. *elegans*, hypophyllum totam superficiem occupans nec congestum ; pseudoperidiis apertis.

On *Trifolium Caroliniense*. Car. Inf. Ravenel. No. 2591. Occupying the whole under surface of the leaf ; pseudoperidia open.

* *Æcidium fraxini*. Schwein.—On *Fraxinus Americana*. Pennsylvania, Michener. No. 4832.

584. *Isaria radiata*. *B. & C.*—Prostrata radians albida receptaculis filiformibus obtusiusculis; sporis globosis.

On pine wood. Alabama, Peters. No. 6397.

Forming little patches on the wood, consisting of radiating filiform, rather obtuse, whitish receptacles, which become yellowish when dry, simple, except at the very base, composed of jointed threads, which towards the base are less closely compacted and without septa; spores globose, .0002in. diameter.

585. *Isaria brevis*. *B. & C.*—Candida, receptaculis brevibus linearibus obtusis fasciculatis hispidis; sporis globosis.

On decayed wood. Pennsylvania, Michener. No. 3607.

Receptacles forming little fascicles, very short, white, at length pale yellow, linear, obtuse, hispid; spores globose.

586. *Isaria congesta*. *B. & C.*—Receptaculis congestis gilvis deorsum nodosis apice nodulosis; sporis minutissimis, elliptico-oblongis.

On *Sphæria densta*. Car. Inf. No. 3014.

Forming little reddish-grey groups, composed of irregular processes, which below are slender, straight, with three or four knots, incrassated above, and nodular; spores confined to the tips, very minute, oblong, elliptic. This is possibly the young state of some *Hypoxylon*. Besides the above are known conditions of *Sphæriacci* under the following numbers:—*Isaria umbrina*, P. On *Platanus*. Car. Inf. No. 3020. Ravenel. No. 1421. *Isaria Sphingophila*, Schwein. No. 2986. *Isaria farinosa*. No. 1727. *Young Xylaria*. No. 5475. Alabama, Peters. No. 3199, on a chrysalis, appears to be something closely allied to the disease in silkworms called Pebrine.

* *Ceratium hydroides*. *A. & S.*—On dead wood. Car. Inf. No. 1125, 1128. Alabama, Peters. No. 4535. Beaumont. No. 4610.

587. *Ceratium crustosum*. *B. & C.*—Receptaculis brevibus in plagas parvas candidas porosas congestis; sporis oblongis.

On decayed wood. New Jersey. No. 4600.

Forming little crust-like white porous spongy patches, one to two lines or more in diameter; receptacles short; spores oblong, .0005 long, sometimes elliptic or cymbæform, very abundant. No. 5684. New England. Murray. May be a distinct species, but the specimens are in bad condition.

* *Pachnocybe subulata*. *B.*—On wood of *Acacia Julibrissin*, &c. Car. Inf. No. 1155, 1168.

588. *Pachnocybe rosea*. *B. & C.*—Minuta rosea clavata; sporis elongato-oblongis; endochromate utrinque retracto.

On bark of *Robinia*. Car. Inf. No. 1817.

Minute, rose-coloured, receptacles cylindrical below, dilated upwards, and at length clavate; head tomentose; spores oblong, with the endochrome retracted to either end; sometimes slightly curved.

589. **Stilbum Spraguei.** *B. & C.*—Minutum fasciculatum deorsum tomentosum, album e mycelio lateritio oriundum; capitulo lateritio.

On decayed cabbage stalks. New England, Sprague. No. 5356.

Forming little fasciculate groups, springing from a brick-red mycelium; minute, white and tomentose below; head subglobose, brick-red. Sometimes the mycelium runs up the receptacle. This may possibly be a state of some *Sphaerostilbe*, under which *S. lateritium* and its allies will be recorded.

* **Stilbum tomentosum.** *Schrad.*—On *Arcyria cinerea*. Santee River. No. 1567.

590. **Stilbum carcinophthalmum.** *B. & C.*—Minutum, stipite candido; capitulo globoso aurantiaco; sporis minutissimis oblongis.

On dead stem of *Pastinaca*. Car. Inf. No. 2670.

Minute; stem short, white; head globose, pale orange, resembling a crab's eye; spores minute, oblong, subelliptic.

* **Stilbum fimetarium.** *B.*—On dung. Car. Inf. No. 2572.

591. **Stilbum annulatum.** *B. & C.*—Sparsum; stipite brevi rufo; capitulo basi annulato concolore.

On decayed cabbage stalks. Car. Inf. No. 6045.

Scattered, minute; stem short, rufous; head at first white, then rufous, with a pallid ring at the base.

592. **Stilbum lichenoideum.** *B. & C.*—Stipite brevissimo crassiusculo albo tomentoso; capitulo maximo lichenoideo subcarneo.

On dead wood of *Juniperus Virginiana*. Pennsylvania, Michener. No. 4054.

Stem very short, cylindrical, rather stout, white, tomentose; head large, looking like the apothecium of a lichen, flesh-coloured.

593. **Stilbum vellereum.** *B. & C.*—Stipite cylindrico albo, basi villosulo; capitulo concolore globoso e floccis furcatis verticillatisque tomentoso; sporis minutis globosis.

On the under side of decaying wood. Pennsylvania, Michener. No. 4059.

Scattered, white; stem cylindrical, densely villous at the base; head globose, consisting of forked verticillately branched flocci, which slightly project. Spores globose, very minute, .000125 in. diameter.

594. **Stilbum aleuriatum.** *B. & C.*—Stipitibus e basi communi oriundis pruinosis; capitulis aurantiacis; sporis minutis oblongis.

On decayed wood of *Acer negundo*. Texas, Wright. No. 3782.

Stems of various length, cylindrical or irregular flexuous, springing from a common base, pruinose; head small, pale orange; spores oblong, .00014 long.

* **Stilbum vulgare.** *Tode.*—On dead wood. Maine, Sprague. No. 5360.

* **Stilbum rigidum.** *P.*—On dead twigs of *Carya*. Car. Inf. No. 3761.

595. **Stilbum rhoidis.** *B. & C.*—Stipite sursum attenuato cinereo; capitulo nigro; sporis oblongis. (*Periconia Rhois*, Schwein.)

On bark of *Rhus copallina*. Car. Inf. No. 1445.

Stem cinereous, attenuated upwards; head globose, black, sometimes proliferous; spores oblong. The stem varies a good deal in thickness.

596. **Stilbum leucocephalum.** *B. & C.*—Stipite elongato nigro granulato, capitulo elliptico candido hispidulo; sporis subglobois.

On bark of *Carya*. Car. Inf. No. 2410. Stem black, elongated, slightly dilated at the base, granulated; head elliptic, minutely hispid, white; spores subglobose or shortly subelliptic. *Atractium* comes under *Sphaerostilbe*. *Tubercularia* is omitted as consisting of mere conditions of *Nectria* or other *Sphaeriacei*.

597. **Hyalopus parasitans.** *B. & C.*—Albus minutus; stipite sursum attenuato; capitulo obovato subirregulari; sporis oblongis. minutissimis.

Parasitic, on a decayed *Merulius*. Car. Inf. No. 2475.

Stem with a few articulations, coated below, attenuated upwards, when barren very acute; head large, obovate, rather irregular; spores very minute, shortly oblong.

598. **Hyalopus mucorinus.** *B. & C.*—Albus; stipite filiformi inarticulato; capitulo clavato; sporis minimis globosis.

On hen's dung. Car. Inf. No. 2759.

Stem slender, white, simple, without any articulations; head clavate, about $\frac{1}{2}$ as long as the stem; spores very minute, globose.

599. **Hyalopus griseus.** *B. & C.*—Effusus griseus; floccis mycelii decumbentibus articulatis, fertilibus inarticulatis; capitulo clavato; sporis oblongis.

On wood, under the bark of *Nyssa*. Car. Inf. No. 2688.

Effused; threads of the mycelium decumbent, articulated; fertile threads inarticulate, pale flesh coloured; heads clavate, $\frac{1}{4}$ as long as the stem; spores oblong, abundant, grey.

CHONDROMYCES. *B. & C.*

Stipes e floccis compactus ramosus induratus; sporae apicales. Berk. Crypt. Fl. cum icone.

600. **Chondromyces crocatus.** *B. & C.*—On decayed melons. Car. Inf. No. 1335.

Stem closely compacted, orange, subcartilaginous, branched, the branches more or less divaricate, nodular at the apex; spores elongato-ovate, with a very short pedicel.

NEW BRITISH FUNGI.

By M. C. COOKE.

[Continued from Vol. II., p. 166.]

Phoma errabunda. *Desm.*

Perithecia erumpent, minute, very numerous, crowded or scattered, globose, black, somewhat shining, at length depressed, corrugated, ostiola papillate, pierced; spores very minute, oblong, obtuse.—*Desm. Ann. des Sci. Nat.*, 1849, vol. xi., p. 282. *Cooke Fungi Britt.*, No. 619.

On stems of *Verbascum*, &c.

Phoma subordinaria. *Desm.*

Perithecia minute, numerous, subseriate, ovate, convex, covered by the cuticle; ostiola minute, naked, then deciduous; spores oblong.—*Desm. Ann. des Sci. Nat.*, 1849, vol. xi., p. 284. *Cooke Fungi Britt.*, No. 617.

On *Plantago lanceolata*. King's Lynn (C. P. B.).

Diplodia syringæ. *And.*

Somewhat gregarious, sometimes in irregular lines, cortical; perithecia globose, black, ostiola rather prominent, elevating and piercing the cuticle; spores elliptical, at length uniseptate and coloured.—*Fckl. Fungi Rhen.*, 1950. *Cooke Fungi Britt.*, No. 626.

On twigs of *Syringa vulgaris*. King's Lynn (C. B. P.).

Sporidesmium cladosporii. (*Corda*) *Fckl.*

Effused in dark olivaceous patches; spores ovoid, cellular, at length brown and opaque.—*Corda Icon. i.*, fig. 118. *Fckl. Fungi Rhen.*, No. 110. *Cooke Fungi Britt.*, No. 679.

On stems of *Scrophularia*. Darenth, &c.

Corda was of opinion that this was parasitic on species of *Cladosporium*. Our specimens accord with those published by Fockel, but we are doubtful as to its parasitism.

Phragmidium bullatum. *West.*

Epicauline. Sori elongated, pulvinate, for a very long time covered with the epidermis, which is rendered bullate, then fissured irregularly, and ultimately thrown off. Pseudospores cylindrical, 5-7 septate, mucronate at the apex, epispore rough, pedicel short, hyaline, rather thickened at the base.—*Westendorp, Bull. des Brux.* 4 notice, No. 44. *West. & Wall, Herb. Belge*, No. 1069. *Kickx. Flor. Fland.*, ii., p. 69.

On twigs of *Rosa canina*. Barnet.

Quite distinct from *Phragmidium speciosum*, Fr., which is also epicauline, but with shorter pseudospores and much longer pedicels.

Ramularia armoraciæ. *Fckl.*

Tufts lax, white, seated on a bleached orbicular spot; flocci fasciculate, simple, conidia cylindrical, somewhat ventricose, simple.—*Fckl. Sym. Myc.*, p. 361, t. i., fig. 24. *Cooke Fungi Britt.*, No. 638. *Grevillea, Vol. ii.*, p. 186. *Oidium fusisporioides*, *Fckl. Fungi Rhen.* No. 133.

On leaves of horseradish. King's Lynn (*C. B. P.*).

This is undoubtedly the conidia, of which *Ascochyta armoraciae* (*Depazea Brassicæcola*, Fr.) is the stylosporous condition, and *Sphærella Brassicæcola*, Not. ("Handbook," No. 2768), the ascophorus state.

Macrosporium cladosporioides. *Desm.*

Effused, forming large patches, irregular, velvety, dark olive. Flocci simple, nodulose, septate, united in fascicles. Acrospores somewhat pellucid, often torulose, unequal, ovoid, oblong or clavate, cellular.—*Desm.*, in *Bull. Soc. Bot. Fr.* (1857). *West, Bull. Soc. Bot. de Belg.*, ii., p. 251. *Kickx. Flora* ii., 295. *Cooke Fungi Britt.*, No. 620.

On stems of *Arctium Lappa*. Kensington.

Leotia circinans. *Pers.*

Pileus fleshy, convex, at length undulate, margine involute, decurrent beneath in nerves with the stem, stem fistulose subpulverulent, asci ovate oblong; sporidia linear, equal in length to the ascus, somewhat curved when free.—*Pers. Ic. & Descr.*, p. 16, t. 5, f. 5-7. *Fries Sys. Myc.* ii. 27. *Cudonia circinans*, *Fckl. Sym. Myc.*, 332. *Fckl. Ex.*, 1139.

In fir woods. Scotland.

Very distinct from *Leotia lubrica*. Colour pallid. Exhibited at the Fungus Show, South Kensington.

Peziza (Sarcoscypha) Dalmeniensis. *Cooke.*

Hemispherical, then expanded, bright yellow; cups fleshy, nearly plane, margin elevated, externally beset with long rigid brown hairs. Asci linear; sporidia elliptical, hyaline, enucleate, smooth.

On the ground in woods. Dalmeny, N. B. Sept.

At first sight greatly resembling *Peziza theleboloides*, but the external hairs are coloured, and five or six times as long; the sporidia are not more than half the size. [Plate xxxiv., fig. 121.]

Peziza (Patellea) cerastiorum. *Wallr.*

Gregarious, innato-sessile, minute, somewhat waxy, rather concave, marginate, testaceous, becoming pallid; asci clavate; sporidia oblong.—*Fries Sys. Myc.* ii., p. 153. *Desm. Ex.*, No. 1068. *Cooke Fungi Britt.*, No. 655. *Lib. Exs.* No. 28. *West & Wall.*, No. 1081. *Kickx. Flor. Hand.* i., 481.

On living chickweed. Chichester (*Dr. Paxton*).

Peziza (Mollisia) filispora. *Cooke.*

Scattered or subgregarious, soft; cups hemispherical, then flattened, externally horn-colour or tawny, brown when dry, and connivent; disc pallid dirty-white, slightly concave; asci cylindrical, clavate; sporidia filiform, straight or curved, triseptate; paraphyses filiform, simple.

On sheaths of grass.

Allied to *Peziza excelsior*, Karst.

Hysterium (Lophodermium) sphaerioides. 'A. & S.

Innato-superficial, scattered, hemispherical, swollen, even,

shining, brownish-black; lips broad, convex, opening with a longitudinal straight fissure, more or less separating, at length broken or collapsing; asci cylindrical; sporidia filiform, hyaline.—*Alb. & Schw.*, t. 10, f. 3. *Duby Hyst.*, p. 44.

var. **Rhododendri**. Ces. = *Lophodermium Rhododendri*, Ces., in *Rabh. Fung. Eur.*, No. 458. *Rehm. Ascomy*, No. 126.

On leaves of *Rhododendron*. Shere (*Dr. E. Capron*).

Melanconis modonia. Tul.

Conidia nestling beneath the bark, at length erumpent, olive-brown, oblong-elliptic, 6-septate.

Ascophore—Perithecia globose or depressed, few together arranged in circles penetrating the bark, with rather short ostiola, and forming small pustules; asci cylindrical; sporidia biconical, uniseriate, hyaline.—*Cooke Fungi Britt.*, No. 681. *Tulasne Sel. Fung. Carp.* ii., p. 141. *Fckl. Sym. Myc.*, p. 188. *Fckl. Exs.*, 2006. *Valsa biconica*, Curr. ("Handbook," No. 2491).

On dead twigs of *Castanea vesca*. Darenth. May.

Sporidia $\cdot 0014 \times \cdot 0003$ in. $\cdot 036 \times \cdot 01$ m.m.

Cucurbitaria Euonymi. Cooke.

Gregarious, subcuticular; perithecia subglobose, at length somewhat erumpent, often wholly concealed by the cuticle, except the small scarcely prominent ostiola; asci clavate, sessile; sporidia elongated, elliptical, constricted in the middle, multicellular, brown.—*Cooke Fungi Britt.*, No. 683.

On twigs of *Euonymus*, often with *Sphæria Laschii*. Mickleham. June.

Sporidia ($\cdot 001$ in.) $\cdot 025$ m.m. long, resembling *Cucurbitaria spartii*, Not.

Lophiostoma Hederæ. Fckl.

Perithecia scattered, nestling beneath the epidermis, rarely free, of medium size, globoso-compressed, quite black; ostiola prominent, broadly compressed, semi-orbicular, somewhat crenulate; asci elongated, sessile; sporidia biseriate, fusiform, curved, 4 nucleate, then triseptate, hyaline.

On ivy twigs. Eastbourne (*C. J. Muller*).

Sporidia ($\cdot 0007 \times \cdot 0015$ in.) $\cdot 02 \times \cdot 004$ m.m.

Sphæria (Diaporthe) Euphorbiæ. Cooke.

Forming irregular, determinate, elongated black patches; perithecia nestling beneath the blackened cuticle, which is slightly elevated by the ostiola; asci subcylindrical; sporidia subfusiform, quadrinucleate, hyaline.—*Cooke Fungi Britt.*, No. 674.

On dead stems of wood spurge. Darenth. May.

Sphæria (Diaporthe) scobina. Nke.

Stroma broadly effused; perithecia small, nestling in the inner bark, aggregated, subglobose or rather compressed; ostiola cylindrical, piercing the cuticle; asci narrowly fusiform, obtuse, quadrinucleate.—*Nke. Pyr. Germ.*, p. 293. *Fckl. Fungi Rhen.*, No. 2258. *Cooke Fungi Britt.*, No. 673.

On dead twigs of ash. Darenth. April.

Forming blackened irregular patches, seated beneath the cuticle, which is loosened, somewhat inflated, and at length fugacious. Sporidia ($\cdot 0004 \times \cdot 00015$ in.) $\cdot 011\text{-}\cdot 012 \times \cdot 004$ m.m.

Sphæria (Diaporthe) Laschii. *Nke.*

Stroma broadly effused, innate, blackening the bark; perithecia nestling in the parenchyma of the bark, globose, attenuated into an abrupt neck; ostiola rather thick; asci clavate, sessile; sporidia fusiform, 4 nucleate, then 4 celled, hyaline.—*Nke. Pyr. Germ.*, p. 292. *Fckl. Sym. Myc.*, p. 208. *Cooke Fungi Britt.*, No. 682.

On twigs of *Euonymus Europæus*. Mickleham.

Sporidia ($\cdot 0003\text{-}\cdot 0005 \times \cdot 00011\text{-}00015$ in.) $\cdot 008\text{-}\cdot 014 \times \cdot 003\text{-}\cdot 004$ m.m.

Sphæria (Diaporthe) occulta. *Nke.*

Perithecia covered by the thin black stroma, globose, black; ostiola exserted, sometimes much elongated, terete, acute; asci narrowly clavate; sporidia oblong or narrowly elliptical, attenuated at each end, quadrinucleate, hyaline.—*Nke. Pyr. Germ.* p. 266. *Fckl. Sym. Myc.*, p. 210. *Fckl. Exs.*, No. 622.

On scales of fir cones. Eastbourne (*C. J. Muller*).

Sphæria cetrariicola. *Nyl.*

Perithecia somewhat gregarious, minute, black, rather prominent. Asci octosporous, sporidia oblong, 1-3 septate, colourless. Paraphyses none. *Nyl. MSS. in litt.*

On *Cetraria Islandica*. Braemar (*Rev. J. M. Crombie*).

The specimen is deposited in the Herbarium of the British Museum.

Sphæria Bryoniæ. *Fckl.*

Perithecia nestling beneath the epidermis, at length nearly free, gregarious, very minute, globoso-depressed, papillate, black; asci oblong, attenuated at the base, obtuse; sporidia biseriata, oblong, or somewhat clavate, unequally bicellular, the upper cell large, the lower obconical, obtuse, hyaline.—*Fckl. Sym. Myc.*, p. 112. *Fckl. Exs.* No. 2318.

On stems of *Bryonia dioica*. Shere, 1873. (*Dr. Capron*.)

Sporidia ($\cdot 0007$ in.), $\cdot 015\text{-}\cdot 017$ m.m. long.

Sphæria (Pleospora) culmorum. *Cooke.*

Perithecia scattered, erumpent, globose, black, with a papillate ostiolum; asci clavate, sporidia elongated elliptical, triseptate, one cell transversely divided, pale brown.—*Cooke Fungi Britt.*, No. 694.

On dead culms of grasses, straw, &c. Irstead.

The sporidia are much more characteristic and distinct than in many of the forms associated under *Pleospora*. This is different from *Sphæria infectoria*, *Fckl.* ("Handbook," No. 2693). Sporidia ($\cdot 0012\text{-}\cdot 0015$ in.) $\cdot 025\text{-}\cdot 035$ m.m. long.

Sphærella ditricha. *Fr.*

Gregarious, seated on grey spots; perithecia hemispherical, small, black, mixed with a few erect hairs; asci fasciculate, oblong,

curved; sporidia oblong-obovate, unequally uniseptate, hyaline.—*Fries Sys. Myc.*, 515. *Fckl. Sym. Myc.*, p. 100. *Cooke Fungi Britt.*, No. 688. *Fckl Exs*, No. 568.

On dead leaves of birch. Darenth.

Sporidia ($\cdot 0005 \times \cdot 00025$ in.), $\cdot 014 \times \cdot 006$ m.m.

Sphærella hederæcola. *Fr.*

Spots whitish, suborbicular or irregular, with a rather broad brown margin, perithecia gregarious, minute, globose, opaque, becoming black, at length naked; stylospores linear, slender, straight, in distinct perithecia; asci subcylindrical; sporidia minute, narrowly elliptical, uniseptate, hyaline.—*Fries Sys. Myc. ii.*, 528.

On green ivy leaves. Shere (*Dr. Capron*, 1873).

Sporidia ($\cdot 0004$ in.), $\cdot 01$ m.m. long.

In habit precisely like *Septoria Hederæ*, of which it is undoubtedly the perfect condition.

Sphærella atomus. *Desm.*

Epiphyllous. Spots rufous, minute, somewhat orbicular; perithecia very minute, numerous, brown, innate, rather prominent, collapsing and umbilicate.—*Desm. Ann. des Sci. Nat.*, 1841, xv., p. 143. *Fckl. Fungi Rhen.*, No. 819.

On dead beech leaves. Darenth.

Venturia glomerata. *Cooke.*

Gregarious on discoloured spots, forming small tufts, hypophyllous; perithecia minute, black, erumpent, membranaceous, crowned about the ostiola with short rigid pointed black bristles; asci clustered, clavate; sporidia fusiform, uniseptate, hyaline, cells unequal.—*Cooke Fungi Britt.* (new series).

On languishing but living leaves of *Geranium dissectum*.

Eastbourne (*C. J. Muller*). Barnet & Mickleham (*M. C. C.*).

At first resembling to the naked eye *Stigmatea geranii*, *Fr.*, but the distinct perithecia are recognizable under a lens.

EPICRISIS HYMENOMYCETUM.—The publication of the new and revised edition of this work will be hailed with pleasure by all mycologists, inasmuch as the course of time had deprived the former edition of much of its original value. Although confined exclusively to European species, this work will be indispensable to all who pursue the study of Fungi with assiduity. We could have wished for more of the synonymy of the species, and a more extended reference to figures, but perhaps this is too much to expect of the author at his advanced age.—We may add with satisfaction, that the Rev. M. J. Berkeley has commenced a work which will supplement the present, and include all extra-European species of *Hymenomyces*, and thus render complete what the illustrious Swedish mycologist has only in part accomplished. No one is so competent to undertake this as the authority who has taken it in hand, and we anticipate that in little more than twelve months, if health should be given him, we shall be in possession of the new *Epicrisis*.

MICROSCOPIC EXAMINATIONS OF AIR.*

The report of Dr. Douglas Cunningham on examination of air in India contains some important results bearing on recent inquiry and speculation. It commences with a digest of the literature of atmospheric micrography from Ehrenberg to the present, and then details the methods adopted in his own investigations. The results are tabulated in connection with rainfall, velocity of wind, and prevalent diseases. The amount of dust visible to the naked eye varied extremely, in some cases being almost or entirely inappreciable, in others present in considerable quantity, whilst in one or two cases in which dust storms had occurred during the period of exposure the amount was so great as actually to form a small heap opposite the orifice of the funnel, and to require the addition of a considerable quantity of fresh glycerine ere contact between the slide and cover could be secured. The relative proportions of the various classes of microscopic constituents present also varied, an increase in one of them being by no means necessarily or invariably associated with an increase in others. For example, dry, windy weather caused a great increase in the amount of silicious, carbonaceous, and amorphous particles, and other *debris*, but certainly did not cause a proportionate increase in the number of spores and other fungal and algal cells. On the other hand, the occurrence of moist weather was accompanied by a great diminution in the quantity of the former without, in many cases, appearing to influence the numbers of the latter at all, or in a similar direction. Where a very large quantity of coarse and amorphous matter is present, it is no doubt often difficult to determine the absolute numbers of the spores, &c., in a preparation, but it is, at all events, easy to see that the increase of them, if it exists, is not proportional. The influence of moisture in diminishing the numbers of the coarser atmospheric particles is evident from the tables, but it does not appear to affect that of the spores, &c., in the same manner, but, on the contrary, rather tends to increase it, for it will be seen that the number of such bodies exceeded the average in 17 instances during the moist period, and only in eight during the dry one. Velocity of wind seems to exert as little influence on the numbers of spores and similar cells in the atmosphere as moisture. A low velocity, in many instances, was coincident with a high number of spores, and *vice versa*.

Of the special elements appearing as constituents in these preparations of atmospheric dust, it may be stated that those of most constant occurrence were particles of silica, amorphous granular masses, carbon, lime, starch corpuscles, cells, hairs, and other fragments of vegetable tissues, fibres of cotton, hairs and scales of insects, oil globules, pollen grains, spores and cells of

* From the Ninth Annual Report of the Sanitary Commissioner with the Government of India, Calcutta, 1872.

fungi and Algæ. Among the rarer constituents were Acari, which occurred in four preparations. Distinct bacteria were observed in one or two instances only, and then in very small numbers, but all the preparations abounded more or less in monad-like molecules, and globules of an undefined nature.

Spores and similar cells were of constant occurrence, and were generally present in considerable numbers. That the majority of the cells were living and ready to undergo development on meeting with suitable conditions was very manifest, as in those cases in which preparations were retained under observation for any length of time germination rapidly took place in many of the cells. In few instances did any development take place beyond the formation of networks of mycelium, or masses of toruloid cells, but in one or two distinct sporules were developed on the filaments arising from some of the larger septate spores, and in a few others *Penicillium* and *Aspergillus* produced their characteristic heads of fructification.

With regard to the precise nature of the spores and other cells present in various instances, little can be said, as, unless their development were to be carefully followed out through all its stages, it is impossible to refer them to their correct species or even genera. The greater number of them are apparently referable to the old orders of fungi, Sphæronemei, Melanconei, Torulacei, Dematiei, and Mucedines, while some probably belonged to the Puccinei and Cœomacei. Among those belonging to the Torulacei the most interesting was a representative of the rare genus *Tetraploa*. Distinct green algoid cells occurred in some specimens.

Then follows in the report details of observations made on the rise and fall of diseases, of which diarrhœa, dysentery, cholera, ague, and dengue were selected, and compared with increase or diminution of atmospheric cells. The conclusions arrived at are—

“Spores and other vegetable cells are constantly present in atmospheric dust, and usually occur in considerable numbers; the majority of them are living and capable of growth and development; the amount of them present in the air appears to be independent of conditions of velocity and direction of the wind; and their numbers are not diminished by moisture.”

“No connection can be traced between the numbers of bacteria, spores &c, present in the air, and the occurrence of diarrhœa, dysentery, cholera, ague, or dengue; nor between the presence or abundance of any special form or forms of cells, and the prevalence of any of these diseases.”

“The amount of inorganic and amorphous particles and other *debris* suspended in the atmosphere is directly dependent on conditions of moisture and of velocity of wind.”

This report contains in detail a large amount of matter from whence the above conclusions are drawn, and it is accompanied by fourteen large and carefully executed plates, each containing hundreds

of organic forms collected between February and September. A careful study of these plates is interesting, but at the same time, except in a few clearly marked instances, it would be extremely hazardous to determine the species or genera to which they belong. Undoubtedly there are many small globose or ovate spores which might belong to Mucedines, but there are also a large proportion of the peculiar dark coloured stalked spores of *Macrosporium*, some even in process of germination. Other spores have all the appearance of *Coryneum*, and others again with a great resemblance to *Phragmidium*. Undoubted *Puccinia* spores appear to be absent, but the dark globose reticulated spores resembling "bunt" are by no means uncommon, especially at the top of fig. 4, of plate iv. There are a number of spores which greatly resemble those of *Helminthosporium*, and one on plate viii. is singularly like *Helminthosporium Smithii*, in size, form, and septation. The spores in the preparation for July 24th, and for a month succeeding, are mostly in a state of active germination. Some spores resemble those of *Fusisporium* and others of *Diplodia*, but the only safe conclusion at which one can arrive from the examination of the figures, is, that by far the larger proportion of organic bodies consist of the spores of Fungi. In this light, therefore, the report serves to confirm the fact, which has been doubted, almost denied, of the presence of organic bodies to any considerable extent in atmospheric air.

NEW GENUS OF DIATOMS.

Mr. F. Kitton has characterised in the "Monthly Microscopical Journal" for November, a new genus of Diatomaceæ, under the name of *Perrya*, for forms which somewhat resemble *Nitzschia*, but the compressed valve and absence of keel indicate that the resemblance is only superficial.

PERRYA, Kitton.—Free, elongated, frustules compressed, sometimes slightly constricted, extremities rounded, striæ transverse moniliform. Marine.

***Perrya pulcherrima*.** *K.*—Valve in f. v. linear, inner or ventral margin straight or very slightly concave, outer or dorsal margin straight, suddenly rounded at the apices, markings distant moniliform dots in transverse striæ, s. v. narrow, linear, suddenly tapering towards the acute extremities, a central line of large moniliform dots dividing the valve. Length .0090 to .0200, breadth .0015in.—Kitton in *M. M. Journ.*, Nov. 1874, p. 218, pl. lxxxi., fig. 1. *Nitzschia pulcherrima*. Grunow MSS.

Hab.—Dredgings from Navy Bay, Colon, Panama; Campeche Bay.

Mr. Kitton intimates that he has found two or three other species of the same genus, which he purposes describing hereafter.

CARPOLOGY OF PEZIZA.

By THE EDITOR.

[Plates XXXI to XXXIV.]

This paper and figures are in continuation from p. 31. The scale and methods adopted are the same as in the previous communication.

- Fig. 65. *Peziza granulata*, Bull, ex. herb. M. C. Cooke.
 ,, 66. *P. adusta*, Cooke, ex. herb. C. H. Peck, Esq.
 ,, 67. *P. brunneoatra*, Desm., Desm. Exs., No. 826.
 ,, 68. *P. Chateri*, Sm., ex. herb. C. E. Broome, Esq.
 ,, 69. *P. deformis*, Karst., Karst. Fungi Fenn., No. 628.
 ,, 70. *P. enchroa*, Karst., Karst. Fungi Fenn., No. 816.
 ,, 71. *P. humosa*, Fr., Cooke, Fungi Britt., No. 476.
 ,, 72. *P. luteopallens*, Nyl., Rehm Ascomyceten, No. 7.
 ,, 73. *P. leucoloma*, Hedw., Fekl. Fun. Rhen., 1219.
 ,, 74. *P. rutilans*, Fr., Cooke Fungi. Britt., No. 475.
 ,, 75. *P. semi-immersa*, Karst., Karst. Fungi Fenn., No. 724.
 ,, 76. *P. rubicosa*, Fr., Rehm. Ascomyceten, No. 203.
 ,, 77. *P. glumarum*, Desm., Desm. Crypt. Fr., ex. 1054.
 ,, 78. *P. hæuastigma*, Fr., ex. herb. C. E. Broome, Esq.
 ,, 79. *P. ollaris*, Fr., Rabh. herb. Myc., No. 423.
 ,, 80. *P. vivida*, Nyl., Rabh. herb. Myc., No. 310.
 ,, 81. *P. convexula*, Pers., Fekl. Fun. Rhen., No. 1875.
 ,, 82. *P. tetraspora*, Fekl., Fekl. Fungi Rhen., No. 1856.
 ,, 83. *P. corallina*, Cooke (*Ascobolus coccineus*, Cr.), Fekl. Fun. Rhen., No. 1854.
 ,, 84. *P. fusispora*, B. & Br., ex. herb. C. E. Broome, Esq.
 ,, 85. *P. pinetorum*, Fekl., Fekl. Fun. Rhen., No. 2082.
 ,, 86. *P. xanthomela*, Pers., Rabh. Fungi Eur., No. 315.
- LACHNEA.
- ,, 87. *P. coccinea*, Jacq., Cooke, Fungi Britt., No. 651.
 ,, 88. *P. floccosa*, Schwz., C. H. Peck, Esq.
 ,, 89. *P. occidentalis*, Schwz., ex. herb. Kew.
 ,, 90. *P. melastoma*, Sow., Fekl. Fungi Rhen., No. 1214.
 ,, 91. *P. hirtipes*, Cookz, Dr. E. C. Bolles.
 ,, 92. *P. radiculata*, Sow., Rabh. Fung. Eur., No. 618.
 ,, 93. *P. nigrella*, Pers., Rabh. Fungi Eur., No. 209.
 ,, 94. *P. fuscoatra*, Red., Rabh. Fungi Eur., No. 614.
 ,, 95. *P. hemispherica*, Wigg., Rehm. Ascomyceten, No. 5.
 ,, 96. *P. arenosa*, Fekl., Rabh. Herb. Myc., ii., No. 630.
 ,, 97. *P. tenuis*, Fekl., Fekl. Fungi Rhen., No. 2289.
 ,, 98. *P. brunnea*, A. & S., Rabh. Fung. Eur., No. 1220. Desm. Exs. No. 1312 is precisely the same.
 ,, 98a. *P. brunnea*, Karst., Fung. Fenu., No. 528.
 ,, 99. *P. fusicarpa*, Ger., ex. herb. W. R. Gerard, Esq.
 ,, 100. *P. lanuginosa*, Bull, Cooke Fungi Britt., No. 471.
 ,, 101. *P. pellita*, C. & P., ex. herb. C. H. Peck, Esq.
 ,, 102. *P. geneospora*, Berk., ex. herb. M. J. B.
 ,, 103. *P. trechispora*, Curr., ex. herb. C. E. Broome, Esq. Cooke Fungi Britt., 288.
 ,, 104. *P. hirta*, Sch., Wright Fungi Cubensis, No. 671.
 ,, 105. *P. stictica*, B. & C., ex. herb. Dr. Curtis.
 ,, 106. *P. albotecta*, B. & C., Wright Fungi Cub., No. 676.
 ,, 107. *P. carneo-sanguinea*, Fekl., Fekl. Fungi Rhen., No. 2288.
 ,, 108. *P. chrysotricha*, Berk., ex. herb. M. J. B.
 ,, 109. *P. abnormis*, M., ex. herb. Montagne.
 ,, 110. *P. vitellina*, Pers., Moug. & Nest., Exs.

- Fig. 111. *P. albocincta*, B. & C., Rav. Fungi Car., No. 949.
 ,, 112. *P. umbrata*, Fr., Kabb. Fungi Eur., No. 217.
 ,, 113. *P. setosa*, Nees, ex. herb. Kritschmar.
 ,, 114. *P. scutellata*, Linn., Fekl. Fungi Rhen., No. 1210.
 ,, 115. *P. olivascens*, Cooke (macrochæta), Erb. Critt. Ital., 585.
 ,, 116. *P. Kerguelensis*, B., ex. Herb., Kew.
 ,, 117. *P. stercorea*, Pers., ex. herb. A. Jerdon, Esq.
 ,, 118. *P. theleboloïdes*, A. & S., Cooke Fungi Britt., No. 571. *a*, an external hair from the cup.
 ,, 119. *P. rubra*, Cooke, Cooke Fungi Britt., No. 572. *a*, an external hair from the cup.
 ,, 120. *P. Carestiaë*, Ces., Erb. Critt. Ital., No. 288.
 ,, 121. *P. Dalmeniensis*, Cooke, from Dalmeney, N. B. *a*, an external hair from the cup, reduced to one half its length and breadth from the camera lucida drawing.

ÆCIDIDIUM SCROPHULARIÆ.

Æcidium Scrophulariæ is assuredly one of the most curious species of a very interesting genus. It was originally described as turning dark in age, but no reason was assigned for it, nor does this appear to be the case in more recent publications. The spores are yellow at first but gradually lose their colour more or less, the edge of the peridium not projecting in a stellate manner as in many species, but being inflected so that each individual plant looks like a little *Peziza*. In an early stage, as we have received the plant from the Rev. M. Anderson of Menmuir, there does not seem to be any tendency to a change of colour, nor is there anything in that condition to attract especial notice. After a time, however, the orbicular patches of peridiæ are surrounded by a ring of irregular brown flat pustules, the nature of which seems hitherto to have been misunderstood, for they are not discolored peridia, but consist of a distinct species of *Uromyces* with obovate spores, each seated on a very slender pedicel which is attenuated downwards. How far it may be a peculiar condition of the *Æcidium* is very uncertain. If it be true that there is any connection between the mildew of the wheat and the *Æcidium* of the barberry, the presumption would be against the *Uromyces* being a condition of the *Æcidium*, but doubtless there are several points in these curious plants which were once undeservedly too much disregarded by systematists which need further investigation. For the present the *Uromyces*, may be described under the name of *Uromyces concomitans* B. and Br. Pustulis irregularibus depressis, peridia *Æcidii* cingentibus; sporis obovatis, pedicellis tenuibus deorsum attenuatis brevioribus.—M. J. B., "*Gardeners' Chronicle*," Aug. 22, 1874, pp. 228, fig. 50.

The figure illustrating this notice, as well as that of *Puccinia Malvacearum*, were kindly lent for that purpose by the proprietors of the *Gardeners' Chronicle*. [Pl. xxxi. xxxii.]

HIMALAYAN LEAF FUNGI.

Dr. James Fleming, late of Delhi, has forwarded us a small but interesting collection made by himself during a trip to the Himalayas. He informs us that they were obtained at a considerable elevation, corresponding to a temperate zone. It is worthy of note that two British species, *Æcidium rubellum* and the *Uredo* of the agrimony are amongst the number. The *Uromyces* on box leaves appears to correspond with the *Puccinia Buxi* of Europe. Until now we are not aware that any *Puccinia* has been found on a crucifer. Dr. Fleming's specimen was accompanied by the siliqua, and it is not improbable that the *Puccinia* occurred on some species of *Brassica* or *Sinapis*. It is not often that a small collection of only ten specimens possesses so much interest. It serves to indicate what a rich unexplored country for the mycologist lies at the base of the Himalayas.

Uredo punctoidea. *Cooke.* — Hypophyllous, aggregated in irregular patches circumscribed by the veins of the leaves. Sori minute, punctiform, at first sub-hemispherical, then ruptured above. Pseudo-spores nearly globose or oval, orange, tuberculose.

On pinnate leaves of some leguminous tree. Himalayas.

Closely resembling in habit and appearance *Uredo Hypericorum*.

Uredo Potentillarum. *D.C.*—On leaves of *Agrimonia*. Himalayas.

Uromyces ambiens. *Cooke.* — Hypophyllous, scattered. Sori irregular, confluent, dark brown, compact, forming rings, enclosing a cluster of spermogonia in the centre. Pseudo spores brown, obovate, with long slender hyaline pedicels.

On box leaves (*Buxus sempervirens*?). Himalayas.

Uredo Clematidis. *Berk.*—On leaves of *Clematis*. Himalayas.

Puccinia Cruciferarum. *Cooke.*—Hypophyllous, scattered or in circinate clusters. Sori irregular, pulverulent-vinous brown. Pseudo-spores, brown, elliptical, scarcely constricted, on short fugacious pedicels, apiculate above.

On leaves of some cruciferous plant. Himalayas.

In habit resembling *Pucc. pulverulenta*, Grev., but darker and with different fruit.

Puccinia dissiliens. *Cooke.* — Hypophyllous, scattered. Sori discoid, convex, compact, dark brown. Pseudo spores on long hyaline pedicels, brown, constricted at the septum, freely separating into two subconical cells, of which the basilar usually remains attached to the pedicel.

On leaves of *Rumex*. Himalayas.

Æcidium rubellum. *Pers.*—On leaves of *Rumex*. Himalayas.

Ailographum vagum. *Desm. (?)*—On coriaceous leaves. Himalayas.

Without fruit, but probably this species. It occurs on the same leaves with an *Erineum*.

Volutella. *Sp.* (?)—A black discoid fungus on coriaceous leaves; the disc beset with long rigid black bristles, which are expanded at the base, is amongst the collection; but there is no fruit, only a profusion of long slender hyaline threads. It is difficult even to determine the genus with certainty.

Septotrichum. *Sp.*—This production, similar to *Septotrichum Sieberi*, Corda, is not a true fungus, but of the same nature as *Phyllerium* and *Erineum*. The tufts of moniliform cells appear to burst through the cuticle, as in the parasitic *Coniomycetes*, but there is no evidence or indication that the cells are reproductive, neither have any organs corresponding to spores been found associated with any of the so-called species. They are all sub-tropical forms, and seem to correspond with the *Erineum* and *Phyllerium* of temperate regions. All of these are now regarded as peculiar conditions of the tissues, and will so remain until some reproductive system can be discovered.

In addition to the foregoing, Dr. Fleming reports that he has met with *Phragmidium bulbosum*, *gracile*, *obtusatum* and *mucronatum*—*Puccinia variabilis*, *umbelliferarum*, and *syngenesiarum*, *Coleosporium pingue* and *Peridermium Pini*. Specimens of these we have not seen.

M. C. COOKE.

A SPHÆRIACEOUS PARASITE ON PEZIZA.

BY J. DE SEYNES.

In the March number of "Grevillea" you have given (p. 143) interesting particulars of a parasite on *Peziza*. Permit me to call attention to a case of parasitism of another Sphæriaceous fungus on a living *Peziza*. This *Peziza* has not yet been published; it was found by Dunal on old dog's dung (album græcum). It is of one millimetre in diameter, between fleshy and ceraceous. One of the specimens I have found presented a little black spot on the external surface. Seen through the microscope this black spot appeared to be a perithecium. It was in the form of a barrel, its base intermixed with the parenchyma of the *Peziza*, with a large ostiolum, and of olivaceous colour. The fungus being too fully ripe exhibited no asci, but the quadriseptate sporidia, also of an olivaceous colour, issued from the apical opening. It seems to me to resemble the genus *Lophiostoma*. It is clear that this perithecium does not belong to the *Peziza* alone, for I have found it also on a very young and small specimen of *Xylaria hypoxylon* only 12 millimetres in length. It was placed on the highest, and most tender part. The perithecium and sporidia had exactly the same form and color. It was also ripe and did not exhibit asci. This seems to approach *Lophiostoma macrostoma*, in which the sporidia are sometimes quadriseptate, but the sporidia of the present species

are not attenuated at the two extremities, hence this parasite seems to me to be a new species.

NOTE BY THE EDITOR.—This appears to be an interesting parasite which M. de Seynes has found on *Peziza* and *Xylaria*. It is always unsafe to hazard an opinion upon a fungus without seeing it; but from the description and figure we do not think it probable that it is a species of *Lophiostoma*. There is really no evidence at all that the parasite is Ascomycetous. In neither instance did M. de Seynes detect asci. From the drawing the perithecium has the appearance of being membranaceous, and not carbonaceous. The measurement of the fruit is not given, and there is no appearance of the sporidia breaking up into joints as in *Perisporium*. We think that in the absence of any trace of asci it is assuming too much to declare the parasite to be Ascomycetous. It is to be hoped that M. de Seynes will meet with it again, and complete his observations.

FUNGI BRITANNICI EXSICCATI.

The seventh and last century of the first series of this collection has recently been issued, and will be of much interest to Mycologists, inasmuch as it contains 20 species that are new to the British Flora, *i.e.*, *Phyllosticta Veronicae*, Desm.; *Phoma Lonicerae*, C.; *Phoma subordinaria*, Desm.; *Phoma vitis*, Bon.; *Phoma errabunda*, Desm.; *Macrosporium cladosporioides*, Desm.; *Diplodia syringae*, Awd.; *Ramularia armoraciae*, Fckl.; *Periconia brassicaeola*, B. & Br.; *Ramularia stellariae*, Fckl.; *Peziza cerastiorum*, Wallr.; *Diaporthe scobina*, Nke.; *Diaporthe Euphorbiae*, C.; *Sporidesmium cladosporii*, Ca.; *Melanconis modonia*, Tul.; *Diaporthe Laschii*, Nke.; *Cucurbitaria euonymi*, C.; *Fusidium Geranii*, Fckl.; *Sphaerella ditricha*, Fr.; *Pleospora culmorum*, C. Of these *five* are new to science, of which descriptions will shortly be published.

Constant applications were being made from abroad for complete sets of these specimens from the commencement, which it was impossible to supply, and in order to meet these requirements in the only way possible, it was resolved to bring the first series to a close, and commence a new series during the coming year. The second series will, it is believed, present improvements on the first. It will be issued in quarto, similarly to Fuckel's "Fungi Rhenani," and to a limited extent figures of the fruit will be given side by side with microscopical species. Each fasciculus, containing a hundred specimens, will be published at one guinea, and although many of the species included in the first series will be repeated, these will be supplemented by other species not yet published. It is scarcely probable that more than one century will be published during a year. Subscribers names may be sent to the Editor.

FUNGUS SHOWS.

The Exhibition of Fungi at Munich took place in the Crystal Palace from the 3rd to 11th October, and was visited by nearly 50,000 persons. Of species 141 were represented by means of 1033 specimens. The arrangement was a systematical one, and every species had its Latin and vulgar name, and other notes, written on a ticket. The edible fungi had white tickets, the venomous sorts green ones, and the indifferent red ones. A lecture, or demonstration, was also given on edible and venomous fungi, their cooking, and what to do in a case of poisoning by them. There was also joined to the exhibition a great many microscopical specimens of parasitical Fungi, which do damage in the rural economy. Drawings of the growth and development of these minute plants were made by Professor Dr. Engler. The list of fungi exhibited is published in full in the "Gardeners' Chronicle" for October 31, 1874, pp. 555. The absence of such species as *Agaricus arvensis*, *Russula heterophylla*, *Agaricus personatus*, *Marasmius urens*, *Panus stypticus*, *Polyporus squamosus*, *Craterellus cornucopioides*, was very singular and inexplicable.

The South Kensington Exhibition of the Horticultural Society of London was held on the 7th October, and although only two competitors entered for prizes, their collections were good, and much better arranged than on previous occasions. Mr. English's specimen of *Thelephora multizonata* was specially fine. The most noteworthy addition to the British Flora was *Leotia circinans*, exhibited by the Rev. J. Stevenson.

On October 1st the annual Fungus Foray of the Woolhope Club took place at Hereford, of which Mr. Smith has furnished a full and particular account in the "Gardeners' Chronicle" for October 10th. Like its predecessors, it was eminently successful, and has become quite an established festival for Mycologists and Mycophagists from all parts of the kingdom.

For the first time this autumn (Sept. 18) a fungus show has been held north of the Tweed, and the meeting at Aberdeen appears to have given so much satisfaction that the experiment will be repeated next year at Perth. An immense number of specimens were exhibited. The "Gardener's Chronicle," states that the number was estimated at the incredible amount of 50,000. There is every reason to hope that the Scottish Exhibition will soon rival those of the south as a permanent institution, and by its peripatetic character perform good work in popularising the study of fungi in the North.

NEW BRITISH LICHEN.

By DR. J. STIRTON.

Parmelia Millaniana. *Sp. nov.*—Thallus tenuis pallide virescens (K flavens, C flavens) vel pallide glaucescens laciniato-lobatus, laciniis sinuato-incisis sæpe imbricatis, lævis vel sublævis laxè affixus, strato medullari tenui pallide flaventi (C flavo), subtus niger, ambitu spadiceus, rhizinosus, rhizinis nigris confertis plerumque dendritico—et divaricato—ramosis; apothecia ignota.

Supra Hypnum cupressiforme socia *Parmelia* physodis.

This *Parmelia* is peculiar, inasmuch as C produces on the yellowish medulla a decided and permanent yellow; while K does not produce any visible reaction, although C applied thereafter gives a permanent orange. The rhizinae in the specimen are truly of the dendritic character, as the branches are numerous, and arise abruptly from a common stock. This character is of less importance than the other, as the place of growth is known to influence considerably the prevalence and habit of these radicles.

Thallus thin, albido-glaucous (K yellow, C yellow), laciniato-lobate, laciniæ, sinuato-incised, often imbricated, smooth, laxly affixed; medulla pale yellow, thin (C yellow); under surface black, towards the margin brown, with black branching radicles; apothecia unknown.

This lichen resembles in several aspects *P. lævigata* (Sm.). Discovered by the Rev. Dr. MacMillan, of Glasgow, in Glen Crow, at the head of Loch Long, during the summer of this year.

Lecidea emphysa (Strn.), described in the No. of "Grevillea" immediately preceding this = *Arthonia lurida* (Ach.).

I was induced to rank this lichen with the *Lecideæ* from the fact that after the chrysophanic acid, which it contained in abundance, had been dissolved and made to disappear by means of liq. potassæ, the paraphyses were rendered tolerably distinct, as well as the spores, which, in much the larger proportion, were of a fuscous tint. It is curious, also, that if a solution of iodine be applied after the action of liq. potassæ, a cœrulescent tint is communicated to the hymenium, instead of the deep vinous red, the usual reaction.

It must be confessed that *A. lurida* has neither in the shape of its spores, external conformation, &c., almost any analogy to the typical *Arthonia*; the same may be said of *A. mediella* (Nyl.), which, by the way, I have also secured near Grantown, and in connection with which I may take another occasion of making a few remarks.

SPHAGNUM LINDBERGII, *Schimper.*

Of two species of Bog-moss, described by Dr. R. Braithwaite in the "Monthly Microscopical Journal" for October, one is recorded as British, under the above-named

Sphagnum Lindbergii, Schimper (*Torfmoose*, p. 67, tab. xxv.). *S. cuspidatum* β . *fulvum*, and *S. fulvum*, Sendtner, MSS. [M. M. J., plate xxvi.] Monoicous, in large dense tufts, 6-12 in. high, glossy, yellowish-green, tinged with ferruginous or purplish-brown. Stem solid, dark brown, with 3-4 cortical strata, formed of irregular sized cells without pores. Cauline leaves crowded, reflexed, broadly lingulate, auricled, the apex broad, truncate, and fringed; basal cells hexagonal, in four rows, pale brown, then becoming narrow and elongated, with a few imperfect fibres in the lateral cells, these bound a central triangle, the base of which is formed by the apical margin, and this space is occupied by large loose rhombic cells, broader, and 2-3 partite at the apex of the leaf; both fibres and pores occur sparingly in the auricles.

Fascioles of 4-5 branches, of which 2-3 are arcuate and divergent, the others pendant, elongated, and closely appressed to stem. Retort cells of the branches larger, recurved at apex.

Branch leaves numerous, in five rows, not undulated, firm, brownish, or ferruginous green, rather glossy, ovate at base, becoming lanceolate above, toothed and involute at apex; hyaline cells elongated, with numerous annular and spiral fibres, and many minute pores at margin; chlorophyll cells narrow, elliptic on section, quite enclosed, but nearest to the back of leaf; border widest at base, formed of 3-4 rows of very narrow cells.

Male inflorescence consisting of few antheridea, which are borne on the pendant branches.

Capsules numerous, seated in the capitulum, moderately elevated; perichætum large, inflated, the bracts yellowish-green, lower elongated oblong, upper broadly obovate-oblong, convolute, truncate, and fimbriate at apex, transversely undulate at base, without fibres or pores; spores yellow.

Habitat.—Deep bogs in the northern region of Europe. In this country it was found, in 1867, by McKinlay, on Ben Wyvis, in Ross-shire, and in America has been met with in Canada, Newfoundland, and Greenland.—Fr. July.

Closely resembles *S. intermedium*, but is readily known by the different form of the stem leaves, and the non-undulated branch leaves unaltered by drying, as well as by the glossy reddish-brown colour.

LICHENES BRITANNICI EXSICCATI.

Eddidit REV. J. M. CROMBIE.

CENTURIA I.

Mr. Crombie has just issued, as above, the First Century of his Lich. Brit. Exs., containing, as will be perceived from the following list, a large number of the rarer and also of the recently detected British Lichens, which are, consequently, not included in the published *Exsiccati*, either of Mudd or Leighton:—

No.

1. *Lichina pygmæa*. *Ag.*
2. *Collemopsis Schæreri*. (*Mass.*)
3. *Collema myriococcum*. *Ach.*
4. *Collema pulposum*. *Bernh.*
5. *Leptogium saturninum*. *Dcks.*
6. *Leptogium Burgessii*. (*Lghft.*)
7. *Leptogium microscopicum*. *Nyl.*
8. *Myriangium Duriaei*. *Mnt.*
9. *Calicium trajectum*. *Nyl.*
10. *Coniocybe furfuracea*. (*L.*)
11. *Acolium stigonellum*. *Ach.*
12. *Bæomyces rufus*. *D.C.*
13. *Thamnolia vermicularis*. (*Sw.*)
14. *Roccella phycopsis*. *Ach.*
15. *Roccella fuciformis*. (*L.*)
16. *Usnea barbata*, var. *florida*. (*L.*)
17. *Usnea barbata*, var. *articulata*. *Ach.*
18. *Alectoria ochroleuca*, var. *cinnamata*. *Fr.*
19. *Alectoria nigricans*. *Ach.*
20. *Alectoria lanata*, var. *parmelioides*. *Cromb.*
21. *Ramalina calicaris*. *Fr.*
22. *Ramalina farinacea*. *L.*
23. *Ramalina scopulorum*, var. *subfarinacea*. *Nyl.*
24. *Platysma nivale*. (*L.*)
25. *Platysma commixtum*. *Nyl.*
26. *Parmelia conspersa*. *Ach.*
27. *Parmelia saxatilis*. *L.*
28. *Parmelia*, *saxatilis* var. *sulcata*. *Tayl.*
29. *Parmelia perforata*. *Ach.*
30. *Parmelia perlata*, var. *ciliata*. *Schær.*
31. *Parmelia physodes*. (*L.*)
32. *Parmelia alpicola*. *Th. Fr.*
33. *Stictina Thouarsii*. *Del.*
34. *Stictina crocata*. (*L.*)
35. *Stictina limbata*. (*Sm.*)

- No.
36. *Stictina scrobiculata*. (*Scop.*)
 37. *Sticta pulmonaria*. (*L.*)
 38. *Sticta damacornis*. (*Sw.*)
 39. *Sticta aurata*. *Ach.*
 40. *Ricasolia laete-virens*. (*Lghft.*)
 41. *Nephromium lævigatum*, var. *parile*. *Ach.*
 42. *Peltidea venosa*. (*L.*)
 43. *Peltigera rufescens*. *Hffm.*
 44. *Peltigera scutata*. (*Dcks.*)
 45. *Peltigera horizontalis*. *Hffm.*
 46. *Solorina crocea*. (*L.*)
 47. *Solorina saccata*. (*L.*)
 48. *Physcia flavicans*. (*Sm.*)
 49. *Physcia intricata*. (*Desf.*)
 50. *Physcia ciliaris*. (*L.*)
 51. *Physcia pulverulenta* var. *pityrea*. *Ach.*
 52. *Umbilicaria pustulata*. *Hffm.*
 53. *Pannaria rubiginosa*. (*Thunb.*)
 54. *Pannaria rubiginosa* var. *cæruleobadia*. (*Schl.*)
 55. *Pannaria pezizoides*. (*Webr.*)
 56. *Coccocarpia plumbea*. (*Lghft.*)
 57. *Coccocarpia plumbea* f. *myriocarpa*. (*Del.*)
 58. *Psoroma hypnorum*. (*Hffm.*)
 59. *Placodium chalybæum*. (*Duf.*)
 60. *Lecanora cerina*. (*Ehrh.*) *athallina*.
 61. *Lecanora ulmicola*. (*D.C.*)
 62. *Lecanora poliophæa*. (*Whlrb.*)
 63. *Lecanora leucophæa*. (*Flk.*)
 64. *Lecanora* *1. *nigro-glomerata*. *Leight.*
 65. *Lecanora lutescens*. *D.C.*
 66. *Lecanora aitema*. *Ach.*
 67. *Lecanora prosechoides*. *Nyl.*
 68. *Lecanora tenera*. *Nyl.*
 69. *Lecanora tartarea* (*L.*) *corticola*.
 70. *Lecanora tartarea* var. *frigida*. *Ach.*
 71. *Lecanora lacustris*. *With.*
 72. *Lecanora Dicksoni*. (*Ach.*)
 73. *Lecanora verrucosa*. *Ach.*
 74. *Lecanora poriniformis*. *Nyl.*
 75. *Urceolaria scruposa*. *Ach.*
 76. *Lecidea cupularis*. (*Ehrh.*)
 77. *Lecidea carneo-lutea*. *Turn.*
 78. *Lecidea lutea*. (*Dcks.*)
 79. *Lecidea lurida*. *Ach.*
 80. *Lecidea flexuosa*. *Fr.*
 81. *Lecidea decolorans* f. *aporetica*. *Krb.*
 82. *Lecidea uliginosa*. (*Schrad.*)
 83. *Lecidea turgidula*. *Fr.*
 84. *Lecidea turgidula* f. *endopella*. (*Leight.*)

- No.
 85. *Lecidea mæstula*. *Nyl.*
 86. *Lecidea luteola*. *Ach.*
 87. *Lecidea fusco-lutea*. (*Deks.*)
 88. *Lecidea latypodes*. *Nyl.*
 89. *Lecidea symphorella*. *Nyl.*
 90. *Lecidea limosa*. *Ach.*
 91. *Lecidea lugubris*. (*Smmrf.*)
 92. *Lecidea coracina*. (*Ach.*)
 93. *Lecidea Caradocensis*. *Leight.*
 94. *Lecidea sanguinaria*. (*L.*)
 95. *Lecidea urceolata*. *Ach.*
 96. *Xylographa parallela*. (*Ach.*)
 97. *Xylographa laricicola*. *Nyl.*
 98. *Opegrapha lentiginosa*. *Lyell.*
 99. *Arthonia varians*. *Nyl.*
 100. *Endocarpon miniatum*. (*L.*)

We understand that the few copies of the above, published by the Author, are intended *exclusively* for public herbaria.

REPRODUCTION OF DESMIDS.—Professor Leidy, at a late meeting of the Academy of Natural Sciences of Philadelphia, made some remarks on the mode of reproduction and growth of the Desmids. In illustration, he described a common species of *Docidium*, or *Pleurotenium*. This consists of a long cylindroid cell, constricted at the middle, and slightly expanded each side of the constriction. When the plant is about to duplicate itself the cell-wall divides transversely at the constriction. From the open end of each half shell there protrudes a colourless mass of protoplasm defined by the primordial utricule. The protrusions of the half cells adhere together, and continue to grow. The bands of endochrome now extend into the protrusions, and subsequently keep pace with their growth. The protrusions continue to grow until they acquire the length and form of the half cells from which they started. The exterior of the new half cells thus produced hardens, or becomes a cell wall like that of the parent half cells. In this condition two individuals of *Docidium* are frequently observed before separation. During the growth of the new half cells the circulation of granules in the colourless protoplasm is quite active. In a species of *Docidium* 1-5 m.m. long, by 1 m.m. broad, the growth of the new half cells was observed to be at the rate of about .35 m.m. in an hour.—*American Naturalist*.

EPICRISIS HYMENOMYCETUM.—We are permitted to state that the Rev. M. J. Berkeley is engaged in the preparation of a work which will supplement the "Epicrisis" of Fries, and include all extra-European *Hymenomyces*. Thus, the work of the venerable Swedish mycologist will be rendered complete.

SPORES AND SPORIDIA.

It has been contended that the terms employed by cryptogamists for the spores of plants coming within their cognizance are by no means settled or universal, and, moreover, that certain terms are objectionable. Accepting the general term "spore" in all its vagueness as applicable alike to Fungi, Lichens, Algæ, and Mosses, it must be admitted that something more definite is required to distinguish one kind of spore from another. This was felt long ago, when it was proposed that the term "sporidia" should be applied to such spores as are generated in asci. The "thecaspores" of most authors convey the same meaning. Naked spores, as distinguished from sporidia generated in asci, retaining the name of spore. This arrangement appeared feasible, and was to some extent adopted. In lichens, for instance, the spores contained in the thecæ or asci, would thus come to be recognized as *sporidia*. In fungi the fruit of all the Ascomycetes is of this character. It does not militate against the manifest advantage of fixing such a limit to the terms *sporidia* and *spore*, that lichenologists, as a rule, do not accept them. It is doubtful whether any effort to assimilate the terms employed by lichenologists and mycologists would be successful or advisable. Spore and sporidia are by no means the only instances.

To argue, as some have done, that sporidia are the normal conditions of spore generation, and that the capsule in mosses is analogous to the ascus in fungi, is simply begging the question. Let bryologists and algalogists look to their own terms. The structural differences do not warrant any demand that the contents of a moss-capsule should be designated as sporidia. Between lichens and fungi there is this agreement, that such apothecia as those of *Lecanora*, &c., are very similar to the cups of *Peziza*, and so also are the asci, paraphyses, and sporidia. It must be conceded that the lichenologists have not the same good reason as mycologists for insisting on the use of a term which shall distinguish thecaspores, or spores contained in asci from naked spores. Anyone who has had experience to any extent in fungi will at once recognize the practical advantage of the two terms as applied, for example, to the fruit of a *Sphæria* on the one hand, and a *Coryneum* on the other. Berkeley has classed fungi under two groups, *Sporifera* and *Sporidiifera*, the former characterized by naked spores, the latter by spores contained in asci (sporidia). Long since Dr. Bail suggested *Basidiosporæ* and *Thecasporeæ* for similar divisions, but there is this objection to *basidiosporæ*, that it is calculated to mislead, since all naked spores are *not* borne on basidia. Accurately, Basidiospores must be confined to the spores of the Hymenomycetes and Gasteromycetes; it would not be applicable to *Ustilagines*, and hardly to the Hyphomycetes. No such objection can be taken to the limitation of spore and sporidia, as

above indicated, and it would be a manifest advantage if mycologists generally would adopt this distinction, which they would find of great practical use to themselves. Lichenologists would perhaps follow the example, but we fail to recognize any reason for a compulsory act of uniformity.

It is a matter of secondary importance whether "thecaspore" or "sporidia" be the accepted term, provided "thecaspore" be employed as a mycologist or lichenologist would employ it, and not as synonymous with the spores developed in the theca, or capsule, of mosses. It is so easy when the same term is applied to two different things for wrong impressions to gain ground, hence we find some persons jumping to the conclusion that because *theca* has been applied to the capsule of mosses, it is equivalent to *theca* when applied to the ascus of a fungus or lichen, and therefore that thecaspores, whether of fungi or of mosses, are the same. This is a manifest error, as there is probably much closer resemblance between the peridia and spores of a *Craterium* and the capsule and spores of a moss than in any other genus of fungi, and in *Craterium* there are no asci and sporidia.

It needs very little argument to show that in dealing with some thousands of species of plants in which there is, within certain limits, great variability in the reproductive organs, it is a manifest advantage to possess well defined terms, and if there is any permanent feature which would enable the botanist to divide the whole into two sections, applying a definite term to each, labour and confusion would be diminished. It is contended that probably half the species of fungi have spores generated in membranous sacs, which the mycologist calls *asci*, and the lichenologist *thecæ*. The spores so produced are designated *sporidia*. The remaining half the number of species have naked or free spores, *i.e.*, spores not generated in asci—to these it has been suggested that the term spore should be limited. Speaking or writing of sporidia, so characterized, a definite idea is at once conveyed of reproductive bodies, produced within an ascus, as opposed to the naked spores, which a more restricted use of the term "spore" would convey.

The term "sporidia" has been, and is still employed by Continental mycologists, but unfortunately without any definite idea being associated with it, so that it has almost the same signification as the term "spore" in its widest sense. Fuckel, it is true, uses *sporidia* in all his Ascomycetes, but whilst employing *spores* in Agaricus, he reverts to *sporidia* in *Boletus*. The antithesis to *sporidia* recognized by this author appears to be *stylospores*. There is certainly a want of uniformity amongst mycologists on this point, but this may proceed rather from ignorance of the meaning attached to the word, when it was first proposed, than from a rejection of the principle involved.

If the term "sporidia" were universally adopted for thecaspores, or spores contained in asci, the residue of spores to be dealt with

would be of too mixed a character long to remain without some better designation. Under this term would be included the basidiospores of the *Hymenomyces* and *Gasteromyces*, the stylospores of the *Sphaeronemei*, the pseudospores of the Uredines—which latter are a kind of prothallus from which true spores are produced—the acrospores of the Mucedines, &c., so that the retention of the term spore for all these would after all be more objectionable than the adoption of sporidia for spores enclosed in asci.

There is, however, one term—whether subsidiary to spore, or independent of it—we would submit for the consideration of Mycologists as worthy of adoption. Recent researches have demonstrated that the Uredines and their allies are not in themselves true spores, but a kind of protospores, or pseudospores, which germinate and produce true spores. It has been proposed that to these bodies the term “pseudospores” should be applied.

Subsidiary names are constantly being given to spores having a peculiar mode of generation or of development, and so long as these terms are understood and restricted to their original characteristics they are useful, but none of these have so much to commend them, or represent a number so vast as those comprehended by the term “sporidia,” for which we claim the adherence of Mycologists and Lichenologists.

HEPATICÆ EUROPÆ.*

If there is one feature more than another which commends itself to us on opening Du Mortier's volume, it is the full, and apparently complete, synonymy of the genera and species, and the large number of references or citations. Anyone who has learnt by experience the labour of collating synonyms will appreciate the large amount of work which such a volume represents. The description, however, is exceedingly brief; practice alone will prove whether, by the help of the analytical key, the student will find them sufficient for the determination of species.

Appearing simultaneously with the early part of Carrington's British Hepaticæ, there will naturally be a tendency to compare, at least, the systematic arrangement. It would be unfair to institute comparisons in features to which Du Mortier's volume makes no pretensions. Dr. Carrington professes to adhere as closely as possible to the arrangement adopted by Nees and his collaborateurs, and in this we think he acted wisely. Du Mortier, of course, adheres to Du Mortier; that is, the volume of 1874 draws its inspiration from the works of 1822, 1831, and 1835, of the same

* *Hepaticæ Europæ*, by B. C. Du Mortier, pp. 200, 8vo. Brussels. 1874.

author. This is scarcely more than natural. It is, nevertheless, a mistake not to have more agreement as to the names which should be adopted for certain genera. Let us take the two parts of Dr. Carrington's work, and compare them with the present volume, leaving others to judge which is right. The first genus, with one species, is *Scalius* of Gray's arrangement (1821). In Du Mortier it is *Mniopsis*, Dmrt. (1822), exception being taken to Gray's name, "*Scalius*, nomen hominis est non plantæ," although the claim to priority is admitted. The second genus is *Gymnomitrium*, Corda (1829), of Carrington, and *Acolea*, Dmrt. (1831), of Du Mortier, each passing over *Cesius*, of Gray (1821); the former because *Cesia* belongs to a genus of Liliacæ, the latter for the same reason that *Scalius* was excluded. The third genus is *Nardia*, Gray (1821), which includes Du Mortier's two genera of *Marsupella* (1822) and *Mesophylla* (1822, 1831). The fourth genus is *Trichocolea*, Dmrt., of Carrington, and *Tricholea* of Du Mortier, the difference being merely a question of Latinity. For this name was written *Thricholea* in 1822, *Thricolea* in 1831, and *Tricholea* in 1835, by the same author. In 1838 *Trichocolea* was adopted by Nees as the accurate rendering of Du Mortier's name, which, however, Du Mortier repudiates. The fifth genus is *Acrobolbus*, Nees (1844), in Carrington, and *Gymnanthe*, Taylor (1844), of Du Mortier. If, however, Dr. Carrington's plea be accepted that *Acrobolbus* differs in certain particulars from *Gymnanthe*, it is not a mere question of name. If Mr. Mitten be right, *Acrobolbus* is a subgenus of *Gymnanthe*. This, however, is a legitimate subject for difference of opinion. The sixth genus is *Saccogyna*, Dmrt., of both authors. The seventh genus is *Harpanthus*, Nees (1836), also in both authors. This is the present limit of Dr. Carrington's work, but this is sufficient to show that whilst there is agreement in two genera, there is disagreement in two as to what name should be adopted, and in a third as to the spelling of a name; whilst in two the difference is rather that of the limits of species, we would fain believe, than a mere question of names.

Surely it cannot aid in the advancement of science that two works published simultaneously should disagree merely in names, and justify the reproach that Botany is a science of names. It were better to make some concession in behalf of uniformity, and so limit the array of synonyms which add to the labour and do not enhance the simplicity of modern Cryptogamic works. We fear that there are other sinners beside those who study Hepaticæ.

We must, however, commend Du Mortier's volume to the attention of such of our readers as may be interested in the plants of which it treats, as it is a handy volume, by an author of more than half a century's experience, and is undoubtedly a trustworthy guide, differences in nomenclature notwithstanding.

ON STENOGRAMME INTERRUPTA. HARV.

By E. M. HOLMES.

The tetrasporic fruit of this rare and beautiful alga has not hitherto been recorded as occurring in Britain, and is not described in any of the more recent works on marine algæ published in England, nor has any figure of the tetraspores, so far as I am aware, ever been published. A description, with explanatory cuts of these may therefore be interesting to British Algologists. Miss Gifford, of Minehead, Somerset, the author of the "Marine Botanist's Guide," appears to have been the first who met with *Stenogramme* having sori of tetraspores. A specimen sent by that lady to Dr. Harvey in 1848, with an enquiry as to the nature of the spores, was probably lost, as no further notice of the plant was taken by him. In 1851 specimens with tetraspores were collected by the late Dr. Welwitsch, in the Tagus, near Lisbon, and sent to Dr. Montagne, of Paris, who carefully examined them, and sent a letter describing the tetraspores to that veteran cryptogamist, the Rev. M. J. Berkeley, who published the letter in the "Ann. and Mag. of Nat. Hist.," June, 1851, p. 481. This description appears to have been overlooked by most British algologists up to the present date.

My attention was lately drawn to the plant by the occurrence of a specimen with tetraspores in Mr. Carroll's collection, recently acquired by the British Museum. Through the kind permission of Mr. Carruthers, I was permitted to examine the plant, and being at that time unaware that the tetraspores had been described, made a memorandum of their appearance and structure, which was afterwards found to correspond almost exactly with the description given in Webb's "*Otia Hispanica*," p. 16, published in 1853. As his description is extremely minute, it will be well to quote it:—

Tetraspores arranged in oval or oblong nemathecium, which are scarcely a line in length, often less. The nemathecium are convex when moist, becoming flattened when dry, and scarcely visible above the surface of the frond, from which they can then be distinguished only by their darker colour. They are generally scattered over the surface of the frond, or more rarely arranged in two parallel lines; occasionally two nemathecium become confluent. The nemathecium consist of a number of vertical or slightly radiating filaments, each consisting of about 4 cells (fig. 3, *a*), these filaments being formed by the multiplication of the small surface cells of the frond; the endochrome of each cell becoming divided—first transversely (fig. 3, *b*), and then longitudinally (fig. 3, *c*, *d*)—thus forming cruciate tetraspores. The tetraspores are oblong, narrow, and very small for the size of the plant. When the tetraspores fall away a pale spot (which is an opening in the frond) is left, owing to the tetraspores having been formed at the expense of the layer of surface cells, as above described.

Mrs. Griffiths, who, in 1851, examined a specimen sent her by Miss Gifford, thought that the tetraspores (which were most likely immature), were tripartite. This supposition probably arose from the fact that the endochrome frequently divides in the lower half before it separates in the upper, so as to present the appearance of tripartite division. Agardh in his "Sp. *Ægarum*," vol. ii., part 2, p. 391, states that Messrs. Cronan, of Brest, reported to him that they had found the tetraspores zonately divided; hence it is probable that they examined immature filaments from the nemathecia, which, as they generally consist of about four cells, with very delicate walls, might easily have been mistaken for zonate tetraspores. Agardh does not appear to have read Montagne's letter, as the Sp. Alg. was published in 1852. The specimen from which the figure is taken was gathered in Scotland, and belongs to Mr. H. Goode, of Plymouth. The only facts that I have not been able to verify in Montagne's description are that the nemathecia do not appear to me to occupy both sides of the frond, and that only in one case have I been able to observe anything approaching a parallel arrangement of the sori.

PLATE xxxvii. FIG. 1.—Portion of frond nat. size, showing position of sori in the penultimate branches.

FIG. 2.—Sorus of tetraspores magnified, and part of frond from which a sorus has disappeared.

FIG. 3.—Vertical filament taken from the sorus, showing the endochrome before division.

FIG. 4.—Tetraspores undergoing transverse and then longitudinal division.

N.B.—The plate illustrating this communication will be given with the next number.

ON COLEOCHÆTE.

Mr. W. Archer, in his observations on some collections from Latee Furnas, Azores,* remarks of a frequently occurring form that "it is a *Coleochæte*, and, indeed, most probably the unnamed 'seventh' species referred to by Pringsheim, at the close of his memoir." As there suggested, there can be little doubt that this is the same presumed 'young' condition of *C. scutata* spoken of by De Brebisson, who founded this interesting genus. There can be no doubt, however, that it is quite a distinct thing, sometimes taken in our home waters in some comparative quantity, though of rather rare and certainly of local occurrence. It forms cells freely existent, or occasionally cohering side by side in small numbers, of a globose figure, tapering upwards, and surmounted by a neck-like process characteristic of the genus, bearing an extremely long bristle. This bristle seems to be continuous from its origin onwards; that is, the basal portion apparently does not open so as

* In "Journ. Linn. Soc.," for October, 1874.

to form a sheath bearing the bristle protruding therefrom, but it passes off uninterruptedly into the bristle. There is, however, a rather well marked point of transition, where the slight tapering basal portion ceases, and the extremely long and slender linear bristle-portion may be said to begin; the bristle does not appear to be jointed. A characteristic of *Aphanochæte* (Brn.) is the non-vaginated bristle; but certain of the species of *Coleochæte* (Breb.) have non-vaginated bristles. Hence the present plant may safely be referred to *Coleochæte*, as indeed Pringsheim, granting the identity of the plants, has done. But one and the same cell often seems to bear more than one, it may be two, three, or more bristles (sometimes five or six). This appears to be due to a repeated evacuation of the older cell-wall, and the formation each time of a new bristle; for every cell has at least one bristle.

This *Coleochæte* might almost deserve to be called a unicellular form, but not in the strictest sense. Of a fructification nothing appears to be known, save the cursory observations chronicled in the minutes of the Dublin Micro. Club, where it was shown that an elliptic fruit-like structure, surrounded by a sharply-marked mucous coating, this latter at each end showing a very narrow depression, wider at the outer surface than below, but seemingly inconspicuous or disappearing after a time, often occurs in close juxtaposition to examples of this pretty little form, empty of contents. Although it has never been seen that the fruit-like body is actually formed from the emerged contents of the adjacent empty cells, the frequency of their concomitant occurrence renders the assumption all but certain, and that in this elliptic body we have at least a form of fruit of the plant, if, indeed, it be going as yet too far to call it an "oogonium," or an "oospore," destitute of an oogonium proper. Though such conditions could not be strictly denominated an "alternation of generations," yet we have here an interesting and curious separation, as distinct "individuals" of the fruit from the plant itself. This form occurred in several of the Azores hot water gatherings, but none showed the form of fructification here adverted to, being simply in the more frequent barren (*i.e.*, merely vegetative) state.

BRYOLOGICAL NOTES.

By E. M. HOLMES.

Since the publication of the Devon and Cornwall Flora, the following Mosses have been noticed in the above counties:—

Campylopus paradoxus, WILS. MSS. Morwell rocks, near Tavistock, E. M. H.

Growing rather sparingly on earth-covered ledges among the rocks. Its smaller size and compact habit distinguish it at sight from *C. flexuosus*, although under the microscope its structure appears exactly similar.

Didymodon cylindricus, B. & S. Mousehole Cave, Penzance, E. M. H. Very sparingly, and in scattered patches.

Grimmia Donniana, Sm. Simon's Bath, near Exmoor.

This pretty little species, which I have never seen on Dartmoor, was discovered by Mr. E. George, who had the good fortune to find, in the same locality, very fine specimens of *Dicranella squarrosa*, Schrad., in fruit.

Grimmia subsquarrosa, WILS. MSS. On micaceous rocks, Prawle Point, and along the coast from Slapton to Salcombe, E. M. H.—It occurs in company with *G. leucophæa*. The latter is by far the commonest *Grimmia* in that district, and presents two well marked varieties, one of which has the hairs on the tip of the leaves about three times as long as the other, giving it quite a different aspect. *Grimmia subsquarrosa* looks very distinct from *G. pulvinata*, Sm., when growing, on account of its short, curved, turgid stems, and less silky appearance of the tufts. In the moist state it is easily recognised by the leaves being squarrose, but otherwise very like those of *G. pulvinata*.

It may be interesting to record here the fact that *Antitrichia curtispindula*, Brid., a moss which generally seems to prefer the highest rocks on Dartmoor, grows in the sand on Dawlish Warren very abundantly, and within a few yards of salt water.

LICHENOLOGICAL NOTES.

By E. M. HOLMES.

The following lichens have not, I believe, before been recorded for Devon and Cornwall:—

Collema biatorinum, Nyl. Wadebridge, C., M. R. V. Tellam.

Collema auriculatum, Hoffm. Plymouth, E. M. H.

This is the plant mentioned in the Devon and Cornwall Flora under the name of *C. furvum* (*Plymouth*).

Leptogium tenuissimum, Dickson, Chagford, E. M. H.

Roccella phycopsis, Ach. In fruit. Lizard, C., E. M. H.

Roccella fusiformis, Ach. In fruit. Land's End. C., W. Curnow.

Parmelia perforata, Wulf. Trees near Budleigh, Devon; Tregawn, near Bodmin, C., Rocks, Kynance Cove, E. M. H.

This species closely resembles *P. perlata*, L., but is easily recognised by the rusty-red tips of the fronds, and the minutely reticulated thallus.

Parmelia tiliacea, var. *rugosa*, Tayl. Kynance Cove, C., W. Curnow. Pentire, St. Minver, R. V. Tellam.

Although very similar in shape to *P. lævigata*, its strongly wrinkled surface distinguishes it at sight.

Pannaria nebulosa, Hoffm. Withiel, near Bodmin, R. V. Tellam.

Pannaria cheilea, Nyl. Cadgwith, C., W. Curnow.

Placodium cirrochroum, L. On limestone rocks, Upton, near Torquay, E. M. H.

This is, I believe, the only locality at present recorded in Britain, besides the original one in Westmoreland, by Mr. J. Martindale.

Lecanora Hutchinsiae, Nyl. Newlyn, Penzance, on granite rocks, W. Curnow.

Lecanora poliophœa, Wahlen. Near Penzance, W. Curnow.

Pertusaria leicplaca, on trees, Withiel, near Bodmin, R. V. Tellam.

Lecidea lucida, Ach. *In fruit*. Rocks, near Chagford, D., E. M. H.

Lecidea chlorophœa, Hepp. St. Merryn, Cornwall, R. V. Tellam.

Lecidea mutabilis, Fries. On young oaks, Hustyn Wood, near Bodmin, R. V. Tellam.

Lecidea Mooreana, Carr. Near St. Austell, Cornwall, R. V. Tellam.

Lecidea subuletozum, Flk. St. Merryn, Cornwall, R. V. Tellam.

Opegrapha Cæsarensis, Nyl. Rocks, Lizard Point (abundant), E. M. H. The only English locality at present recorded.

Opegrapha anomala, Leight. On birch trees, Hustyn Wood, near Bodmin, R. V. Tellam.

Stigmatidium circumscriptum, Tayl. Rocks, Lizard, E. M. H.

Normandina lætevirens, Turn. & Borr. Rough Tor, Cornwall, R. V. Tellam.

Endocarpon miniatum, *f. complicatum*, Sw. Kynance Cove, W. Curnow.

Verrucaria ventosicola, Mudd. Cawsand Beacon, Devon. E. M. H.

BRITISH COLLEMACEI,

As Revised by THE REV. J. M. CROMBIE.

The "Journal of Botany" for November contains a revision of this family, of which we submit an extract.

Tribe I. LICHINEI. Many of the filamentose Algæ are referable to this tribe, though being in a barren state they cannot be accurately described as Lichens.

I GONIONEMA. Nyl. To this genus belong various species of *Scytonema*

Gonionema velutinum, Ach.

II. SPILONEMA. Born. To this are to be referred several species of *Sirosiphon*, as—

Spilonema paradoxum. Born.

Spilonema reverens. Nyl.

Spilonema scoticum. Nyl.

For further details the paper above alluded to must be consulted.

III. EPHEBE. Born. Scarcely distinguishable from the foregoing in a young state.

Ephebe pubescens. Fr. The *Lichen exilis* of Lightfoot.

IV. LICHINA. Ag.

Lichina pygmæa. Lgft.

Lichina confinis. Ach.

Tribe II. COLLEMEI. This includes also some species of "Pseudo-algæ," viz., the *Nostocs*.

I. PYRENOPSIS, Nyl. as recently limited by Nylander—

Pyrenopsis hæmatopsis. Smf.

Pyrenopsis hæmalea. Smf.

Pyrenopsis granatina. Smf.

Pyrenopsis homæopsis. Nyl.

Pyrenopsis fuscatala. Nyl.

Pyrenopsis furfurea. Nyl.

II. COLLEMOPSIS. Nyl. Thallus glaucous green, and gonimia submoniliformly arranged.

Collemopsis Schævereri. Mass.

Collemopsis lecanopsoides. Nyl.

Collemopsis furfurella. Nyl.

Collemopsis oblongans. Nyl. (Grev. iii., p. 22.)

Collemopsis diffundens. Nyl.

III. SYNALISSA. D.C.

Synalissa symphorea. D.C.

IV. COLLEMA, Ach., in the following sections:—

A. *Lichinopsis.* Cromb.

Collema lichinodeum. Nyl.

B. *Physma.* Mass.

Collema chalazanum. Ach.

Collema chalazanodes. Nyl.

Collema myriococcum. Ach.

Collema confertum. Ach.

C. *Eucollema.* Cromb.

Collema terrulentum. Nyl.

Collema ceraniscum. Nyl.

Collema auriculatum. Hoffm.

Collema furvum. Ach.

Collema pulposum. Bernh.

a. *granulatum.* Sw.

β. *compactum.* Ach.

γ. *hydrocharum.* Ach.

var. 1. *ceranoides.* Borr.

var. 2. *pulposulum.* Nyl.

Collema subplicatile. Nyl.

a. *meizolobum.* Nyl.

Collema limosum. Ach.

Collema crispum. (Huds.)

a. *cristatum.* Ach.

Collema cheileum. Ach.

a. *nudum.* Schær.

β. *monocarpon.* Duf.

Collema melenum. Ach.

a. *marginale.* (Huds.)

- β. *jacobæfolium*. (Schr.)
 γ. *gyrosum*. Ach.
 δ. *complicatum*. Schl.
Collema cristatum (Hffm.) Schær.
Collema polycarpon. Schær.
 D. *Lathagrium*. (Ach.)
Collema stygium. Del.
Collema Laureri. Krb.
Collema flaccidum. Ach.
Collema fasciculare. L.
Collema multipartitum. Sm.
Collema nigrescens. (Huds.)
Collema aggregatum. (Ach.)
 E. *Leptogiopsis*. Cromb. Thallus nearly as in *Leptogium*; apothecia those of *Collema*.
Collema biatorinum. Nyl.
Collema microphyllum. Ach.
- V. LEPTOGIUM. Ach.
- A. *Euleptogium*. Cromb.
Leptogium amphineum. Ach.
Leptogium rhyparodes. Nyl.
Leptogium tenuissimum. Deks. (*L. spongiosum*. Nyl.)
Leptogium fragile. (Tayl.)
Leptogium cretaceum. (Sm.)
Leptogium pusillum. Nyl.
Leptogium lacerum. Sw.
 α. *fimbriatum*. Hoffm.
 var. 1. *pulvinatum*. (Hoffm.)
 var. 2. *lophæum*. (Ach.)
Leptogium subtile. (Schrad.)
Leptogium sinuatum. (Huds.)
 α. *Polinieri*. (Del.)
 var. 1. *crenulatum*. Nyl. (To this is referable
 L. fragrans. Mudd., from Cleveland.)
Leptogium plicatile. (Ach.)
Leptogium palmatum. (Huds.)
Leptogium tremelloides. (Linn.)
Leptogium fluviatile. (Huds.) = *L. rivulare*. (Ach.)
Leptogium chloromelum. (Sw.)
- B. *Mallotium*. Fw.
Leptogium saturninum. (Deks.)
Leptogium Hildenbrandii. (Garov.)
Leptogium Burgessii. (Lgft.)
- C. *Polychidium*. Ach.
Leptogium turgidum. (Ach.)
Leptogium Schraderi. (Bernh.)
Leptogium microscopicum. Nyl.
Leptogium muscicolum. (Sw.)

VI. LEPTOGIDIUM. Nyl. Separated from *Leptogium* by having the gonimic granules moniliformly concatenated.

Leptogidium dendriseum. Nyl.

VII. PYRENIDIUM. Nyl. If the apothecia are not parasitic this should be included in a distinct tribe.

Pyrenidium actinellum. Nyl.

The genus *Obryzum*, being entirely parasitic, is to be removed from the *Collemei* to the *Pyrenocarpei*.

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Grevillea,

A QUARTERLY RECORD OF CRYPTOGAMIC BOTANY
AND ITS LITERATURE.

NOTICES OF NORTH AMERICAN FUNGI.

By the REV. M. J. BERKELEY, M.A., F.L.S.

(Continued from page 64.)

CHEIROMYCES. *B. & C.*

Sporæ digitatæ e pulvinulo papillato oriundæ.

601. **Cheiromyces stillatus.** *B. & C.*—Berk. Crypt. Bot. cum icone.

On *Scirpus Eriophorus*. Pennsylvania, Michener. No. 4883. Alabama, Beaumont. No. 5087.

On a *Sphæropsis*. Forming little specks, which consist of a cellular papillose cushion, to which are fixed the digitate spores, .0006 long. The divisions, which are obtuse, vary from two to five, and are sometimes waved.

STIGMATELLA. *B. & C.*

Receptaculum e floccis flexuosis compactum ; sporæ magnæ pedicellatæ terminales.

602. **Stigmatella aurantiaca.** *B. & C.*—Berk. Crypt. Bot., p. 313, cum icone.

On *Sphæria Hibisci*. Car. Inf. No. 2665. Ravenel. No. 1328. On Lichen.

Minute, bright orange ; stem short, rather thick, composed of flexuous threads ; spores large, subglobose, with a short pedicel, forming a little group at the top of the stem.

603. **Volutella pulchra.** *B. & C.*—Apotheciiformis, subtus marginæque alba ciliata, supra rufula, sporis ellipticis.

On branches of willow. Connecticut. No. 5629.

Resembling the apothecia of some Lichen, scattered or confluent, white beneath, ciliated with short hairs ; disc carneo-rufous, with a white margin ; spores elliptic, .00025 long.

* **Fusarium lateritium.**—On various plants. On *Morus multi-caulis*. Car. Sup. No. 282. Car. Inf. No. 3029. Ravenel. No. 1183. On beech. Ohio.

604. **Fusarium marginatum.** *B. & C.*—Disco irregulari carneo, albo-marginato ; sporis minutis oblongis.

On stems of *Smilax*. Alabama, Beaumont. No. 4659.

Disc flesh-coloured, with a narrow white margin; spores oblong, minute.

605. **Fusarium microspermum.** *B. & C.*—Aurantiacum tenue confluens; sporis oblongis minutissimis.

On fig. Santee River. No. 1593.

Forming little gelatinous orange spots, which are immarginate, and often become confluent; spores extremely minute, oblong, short, narrower than in the last.

606. **Fusarium helotioides.** *B. & C.*—Disco convexo carneo quandoque brevissime stipitato; sporis minutissimis.

On *Ilex Prinoides*. Alabama, Peters. No. 4520.

Disc convex, flesh-coloured, occasionally with a very short stem, sometimes two or three burst through the bark together; spores even smaller than in the last.

607. **Fusarium Mikaniæ.** *B. & C.*—Erumpens pallidum gregarium epidermide cinctum; sporis obovatis.

On stems and leaves of *Mikania scandens*. Santee River. No. 1690a.

Gregarious, pale rose-coloured, surrounded by the cuticle; spores obovate, rather narrow.

608. **Fusarium nitidum.** *B. & C.*—Carneum solitarium, irregulare; sporis oblongis tenuibus lateralibus.

On *Aralia spinosa*. Pennsylvania, Michener. No. 3947.

Disc erumpent, solitary, irregular, flesh-coloured; spores springing laterally from the threads, oblong, narrow, .00026 long, about four times longer than broad.

609. **Fusarium erubescens.** *B. & C.*—Punctiforme pallide roseum demum albidum tomentosum; sporis minutissimis.

On dead bark. Alabama, Beaumont. No. 5081.

Scattered or arranged in lines, pale rose-coloured, becoming nearly white, tomentose; spores extremely minute.

610. **Fusarium semitectum.** *B. & Rav.*—Pallidum semitectum confluendo elongatum; sporis subclavatis.

On petioles of *Banana*. Philadelphia, Ravenel. No. 1718.

Forming little pallid specks, which, by confluence, become linear; spores oblongo-clavate, .0006-.0008 long, about four times longer than wide, sometimes abruptly swollen in the middle on one or both sides.

611. **Fusarium cymbiferum.** *B. & C.*—Punctiforme roseum; sporis cymbæformibus utrinque subapiculatis.

On stems of some herbaceous plant. Car. Sup. No. 348.

Dotlike, rose-coloured; spores cymbæform, slightly apiculated at either extremity, resembling those of some small spored *Vermicularia*.

* **Fusarium roseum.** *Lk.*—On *Ficus carica*. Car. Inf. No.

1268. On *Zea*. No. 1443. On pine. No. 1299. On *Amaranthus alba*. Kingston. Canada.

612. **Fusarium anomalum**. *B. & C.*—Erumpens carneum; sporis inarticulatis arcuatis utrinque subito contractis.

On *Gleditschia*. New England. Sprague. No. 5305.

Bursting through chinks in the cuticle, flesh-coloured; mycelium cellular; component threads stout, branched; spores arcuate, contracted suddenly at either end, $\cdot 0015$ - $\cdot 001$ long.

* **Fusarium Berkeleyi**. *Mont.*—On *Hibiscus syriacus*. *Car. Inf.* No. 2114. On Fig. *Car. Inf.* Ravenel. No. 1579. On *Cornus*. Alabama, Peters.

613. **Fusarium sticticum**. *B. & C.*—Punctiforme pallidum; sporis rectis arcuatisque, 3-4 septatis.

On peach twigs. *Car. Inf.* No. 4978.

Very small, punctiform, so as to look like mere dots to the naked eye, pallid; spores straight or arcuate, the joints sometimes constricted, $\cdot 001$ or more long.

* **Fusarium aurantiacum**. *Cl.*—On *Accacia julibrissin*. *Car. Inf.* No. 2807. On Gourds. No. 1394.

614. **Fusarium arcuatum**. *B. & C.*—Carneum circinans; sporis arcuatis triseptatis utrinque abrupte incurvatis.

On bark of *Pyrus malus*. *Car. Inf.* Curtis. No. 2638.

Bursting through the bark several together, leaving a vacant space in the middle; spores elongated, arcuate, triseptate, abruptly curved at either extremity.

615. **Fusarium pallens**. *B. & C.*—Minutum pallide carneum, sporis apicalibus, arcuatis triseptatis.

On the efflorescence of *Juncus*. *Car. Inf.* No. 3799.

Pale rose-coloured, irregular, composed of short threads, which sometimes have a constriction above, on which are seated the arcuate triseptate spores, about $\cdot 003$ long; sometimes they are developed at once upon the tips of the threads.

616. **Myrothecium convexum**. *B. & C.*—Receptaculis papillæformibus; sporis breviter fusiformibus.

On decaying grapes. Pennsylvania, Michener. No. 3835.

Receptacles papillæform, soon casting off the white outer covering; spores $\cdot 0003$ long, shortly fusiform, about half as much broad as long. In the last species they are much narrower.

* **Myrothecium roxidum**. *Tode.*—On leaves and inflorescence of *Syringa*. *Car. Inf.* No. 1357, 2794. On glumes of *Eleusine Indica*. No. 2232. New England, Murray. No. 5681.

* **Myrothecium verrucaria**. *Dittm.*—On rotten leaves. Pennsylvania, Michener. No. 4123. On grass. Alabama, Beaumont. No. 4622. On seeds of water melon. *Car. Inf.* No. 5032.

The spores vary from $\cdot 00025$ - $\cdot 0003$.

* **Myxormia atro-viridis.** *B. & Br.*—On decaying bark of *Rubus*. Alabama, Beaumont. No. 4890.

This genus differs from *Myrothecium* in the spores being concatenate.

* **Epicoccum scabrum.** *Cd.*—On dry roots of *Nyssa*. Car. Inf. No. 2351.

* **Epicoccum neglectum.** *Desm.*—On male inflorescence of *Zea*. Car. Inf. No. 2166.

* **Epicoccum micropus.** *Cd.*—On old pods of *Phaseolus*. Pennsylvania, Michener. No. 4402.

617. **Epicoccum simplex.** *B. & C.*—Punctiforme; sporis globosis simplicibus.

On leaves of *Arundinaria*. Car. Inf. No. 1378.

This agrees entirely in habit with *E. neglectum*, *Desm.*, but the spores are free from any marks, reticulations, or septa. No. 3177, on *Quercus fulcata*, and 3192, on *Q. nigra*, belong to the same genus, but I find no fruit in either.

* **Illosporium coccineum.** *Fr.*—On Lichen. Car. Inf. No. 1768, 1435. *Illosporium niveum*, *Desm.*, is *Ægerita candida*.

* **Ægerita candida.** *P.*—On decayed bulb of *Narcissus*. Car. Inf. No. 1405.

618. **Dendryphium fasciculare.** *B. & Rav.*—Floccis fasciculatis, sporis elongato-clavatis multiseptatis basi attenuatis.

On bark of *Liquidambar*. Car. Inf. Ravenel. No. 1410.

Forming minute fascicles of erect black articulated threads, which have a few very short branchlets above; spores elongato-clavate, greatly attenuated below, concatenate. There is a second species on stems of herbaceous plants. Pennsylvania, Michener. No. 4401, but indeterminable in the absence of spores.

* **Sporocybe byssoides.** *Fr.*—On dead herbaceous stems. Car. Inf. No. 2095, 1152. On vine, No. 1221. On gourd, No. 1526. On *Erythrina herbacea*. Santee River. No. 1618. On *Ficus* No. 2361.

* **Sporocybe calicioides.** *Fr.*—On bark of *Populus angulata*. Car. Inf. Ravenel. No. 1389. Maine, Rev. J. Blake. No. 6300.

The spores in the latter specimen are lemon-shaped, .0004 long. In Ravenel's specimen I find minute conidia.

* **Sporocybe alternata.** *B.*—On damp paper. Hillsborough. No. 6420.

* **Stachybotrys atra.** *Cd.*—On damp paper. No. 5875, 5899.

619. **Graphium clavisporum.** *B. & C.*—Minutum olivaceum e maculis orbicularibus brunneis oriundum; sporis linearibus clavatis pluriseptatis.

On vine leaves. Car. Inf. No. 1739, 1813.

Growing on brown orbicular spots; olive green; stem compacted of flexuous threads, which are free at the apex and waved; spores

linear or clavate pluriseptate, sometimes much attenuated below; when perfect there is a nucleus in each articulation.

620. **Graphium explicatum.** *B. & C.*—Atrum gregarium; floccis sursum explicatis; sporis globosis pallidoribus.

On twigs of *Quercus Catesbæi*. *Car. Inf.* No. 696. *Q. nigra*. No. 1096.

Black, gregarious; component flocci much expanded above, flexuous, the tips bearing little clusters of globose paler spores. No. 752 is probably a stylosporous state of some *Sphinctrina*.

621. **Monotospora setosa.** *B. & C.*—Floccis articulatis, apice simplicibus vel divis; sporis obovatis.

On decayed wood in moist places. *Car. Inf.* No. 2509.

Threads black, septate, simple, or with a single short division, in which case the obovate shortly pedicellate spore is lateral. Occasionally at the base of the spore there are one or two septa, and more rarely three, with vertical divisions.

* **Edemium atrum.** *Fr.*—On leaves of *Bignonia capreolata*. Santee River. No. 1025. On twigs. *Car. Inf.* No. 3863.

622. **Edemium sparsum.** *B. & Rav.*—Floccis laxè congestis articulatis fuscis; sporangiis obovatis, sporis minutis.

On bark of *Platanus*. *Car. Inf.* Ravenel. No. 1428.

Flocci loosely compacted, free above, and sometimes divided once; sporangia large, obovate, terminal; spores minute.

* **Podosporium rigidum.** *Schwein.*—On bark of various trees. *Car. Sup.* On *Rhus radicans*. No. 1944. On plum. *Car. Inf.* No. 1414. On *Ampelopsis bipinnata*. No. 2159. A small variety. No. 1287. Ravenel, appears to be a barren state.

623 **Podosporium briareus.** *B. & C.*—Mycelio reticulato; sporis longissimis flexuosis pluriseptatis è ramulis brevissimis oriundis.

On dead branches. *Car. Inf.* No. 1396.

Springing from decumbent reticulated threads; branchlets very short; spores flexuous, elongated, acute, 15-20 septate, attenuated above. A very fine species, confirming Schweinitz's genus, which differs from *Helminthosporium dendroideum*, *B. & Br.*, in the congested stem.

624. **Helminthosporium siliquosum.** *B. & C.*—Floccis brevissimis e mycelio repente oriundis; sporis longissimis apicalibus linearibus flexuosis obtusis pluriseptatis.

On branches of *Vitis vulpina* and *Smilax*. *Car. Inf.* No. 2347, 2519.

Mycelium of coarse creeping threads, which bear extremely short erect processes, terminated by very long linear obtuse spores, with from fifteen to twenty septa. Very distinct from every other species.

* **Helminthosporium macrocarpon.** *Grev.*—On branches of various trees. *Car. Inf.* No. 6147. On *Castanea vesca*. *Car. Sup.* No. 434. On *Cornus florida*. No. 854. On *Magnolia auriculata*. No. 4417.

Var. **Caudatum**, sporis basi valde attenuatis. On *Custanea pumila*. No. 4038. On oak. Car. Inf. Ravenel. No. 1237.

Spores .0035 long, very much attenuated below, but the species is scarcely distinct.

625. **Helminthosporium olivaceum**. *B. & R.*—Olivaceum; floccis brevibus e mycelio repente oriundis flexuosis quandoque nodulosis; sporis longissimis lineari-clavatis, 10-12 septatis.

On leaves of *Gleditschia*. Car. Inf. Ravenel. No. 1333.

Forming thin olive patches; mycelium consisting of creeping jointed threads, from which the short, erect, flexuous, sometimes nodulose fertile threads arise, which bear at their tips one or two very long, linear, clavate spores, with about twelve septa.

626. **Helminthosporium Petersii**. *B. & C.*—Floccis e maculis orbicularibus fuscis oriundis nodulosis demum atris obscuris; sporis clavatis 6-septatis.

On orbicular brown spots on the underside of leaves of *Smilax*. Car. Inf. No. 4942. On *Laurus Benzoin*. Alabama, Peters. No. 3875.

Flocci nodulose, at first pale, then so dark as to mask any septa, which, however, appear to be always absent; spores lateral, or more rarely apical, clavate, with about six septa, .004 long.

* **Helminthosporium foliculatum**. *Cl.*—On *Zea*. Pennsylvania, Michener. No. 4367. On cabbage stalks. New England. Murray. No. 5423. On *Quercus laurifolia* (living bark). Car. Inf. No. 1016; var. with the spores concatenate with an intervening globose cell.

627. **Helminthosporium fragilissimum**. *B. & C.*—Valde fragile; sporis clavatis cum floccis continuis.

On dead twigs of *Smilax*. Car. Inf. No. 2386. On *S. rotundifolia*. No. 3765.

Extremely brittle; spores clavate, so continuous with the septate flocci that there is no distinction.

628. **Helminthosporium Ravenelii**. *Curtis*.—Spongiosum; floccis nodosis ramosis inarticulatis; sporis cymbæformibus 4-articulatis. *H. Hoffmanni*. *B. Mss.*

Forming a thick spongy mass on the inflorescence of *Sporobolus Indicus*. Car. Inf. No. 1339. The fungus is so common on the inflorescence of this grass that specimens are rarely found without it, and its common name of Black-seed Grass is derived from it. Flocci branched, nodulose, apparently inarticulate; spores boat-shaped, with about four septa, the endochromes connected with each other by a little process as in some *Sphaeria*. The species occurs also in Cuba.

629. **Helminthosporium nodosum**. *B. & C.*—Sparsum; floccis articulatis ad articulos nodosis; sporis clavatis 6-septatis.

On inflorescence of *Eleusine Indica*. Car. Inf. No. 1331.

Not forming a spongy mass as in the last, but scattered; flocci

articulated, zigzag, nodose, sometimes divided slightly above; spores clavate, with about six septa.

630. **Helminthosporium arbuscula.** *B. & C.*—Floccis fasciculatis inarticulatis sursum processibus brevibus deorsum incrassatis apice sporiferis præditis; sporis subfusiformibus 3-septatis.

On bark of various trees. On *Acer*. *Car. Sup.* No. 54. On *Rhus copallina*. *Car. Inf.* No. 1445, with *Podosporium rigidum*. On *Carya*. No. 3234. On *Magnolia glauca*. *Ravenel*. No. 1671. On *Acer rubrum*. No. 1609.

631. **Helminthosporium rectum.** *B. & C.*—Floccis brevibus simplicibus triseptatis; sporis oblongis utrinque obtusis triseptatis.

On oak wood. *Car. Inf.* No. 2275.

Flocci short, simple, with but very few articulations, partially clothed with gelatinous shreds; spores oblong, obtuse at either end, triseptate.

632. **Helminthosporium obtusissimum.** *B. & C.*—Floccis tenuioribus septatis; sporis biseptatis utrinque obtusissimis.

On dead wood. *Car. Inf.* No. 3050.

Flocci longer and more slender than in the last, with more articulations; spores oblong, very obtuse at either end, with two or, more rarely, three septa. Resembling in some respect *H. oosporum*, *Cd.*, but the habit is very different.

633. **Helminthosporium molle.** *B. & C.*—Molle; floccis fasciculatis flexuosis obtusis simplicibus; sporis oblongis vel oblongo-ellipticis utrinque obtusis triseptatis. *Journ. Linn. Soc.* x., p. 361.

On *Passiflora*. *Car. Inf.* No. 2108. On *Dolichos* (cow pea). No. 1575, on which also it occurs in Cuba.

Forming a soft velvety stratum; flocci fasciculate, flexuous, simple, obtuse; spores oblong or oblongo-elliptic, obtuse at either end, triseptate.

634. **Helminthosporium interseminatum.** *B. & Rav.*—Effusum molle; floccis gracilibus ramosis hic illic sporiferis geniculatis; sporis oblongis bi-triseptatis.

On *Phytolacca decandra*. *Car. Inf.* *Ravenel*. No. 1192. On *Cicuta maculata*. Pennsylvania, Michener.

Forming a soft effused stratum; threads slender, branched above, geniculate, bearing here and there, the oblong 2-3 septate spores .00086 long.

635. **Helminthosporium Pruni.** *B. & C.*—Floccis gracilibus septatis articulis supra inflatis; sporis apicalibus subclavatis 4-septatis

On bark of *Prunus serotina*. *Car. Sup.* No. 775.

Threads slender, septate, articulated, one or two joints at the top swollen; spores seated at the tips of the threads, subclavate, slightly torulose, quadriseptate, often more or less distorted.

* **Helminthosporium apiculatum.** *Cd.*—On *Cornus florida*. *Car. Inf.* No. 2452, 3237. On oak. No. 1158.

Spores rather apiculate.

* **Helminthosporium velutinum.** *Lk.*—On dead twigs of *Laurus Caroliniana*. Car. Inf. Ravenel. No. 1798.

636. **Helminthosporium melanosporum.** *B. & C.*—Floccis gracilibus articulatis; sporis breviter fusiformibus multiseptatis; articulis verticaliter divisis.

On fallen branches. Car. Inf. No. 2306.

Threads slender, even, simple; spores dark, subfusiform, or cask-shaped, with many close septa, and a few vertical divisions. No. 6257. Boston, Sprague, differs in the threads being rather thicker, and not articulate.

* **Helminthosporium clavariarum.** *Desm.*—On *Clavaria*. Boston, Sprague. No. 6260.

Tulasne has shewn in his "Carpologia" that this is a condition of a *Sphaeria*.

637. **Helminthosporium dubium.** *B. & C.*—Molle; floccis brevibus obtusis basi divaricato-divisis; sporis oblongis, 7-septatis.

On the underside of leaves apparently of *Viburnum*. Alabama, Beaumont. No. 4651.

Flocci short, divided in a divaricate manner at the base, obtuse; spores oblong, with about seven septa, .0016 long. There is occasionally a single vertical septum.

638. **Helminthosporium inflatum.** *B. & Rav.*—Mycelio ramoso repente, floccis fuscis flexuosis; sporis arcuatis apiculatis, 4-septatis; articulo altero inflato colorato.

On branches of *Myrica cerifera*. Car. Inf. Ravenel. No. 1585.

Mycelium creeping, branched, colourless, giving rise to erect, flexuous dark threads, the two basal articulations of which are colourless bearing one or two spicules above, on which are seated the curved, somewhat lanceolate, quadriseptate spores, .0028 long, one joint of which is inflated and dark, the rest colourless.

639. **Helminthosporium subfuscum.** *B. & C.*—Molle; floccis pallidioribus basi divaricato-ramosis; articulo ultimo in sporam triseptatam sublanceolatam mutato.

On dead branches. New Jersey. No. 4679.

Threads rather thick, pale, branched in a divaricate manner at the base, but swollen below the ultimate joint, which is at first obtuse, forming the somewhat lanceolate, very slightly curved, triseptate spore, .002 long.

640. **Helminthosporium tiara.** *B. & Rav.*—Floccis tenuibus articulatis; sporis sublanceolatis curvulis, 4-septatis.

On fallen branches. Sulphur springs. Car. Sup. Ravenel. No. 1520.

Threads slender, unbranched, not the least flexuous; spores somewhat lanceolate, swollen below, .002-.0025 long. The spores in these three species are of a peculiar type, and closely resemble each other, but the flocci are very different.

* **Helminthosporium pyrorum.** *Desm.*—*Spilocaea Pomi*, Fr. *Cladosporium dendriticum*, Wallr.

On apples. No. 5935. On apple leaves. Canada, Poe. No. 6135. On pear leaves. Car. Inf. Ravenel. No. 3084.

641. **Drepanispora pannosa.** *B. & C.*—*Pannosa*, floccis flexuosis, hic illic processibus brevibus fertilibus præditis; sporis longissimis insigniter falcatis pluriseptatis.

Forming a cloth-like stratum on the cut surface of stumps. Car. Inf. No. 2354.

Mycelium creeping, sending off flexuous articulated flocci, which bear two or three short fertile processes above; spores very long, much curved, multiseptate.

* **Macrosporium cheiranthi.** *Fr.*—On *Prunus Caroliniensis*. Car. Inf. No. 1173. On turnip leaves. No. 2389. On *Capsicum*, No. 2798. On *Sterculia platanoides*. No. 2603. On *Castanea*, 3378. New York, Sartwell. No. 1797. On some herbaceous plant. No. 2646. On rose. Car. Inf. Ravenel. No. 1371. Alabama, Beaumont. No. 4624. Car. Sup. No. 513. On pea pods. No. 212. On *Capsicum*. No. 868. On *Phytolacca*, Virginian Mountains. No. 3361. *Rhus glabra*, No. 3295.

Var. **Circinans**, *B. & C.*, in maculas pallidas orbiculares circinans.

On cabbage leaves. Car. Inf. No. 2461. Growing in a circinate manner on orbicular pallid spots. There is a little difference in the spores, but scarcely sufficient to be considered specific.

Var. **Echinellum**, *B. & C.*, punctiforme floccis radiantibus, sporis angustis.

On leaves of *Platanus occidentalis*. Ravenel. No. 1762. Forming little echinulate specks; spores narrow.

642. **Macrosporium antennæforme.** *B. & C.*—Floccis brevibus, sporis torulosis elongatis deorsum attenuatis pluriseptatis.

On leaves of *Celtis*. Alabama, Peters. No. 4873.

Threads short, sometimes acute, sometimes dilated at the apex and fertile; spores attenuated below, elongated above, 12-18 septate torulose; occasionally they are shorter, more obtuse, with a few vertical septa. Two spores are sometimes formed at the two angles of the wedge-shaped terminal joint.

643. **Macrosporium stilbosporoideum.** *B. & C.*—Floccis brevissimis, quandoque obsoletis; sporis obovatis fenestratis.

On leaves of *Cratægus*. Alabama, Beaumont. No. 4654.

Mycelium creeping; fertile branches very short or obsolete; spores obovate, with about three transverse and several vertical divisions, resembling those of *Steganospora*, Cd., .001-.0013 long, about two-thirds as much broad, with a short pedicel.

644. **Mystrosporium Curtisii.** *B.*—Sporis doliiformibus pluriseptatis verticaliter divisis; pedicellis hyalinis elongatis; floccis acutis intermixtis.

On fallen branches. Car. Inf. No. 4913. New England, Sprague. No. 5399.

Mycelium decumbent, giving off the long pedicels of the cask-shaped spores, which have many horizontal and vertical septa, intermixed with acute dark threads.

645. **Helicoma Berkeleyi.** Curt.—Floccis e communi basi radiantibus; sporis apicalibus, spiris binis compactis pluriseptatis.

On *Liquidambar*. Car. Inf. Curtis. No. 1775. Ravenel. No. 1599. On *Fraxinus*. No. 1533.

Mycelium consisting of dark creeping articulated threads, which send off short branches, which divide above in a radiating manner, each division terminated by a spore consisting of two compact, many-septate spirals, .001-.001½ in diameter. These were sent out as *Helicoma binale*, and its variety, *apertum*, but were published by Curtis under the above name.

646. **Helicoma Curtisii.** B.—Floccis flexuosis elongatis; sporis 6-septatis.

On *Salix Babylonica*. Santee River. No. 1622.

Mycelium creeping, sending off elongated flexuous threads; spores with about seven uninucleate joints, the terminal one acute. This is perhaps too near *H. Mülleri*.

* **Polythrincium Trifolii.** Kze.—On leaves of red clover. Fort Malden, West Canada (Dr. Maclagan). No. 434.

* **Cladosporium herbarum.** Lk.—On decayed leaves from various localities.

647. **Cladosporium personatum.** B. & C.—Maculis orbicularibus fuscis; floccis brevibus; sporis oblongis clavatisque.

On leaves of *Arachis hypogæa*. Santee River. Ravenel. No. 1612. Looking very like a *Puccinia*.

Forming orbicular brown spots; flocci short, irregular; spores terminal, oblong, or clavate. A variety occurs on *Cassia occidentalis*. Car. Inf. No. 1748, which, amongst the usual threads, has others which are slender, articulated with longer oblong uniseptate spores.

648. **Cladosporium effusum.** B. & C.—Effusum tenue ferrugineum; floccis tenuibus flexuosis; sporis curvis.

On *Polygonum punctatum*. Society Hill. Car. Inf. No. 3775. On *Lobelia puberula*. No. 1742. On *Lobelia siphilitica* and *Nabalus altissima*. Pennsylvania, Michener. No. 4036, 3502.

Forming a thin ferruginous stratum, consisting of delicate flexuous threads; spores curved. These all seem to belong to one species, but I have seen spores in the first only.

649. **Cladosporium compactum.** B. & C.—Punctiforme; floccis tenuibus inarticulatis compactis; sporis breviter fusiformibus.

On leaves of *Arundinaria*. No. 3767.

Forming little dark specks, in which the threads are closely

compacted below, and free above, delicate, inarticulate, flexuous, sometimes branched; spores shortly fusiform, $\cdot 001\frac{1}{2}$ long.

650. **Cladosporium stenosporum.** *B. & C.*—Floccis continuis deorsum fuscis; sporis angustis.

On *Stylosanthus*. Car. Inf. No. 2067. On apple leaves. No. 2529.

Flocci unbranched, darker below, slender, articulated, springing from a decumbent mycelium; spores oblong, narrow.

651. **Cladosporium microspermum.** *B. & C.*—Floccis tenuibus divaricato-furcatis articulatis; sporis minutis uniseptatis.

On leaves of *Quercus obtusiloba*. Car. Inf. No. 1686.

Threads delicate, articulate, forked, the divisions divaricate; spores minute, subelliptic, uniseptate. No. 2361, on Fig, is apparently the same in a younger stage, as the spores are without any septum.

652. **Cladosporium cubisporum.** *B. & C.*—Floccis ramosis furcatis; sporis subquadratis.

On *Ribes*. Maine, Rev. J. Blake. No. 6318.

Threads forked about four times, articulated, even; spores subquadrate, sometimes obtuse at one end, truncate at the other, resembling those of *Cystopus cubicus*.

653. **Sporodum atropurpureum.** *B. & C.*—Floccis flexuosis sursum divis; sporis globosis concatenatis echinulatis.

On roots of *Arundinaria*. Car. Inf. No. 2605.

Forming minute tufts, consisting of flexuous articulated flocci, slightly divided above; spores connected by a little cylindrical process, globose, echinulate.

654. **Streptothrix atra.** *B. & C.*—Floccis parce articulatis sursum ramosis crenulato-flexuosis; sporis globosis vel subellipticis inquinantibus.

On Juniper. Alabama, Peters. No. 4594. Massachusetts, C. J. Sprague. No. 4895. On *Carya*. Pennsylvania, Michener. No. 3827. On *Carpinus Americana*. Pennsylvania. No. 3581. On peach. Car. Inf. No. 2789, 3282.

Threads branched above, repeatedly undulated, with short constrictions; spores globose or subelliptic, abundant, falling off as a black powder. No. 1605, Santee River, is a variety, with the threads far less undulated and the spores obovate.

* **Aspergillus maximus.** *Lk.*—On *Polypori*. Car. Sup. No. 646.

* **Aspergillus glaucus.**—On various decaying substances. Car. Inf. No. 2310. Rhode Island, Curtis. No. 5030. Car. Inf. On decayed grapes is a coremoid form of this, or some closely allied species.

* **Aspergillus roseus.** *Lk.*—On hen's dung. Car. Inf. No. 2724.

655. **Aspergillus alutaceus.** *B. & C.*—Floccis sporisque globosis alutaceis; sporophoris linearibus flexuosis.

On decaying Indian corn.

Tan coloured; threads slender; sporophores linear, flexuous; spores globose.

656. **Aspergillus cimmerius.** *B. & C.*—Aterrimus; floccis septatis; sporis ellipticis.

On fruit of Paeony. New England, Russell. No. 5896.

Jet black; flocci articulated; spores elliptic, $\cdot 0003$ long, connected by a little process; basal spores cuneiform.

657. **Rhinotrichum Curtisii.** *B.*—Aureum; floccis deorsum divisus flexuosis apice tumidis; sporis subglobosis. *Aspergillus laneus.* Schwein.

On oak posts. Ravenel. No 1765. On soft wood, in marshes. Car. Inf. No. 5025. On wood, under the eaves of a house. Car. Sup. No. 565, 566. On alder. No. 4958. Golden yellow. Texas, C. Wright. No. 3892. Pennsylvania, Michener. No. 5990.

Threads more or less branched, flexuous, sometimes curved above (as in specimens from Venezuela), articulate, the upper joint swollen, with occasionally a second, covered with little spicules, to which the globose or subglobose spores, $\cdot 0005$ in diameter, are attached.

658. **Rhinotrichum bellum.** *B. & C.*—Vivide aurantiacum; effusum; sporis oblongo-ellipticis.

On dead wood. Alabama, Beaumont. No. 4865.

Bright orange, forming a thin stratum; spores oblong, elliptic, $\cdot 0006$ long. The spores in *R. aurantiacum* are $\cdot 0006$ – $\cdot 0005$ long.

659. **Rhinotrichum armeniacum.** *B. & C.*—Armeniacum; floccis adscendentibus minute granulatis; sporis globosis.

On *Polyporus Schweinitzii.* Car. Inf. No. 3011.

Forming a thin apricot-coloured stratum; flocci ascending, articulated, the ultimate joint much elongated; granulated; spores globose.

660. **Rhinotrichum fulvum.** *B. & C.*—Tenue fulvum; mycelio pallidiore; articulo ultimo elongato echinulato; sporis subglobosis.

On dead wood. Car. Sup. Ravenel. No. 1784.

Forming a thin tawny stratum, which is paler below; threads articulated, the ultimate joint elongated, echinulated; spores subglobose. Externally resembling *Oidium fulvum.*

661. **Rhinotrichum fusiferum.** *B. & C.*—Minutum luteum; floccis brevibus inarticulatis apice sporis fusiformibus sparsis.

On fallen wood in moist places. Car. Inf. No. 4964.

Dull yellow flocci short, inarticulate, studded above with the fusiform spores $\cdot 0016$ – $\cdot 0015$ long. A very pretty species.

662. **Rhinotrichum ramosissimum.** *B. & C.*—Pallide alutaceum;

floccis ramosissimis articulatis articulo ultimo elongato spiculifero ; sporis obovatis.

On rotten wood. Car. Inf. No. 2430.

Pale tan-coloured, much branched, the ultimate joints elongated and covered with spicules ; spores obovate, apiculate below.

663. **Rhinotrichum tenellum.** *B. & C.*—Album ; floccis primum simplicibus apice clavatis spiculatis, dein proliferis ; sporis oblongo-ellipticis.

On rotten onions. Car. Inf. No. 2322.

White ; flocci at first erect, simple, with the terminal joints elongated and covered with strong spicules, then proliferous ; spores oblong, elliptic.

664. **Rhinotrichum cucumerinum.** *B. & C.*—Albidum ; floccis inarticulatis primum simplicibus sursum clavatis granulato-spiculatis dein proliferis ; sporis obovatis.

On stalks of *Zea*. Car. Sup. No. 4992.

Dirty white ; flocci inarticulate erect, at first simple, clavate above, rough with granules, then proliferous ; spores obovate, .0006-.0005 long. The spores are very different from those of the last species.

665. **Rhinotrichum breve.** *B. & C.*—Floccis brevibus apice vix echinulato sporiferis ; sporis breviter fusiformibus medio tumidis ; nucleo magno.

On the under side of oak leaves. *Quercus obtusiloba*. Car. Inf. No. 3002, 1728a.

Flocci short, incrassated at the apex, with one or two nodules or obscure spicules ; spores .0005 long, shortly fusiform, at first lemon-shaped, swollen in the middle, with a large nucleus.

666. **Rhopalomyces cucurbitarum.** *B. & R.*—Hyalinus ; floccis inarticulatis ; capitulis globosis echinulatis ; sporis obovatis ovatisque.

On putrid squashes. Car. Inf. Ravenel. No. 1864.

Resembling at first sight a *Mucor* ; threads hyaline, inarticulate ; head globose, echinulate ; spores obovate or ovate, attached to the spicules ; sometimes a second spore occurs.

667. **Peronospora viticola.** *B. & C.*—Floccis candidis sursum ramosissimis apicibus breviter emarginatis furcatisve ; sporis ovatis.

On the under side of leaves of *Vitis æstivalis*. Santee River, Ravenel. No. 1632. New England, Sprague. No. 5764. Missouri, Dr. Engelmann.

Forming orbicular white spots ; flocci articulated, much branched above ; the apices emarginate or shortly forked and acute ; spores ovate. In those varieties where the leaves are woolly beneath the spots are less conspicuous.

* **Peronospora infestans.** *Mont.*—Massachusetts, Russell. No. 6401. On potato leaves.

* **Polyactis cinerea.** *B.*—On dead *Gladiolus*. New England, Russell. No. 5951, 5959.

* **Polyactis vulgaris.** *Lk.*—On bean pods. Connecticut, C. Wright. No. 5642. On dead roses. Pennsylvania. No. 3424.

* **Polyactis fasciculata.** *Cd.*—On *Solanum Melongena*. Michener. No. 3818.

668. **Polyactis pulvinata.** *B. & C.*—Pulvinata gilva, floccis hic illic tumidis sursum ramosis; sporis globosis.

On branches of alder. No. 5432.

Forming little compact pinkish grey cushions; stems here and there swollen below, branched, with the main branches opposite, ultimate divisions obtuse; spores globose.

669. **Polyactis curta.** *B. & C.*—Minuta curta e maculis orbicularibus brunneis oriunda; floccis simplicibus vel apice lobatis; sporis subglobosis.

On the under side of leaves of *Magnolia*. Alabama, Beaumont. No. 5472.

Growing on orbicular brown spots; stems very short, with from one to two septa, simple, or slightly divided at the apex; spores subglobose, .0008 in diameter.

* **Verticillium lateritium.** *Fr.*—On *Arctium lappa*. No. 5917. Pennsylvania, Michener. No. 3931.

670. **Verticillium solediatum.** *B. & C.*—Gilvum punctiforme; floccis brevibus ramosis apicibus trifidis; sporis minutis oblongis.

On dead wood. Texas, C. Wright. No. 3777.

Forming little pinkish grey specks; flocci short, branched above; branches opposite or trifid, ultimate divisions trifid; spores minute, oblong.

* **Verticillium nanum.** *B. & Br.*—On sticks. New England, Sprague. No. 5679.

671. **Verticillium rosellum.** *B. & C.*—Pallide roseum; floccis parce ramosis apicem versus verticillatis; sporis minimis.

On fallen leaves of *Viscum*.

Pale rose-coloured, at length becoming white; flocci short, sparingly branched, verticillate at the apex; spores very small.

672. **Verticillium stigmatellum.** *B. & C.*—Albidum; floccis in glomerulas minimas collectis sursum ramosis verticillatis; sporis parvis ellipticis.

On decaying gourds. Car. Inf. No. 1816.

Dirty white, forming minute tufts; flocci much branched, verticillate above; spores small, elliptic.

673. **Verticillium pulvinatum.** *B. & C.*—Pulvinatum gilvum, deorsum nigrescens, floccis parce ramosis, sursum verticillatis; sporis minimis subellipticis.

On *Acacia Julibrissin*. Car. Inf. No. 2667.

Pulvinate, reddish grey in the younger parts, black where old;

flocci sparingly branched, slightly verticillate above; spores very small, subelliptic.

* **Botrytis Tilletii.** *Desm.*—On rotten wood and leaves. Car. Inf. No. 2036. New England, Sprague. No. 5717.

* **Botrytis Bassiana.** *Mont.*—On dead caterpillars. Virginia. No. 6120. T. S. Pleasants.

674. **Botrytis pallida.** *B. & C.*—Effusa argillacea, sursum ramosa apicibus plurilobatis; sporis globosis.

On leaves of *Arundinaria*. No. 5009.

Forming effused clay-coloured patches; flocci sparingly branched above, the apices of the branches with many short processes; spores globose.

675. **Botrytis Micheneri.** *B. & C.*—Nivea; floccis ramosis apicibus divis; sporis globosis minimis.

On moss. Pennsylvania, Michener. No. 3570.

Forming little snow-white scattered tufts; flocci branched, the apices divided into short processes; spores very minute, globose.

676. **Botrytis prasina.** *B. & C.*—Pallide viridis; floccis dichotomis, apicibus furcatis; sporis oblongo-ellipticis.

On decayed oak. Car. Inf. No. 3720.

Forming little green tufts, which at first look like some hairy *Sphaeria*; flocci dichotomous, the ultimate divisions tolerably long; spores oblong-elliptic, .0004 long.

* **Stachylidium diffusum.** *Fr.*—On smooth bark. New England, Sprague. No. 5811.

* **Dactylium dendroides.** *Fr.*—On dead fungi. Pennsylvania, Michener. No. 3551. Rhode Island, Bennett. No. 2634.

* **Dactylium macrosporum.** *Fr.*—On dead wood. Car. Inf. No. 2352, 2792, 4954. Santee River. Ravenel. No. 1685. On leaves. Car. Inf. No. 2721.

* **Dactylium roseum.** *B.*—On various decaying bodies. Car. Inf. No. 2145, 2152, 3280. New Jersey. No. 4699.

* **Penicillium glaucum.** *Lk.*—On leaves of *Magnolia*. Car. Inf. No. 2201.

* **Penicillium crustaceum.** *Fr.*—On Ink. Car. Inf. No. 2097.

* **Penicillium armeniacum.** *B.*—On Indian corn. Car. Inf. No. 6363.

* **Penicillium candidum.** *Lk.*—Rhode Island, Bennett. No. 2633.

677. **Penicillium epigeum.** *B. & C.*—Crassum fulvum; floccis ramosis deorsum cylindricis, articulis sursum cuneatis; sporis inferioribus ellipticis, superioribus globosis.

On the ground. New England, Murray. No. 5669.

Forming a thick tawny mass; threads much branched, cylindrical below, the joints of the upper divisions wedge-shaped, or

somewhat obovate; the lower spores subelliptic, with a little connecting pedicel, the upper globose, '0006-'00057.

* **Oidium simile.** *B.*—On very decayed wood. Car. Inf. No. 3026. On pine. No. 2334. Ohio.

678. **Oidium pulvinatum.** *B. & C.*—Pulvinatum pallide gilvum; sporis magnis ellipticis, vel appendiculo addito limoniformibus.

On damp rotten logs. No. 1573.

Forming little pulvinate pinkish-grey tufts; threads short, consisting of about two joints; spores lemon-shaped; the little process at either end being external to the epispore. It must be remarked that externally there is the strongest resemblance between this, *Verticillium pulvinatum*, and *Polyactis pulvinata*, though the structure is very different. All may ultimately prove to be forms of one species. I have omitted *O. crustaceum*, *B. & C.*, on stale curds, because it is undoubtedly a state of some higher fungus. *O. citrinellum*, parasitic on *Peziza albo-violascens*, No. 2664, and also those *Oidia* which are states of Erysiphe. Amongst them No. 3723, sent by Lindheimer from Texas, on *Vitis rupestris*, is the vine mildew. The numbers are 3034, 5983, 6153. Ravenel. No. 1675, 1589, and Dr. MacLagan, 431.

* **Oidium fructigenum.** *Kze.*—On plums. Car. Sup. 423.

* **Fusidium griseum.** *Fr.*—On dead leaves. Car. Inf. No. 2607.

679. **Fusidium torulosum.** *B. & C.*—Candidum tenue, sporis 6-septatis ad commissuras incrassatis.

On decayed cabbage stalks. Car. Inf. No. 6034. On pine. Pennsylvania, Michener. No. 4404. On herbaceous plants. No. 4065.

Forming a thin white stratum; spores fusiform, with about six septa, curiously projecting at the commissures, sometimes almost annulated, very variable in length in different specimens, '002, '001, '001, 0013 long.

* **Zygodemus fuscus.** *Cd.*—On various decaying substances. Pennsylvania, Michener. No. 3923, 3930, 4533, 5135, 5137, 6111. Ravenel. Car. Inf. No. 1564. Alabama, Peters. 4587, 5227.

680. **Zygodemus pannosus.** *B. & C.*—Argillacius, late effusus; granulatus; sporis globosis minoribus.

On the under side of fallen limbs. Car. Inf. No. 3007. Pennsylvania, Michener. No. 4380.

Forming a wide-spreading, cloth-like, clay-coloured stratum; spores globose, echinulate, small.

681. **Zygodemus hydnoideus.** *B. & C.*—Effusus, rubiginosus granulatus; sporis minute echinulatis.

On rotten wood. Pennsylvania, Michener. No. 4335. Car. Inf. No. 2485, 4801.

The two latter, sent out as *Thelephora granosa*. Rust-coloured, effused, granulated, so as to look like a *Hydnum*; spores globose, minutely echinulate, '0006 in diameter, differs principally in colour from the last.

LICHENOLOGICAL MEMORABILIA, No. 6.

By the REV. W. A. LEIGHTON, B.A., Camb., F.L.S., F.B.S. Ed.

Lichenological Researches in North and South Wales in 1874.

The delightful month of May and part of June I this year spent at the retired and romantic little village of Trefriw, in the vale of Conway, on the western bank of the river Conway; and as a sequel to my paper published two years ago in "Grevillea," on the lichens obtained at Bettws-y-coed and the Gwydir woods, it may be desirable to record the results of my researches. Before doing so, it may be as well to mention the abundance of fine large ancient and still vigorous yew trees which are especially noticeable in the churchyards of the district. The name Trefriw means the *town* or village of the *yew*, and the inhabitants told me that the church was within a few years past surrounded by many yews, two only of which of large dimensions now remain at the west end. The ancient church of Llanrochwyn, founded by a Welsh saint, St. Rochwyn, about 696, possesses two magnificent yews, which appear coeval with the church, although the present building contains no architectural feature earlier than Early English or very early Decorated.

The curious little church of Caerhûn, four miles from Trefriw, is built on the centre of the square Roman camp or station of Conovium, and in the churchyard are several still larger and finer yew trees than any others in the district, leading us by their magnificent size to the conclusion that they are probably coeval with the foundation of the church after the departure of the Romans. There is a singular peculiarity in these churches, their chancels are not placed continuously at the east end of the nave, but parallel to and of equal size and length with the nave, giving the appearance of two small churches built side by side.

The lichens which I gathered in the woods around Trefriw were *Arthonia aspersella*, LEIGHT., on holly. *A. lurida*, ACH., on holly and Scotch fir. *A. Swartziana*, ACH., on holly, mountain-ash, oak, ivy, and alder. *A. vinosa*, LEIGHT., on oak and its var. *pineti*, KORB. *A. spadicea*, LEIGHT., on holly. *A. ochracea*, DUF. and *A. astroideastera*, NYL. *A. punctilliformis*, LEIGHT., *species nova*, very rare, on holly. *Opegrapha vulgata*, ACH., on oak. *O. viridis*, PERS., on holly. *O. herpetica*, f. *rufescens*, PERS., on holly. *O. involuta*, NYL., on holly. *O. atra*, f. *denigrata*, (ACH.) *O. Turneri*, LEIGHT.; *Verrucaria epidermidis*, f. *cinereo-pruinosa*, SCHÆR., on holly; *V. chlorotica*, f. *carpineae*, SCHÆR., on mountain-ash; *V. nitida*, (WEIG.), *V. epidermidis*, f. *fallax*, NYL., on mountain-ash, crab, birch, and sweet chestnut; *V. Laburni*, LEIGHT., on alder; *V. megaspora*, NYL., on beech; *V. conformis*, NYL., on oak; *Graphis pulverulenta*, ACH.; *G. elegans*, SM., on pine trees; *Lecidea subturgidula*, NYL., a single specimen, on holly; *L. parasema*, (ACH.), on

mountain-ash and willows; *L. carneola*, ACH., very fine on oak and beech; *L. resinæ*, FR.; *L. melæna*, NYL., on fir; *L. spododes* (?) NYL., on fir; *L. pulverea*, BORR. (rare). *L. nigriflula*, NYL., on fir. *Pertusaria communis*, *P. fallax*, *P. leioplaca*, and *P. ceuthocarpa*, on beech and sycamore, the latter rare. *Lecanora expallens*, ACH., and *Lecanora pavella*, *f. tumidula*, (PERS.), very fine and abundant on old sycamores. *Stictina sylvatica*, *S. fuliginosa*, and *S. scrobiculata*, *Neplromium Lusitanicum*, SCHÆR. *Ramalina calicaris*, FR. and what I incline to regard as a new species of *Melaspilea* with uniseptate vermiform spores, very sparingly on oak, and which I name *M. vermiformis*, and also a very singular-looking plant growing on the fir-tree resin in company with *L. resinæ*, consisting of scattered globular or verruciform pale olive-green apothecia, depressed at the apex, and containing lineari-oblong 3-septate colourless spores, arranged in double series in the asci. It is doubtful whether this should be classed with lichens or fungi—if to the former I would name it *Lecidea chlorocarpa*, LEIGHT.

From the rocks in the woods I obtained *Opegrapha saxigena*, TAYL., excessively fine, well developed, and abundant. *Verrucaria nigrescens*, (PERS.). *V. chlorotica*, *f. codonoidea*, LEIGHT. *V. horistica*, LEIGHT., very fine. *V. lectissima*, (FR.). *V. gemmifera*, TAYL. *V. rupestris*, SCHRAD. *V. mesotropa*, NYL. *Lecidea dealbatula*, NYL., very fine and abundant in one locality. *L. Oederi*, ACH. *L. pelidna*, ACH. *L. lactea* (FLK.). *L. fusco-atra*, *f. grisella*, FLK. *L. subkochiana*, NYL. *L. concreta*? WAHL. *L. panæola*, ACH. *Lecanora argopholis*, WAHL.

On the rocks about the beautiful Trefriw waterfall occurred *Verrucaria margacea*, WHNB. *V. lucens*, TAYL., fine and abundant with 3, 5, and 7-septate spores. *V. pyrenophora*, ACH., with simple 1- and 3-septate spores. *V. umbrina*, WHNB. *V. peripherica*, (TAYL.). *V. erratica*, (MASS.). *Lecidea excentrica*, ACH. *L. leiotea*, NYL., *L. coarctata*, *f. elacista*, and *involuta*; *L. leucoclinella*; *L. protrusa*, FR., *L. rivulosa*, ACH., *L. citrinella*, ACH., *L. lenticularis*, ACH., *L. chalybeia*, BORR., *Stereocaulon paschale*, (ACH.), and *Lecanora lacustris*, (WITH.).

On the rocks and stone walls around the romantic Lake *Llyn Geirionydd*, the burial place of the Welsh poet Taliessin, about three miles S.W. from Trefriw, I collected *Verrucaria lectissima*, (FR.), *Lecidea Parmeliarum*, SMRF., very fine and abundant on *Parmelia omphalodes*, which was also in fine fruit, *L. lactea* (FLK.). *L. subkochiana*, NYL., *L. silacea*, ACH., *L. lithophila*, ACH. *L. aglæa*, (SMRF.). *L. fuliginosa*, TAYL., very fine and abundant. *Opegrapha saxicola*, ACH., *f. gyrocarpa*, (ZW.), *Lecanora intricata*, (SCHRAD.), *Parmelia physodes*, *f. platyphylla*, ACH. *Squamaria saxicola*, (POLL.), and *versicolor*, (PERS.), *Lecanora badia*, ACH. *Phycia lychnea*, ACH. *Lecanora fuscata*, (SCHRAD.). *Parmelia conspersa*, *f. isidiata*, ANZI. *Lecanora polytropa*, *f. conglobata*, (SMRF.).

On the yew trees in Llanrochwyn churchyard were *Opegrapha atra*, *f. nigrita*, LEIGHT.; an *Opegrapha* which on more attentive examination may perhaps prove new. *O. taxicola*, LEIGHT. *Lecanora sophodes*, *f. roboris*, (DUF.).

Around the Conway falls I met with *Verrucaria lucens*, TAYL., *Stigmatidium Hutchinsiae*, LEIGHT., *Verrucaria chlorotica*, (ACH.), *Platysma ulophylla*, (ACH.), *Pertusaria multipunctata*, (TURN.), *Lecanora lacustris*, (WITH.), *L. tartarea*, *f. frigida*, ACH.

In August I passed a couple of days at Bwlth, South Wales, in company with the Caradoc Field Club, and gathered there *Verrucaria rupestris*, (SCHRAD.). *V. chlorotica*, *f. carpinea*, SCHÆR. *V. biformis*, BORR. *Lecidea excentrica*, ACH. *L. sylvicola*, FLOT. *L. turgidula*, FR. *L. endoleuca*, NYL. *Arthonia astroidea*, ACH., on ash and mountain-ash. *A. vinosà*, *f. pineti*, on holly. *Opegrapha varia*, *f. diaphora*, ACH., on ash. *O. atra* *f. nigrita*, LEIGHT. *Graphis scripta*, var. *serpentina*, *f. eutypa*, ACH. *Lecidea tricolor*, (WITH.), on holly, with spermogonia; *Calicium quercinum*, PERS., *C. hyperellum*, ACH., and *C. stemoneum*, ACH., on birch. *Sphinctrina turbinata*, (PERS.), *Lecidea alboatra*, *f. epipolia*, ACH., on holly. *L. citrinella*, ACH., *L. turgidula*, FR., *L. endoleuca*, NYL., *Lecanora expallens*, ACH., *Opegrapha atra*, *f. arthonoidea*, = Schær. 463 and 634. *Opegrapha atra*, *f. viridis*, = Anzi Ital. Sup. 334. *Lecidea fusco-atra*, *f. Mosigii*, ACH. *Bæomyces rufus*, D.C.

A week in the month of September was passed at Pwlhelli, North Wales, and on the Gimlet Rock in the bay I detected *Lichina confinis*, AG., *Ramalina cuspidata*, ACH., *Verrucaria maura*, (WHLNB.), *Lecidia protrusa*, FR., *Lecanora prosecha*, ACH., *Lecidea stellulata*, TAYL., *L. coarctata*, *f. involuta*, TAYL., *Placodium murorum*, HOFFM., *f. obliteratum*, (PERS.), *Placodium callospium* (ACH.), *f. plicatum*, WEDD., *Lecanora ferruginea*, (HUDS.), *f. festiva*, (ACH.), *Lecidea lithophila*, ACH., *L. intumescens*, FLOT.), *Pertusaria Westringii*, (ACH.), *Endocarpon miniatum*, (L.), var. *complicatum*, (SW.), *Verrucaria nigrescens*, PERS., *Physcia aquila*, (ACH.), in fruit; *Lecanora squamulosa*, (SCHRAD.), *Arthonia varians*, DAV.; and on the stems of grass on the sands, but very sparingly, *Lecanora pyreniospora*, NYL., *Lecidea nigritula*, NYL., and *Lecanora varia*, (EHRH.), all growing together.

One day we crossed to Nevin, on the north shore of the promontory of Lleyln, but were disappointed in not finding any cliffs or rocks on the beach. *Verrucaria nigrescens*, PERS., covered the stone walls for miles. We also met with *Verrucaria chlorotica*, (ACH.), var. *codonoidea*, LEIGHT., *Collema limosum*, ACH., and *Lecidea polycarpa*, FLK.

We now turned our steps to Llanbedrog, a village four miles S.W. from Pwlhelli; and on a rock above the village projecting into the sea, we obtained a goodly harvest of lichens. First and foremost was a little *Lecidea*, growing parasitically on rock, on a

sterile yellow thallus (probably *Pertusaria sulphurea*, SCHÆR.), which I believe to be new, and named *Lecidea advenula*, LEIGHT.; *L. aglæa*, SMRF., intermixed with *L. fuliginosa*, TAYL.; *Lecidea eleochroma*, ACH., associated with *Lecanora sophodes*, (ACH.), and *L. expallens*, ACH., on pales. *Ramalina polymorpha*, ACH., *f. ligulata*, ACH.; *Lecidea grossa*, PERS.; *L. endoleuca*, NYL.; *Stigmatidium crassum*, DUB.; *Opegrapha herpetica*, ACH., *f. rubella*, PERS.; *Lecanora subfusca*, (L.), *f. coilocarpa*, ACH., *Lecidea biformigera*, LEIGHT.; *Lecidea concreta*, WAHL.; *Lecidea myriocarpa*, (D.C.), on rock; *Verrucaria erratica*, (MASS.); and on some fine old sycamores close to the village, *Lecidea canescens*, (DICKS.), in magnificent fruit; *Pertusaria fallax*, (PERS.), *Calicium trajectorym*, NYL., *Collema nigrescens*, L., *Lecanora parella*, (L.), *f. pallescens*, (L.), *Physcia stellaris*, (L.), and *Verrucaria nitida*, (WEIG.).

We next day went by rail to Portmadoc, and there took a car to Beddgelert. The adjoining town of Tremadoc would be a capital place to sojourn at for the botanical exploration of the neighbourhood, the rocks and woods skirting the road to Beddgelert being grand and sublime in the extreme, with mountains of considerable height and promise in the distance. Indeed, this is the route the tourist should take to see the Pass of Aberglaslyn in its grand sublimity, the return from Beddgelert to Tremadoc being comparatively tame.

Arrived at Beddgelert, we walked to the Lake Llyn Dinas, and on the rocks flanking its shores found *Ramalina subfarinacea*, NYL., *Lecidea stellulata*, TAYL., *L. rivulosa*, ACH., *f. obscurior*, CROMBIE, and a curious variety of *Lecanora cinerea*, (L.), with the areolæ elevated into convex squamulæ, and which I have consequently named var. *lepidota*. The same state I have previously possessed, unnamed, from Jersey and from Barmouth. On the trees we only found *Arthonia vinosa*, LEIGHT. var. *pineti*, KORB.; *Arthonia Swartziana*, ACH.; and *Verrucaria epidermidis*, ACH., var. *fallax*, NYL.

Returning homewards, we stayed an evening at Barmouth, and there gathered, in Mr. Salwey's original locality, good specimens of *Lecidea Taylori*, SALW., *Lecidea jurana*, SCHÆR., and *Pyrenopsis fuscicula*, NYL., is a single specimen.

I had nearly forgotten to mention that the last day of our stay at Trefriw was rendered memorable by the fortunate discovery by my friend and companion, Mr. Wm. Phillips, on the soil and decaying *Jungermannia* of a broken roadside bank of *Thelocarpon superellum*, NYL., and of a new fungus, a *Periconia*, which Mr. Berkeley has named *Periconia Phillipsii*; a well-merited and deserved compliment to its discoverer, whose talents are now so well and so far known as an ardent, enthusiastic, and scientific student of British Fungi.

ON "PARMELIA MILLANIANA, STIRTON."

On the 5th November, 1874, Dr. Hugh Macmillan, of Glasgow, sent me a sterile thallus which he had found growing with *Parmelia lævigata*, in Glen Crow, at the head of Loch Long, Argyleshire, and which both he and Dr. Stirton, of Glasgow, regarded as new and distinct, and to which the latter had given the name of *P. Millaniana*, in honour of the discoverer, Dr. Macmillan. Dr. Macmillan asked in his letter, "Is there any possibility of its being your *P. endochlora*, which Dr. Taylor found associated with *P. lævigata* in Ireland?" and requested my reply by *return of post*. I immediately compared Dr. Macmillan's specimen with an authentic specimen from Dr. Taylor himself, gathered by him at Dunkerron, which I have in my herbarium, and found them quite identical. On the same day, November 6th, I wrote to this effect to Dr. Macmillan. Judge, then, of my astonishment, when on opening the December No. of "Grevillea," I found this selfsame lichen, notwithstanding my careful and communicated identification, described and published as "*P. Millaniana*, STIRTON," and as a "*species nova*!" Is this advancing or retarding the progress of science?

Arthonia lurida, ACH.

In the same paper Dr. Stirton declares that his *Lecidea emphyssa* (which from his description could never be a *Lecidea*) is identical with *Arthonia lurida*, ACH. As I have never had an opportunity of examining and comparing Dr. Stirton's lichen, I cannot say whether this be correct or otherwise. But he makes such startling remarks respecting the external and internal structure of *A. lurida*, that I really must be pardoned if I express a doubt whether Dr. Stirton really knows *A. lurida*. I have, from time to time, collected and examined scores, nay hundreds, of specimens of *A. lurida*, but have never detected any character which could by any possibility lead me to question its being a true *Arthonia*. The internal structure and spores I have invariably found as figured in my "British Graphideæ," t. 8, fig. 38, and described in my Lichen-Flora. I have tried the effect of liq. potassæ, but could not perceive any distinct paraphyses, the structure being that of a gelatinoso-concrete mass, as in all other *Arthoniæ*, in which the rotundopyriform asci are imbedded, as it were, in cavities, carved out of this mass. Such is the structure which all authors whom I have ever consulted attribute to the genus *Arthonia* "thalamium paraphysisibus discretis nullis" (Nyl. *Scand.* 257); "Lamina sporigera grumoso-floccosa paraphysisibus destituta" (Korb. *Syst.* 280). Massalongo does, indeed, say (*Ric.* 50), "paraphysisibus tennibus;" but Th. M. Fries, in his *Lich. Arctoi*, 240, corrects this thus: "'Paraphyses capillares' de quibus mentionem facit cel. Massalongo (l.c.) non adsunt." Et sic omnes. Nor could I produce any "cærulescent

tint" by applying solution of iodine after liq. potassæ; and, indeed, all my experience tends to prove that these two chemicals, whether applied together or consecutively, only nullify each other. May I be permitted to hint the possibility that Dr. Stirton has had under his microscope a section of an apothecium of some other lichen which has accidentally grown strayingly on the same piece of wood with the Arthonia? I shall have great pleasure in sending Dr. Stirton a specimen of true *A. lurida*, if he will signify his wish thereanent.

W. A. LEIGHTON.

NATURAL HISTORY OF DIATOMACEÆ.

By DR. A. M. EDWARDS.

Dr. Edwards has sent us a copy of the chapter from the Reports of the Geological Survey on the above subject, which is written in a popular style for general readers, and extends over nearly 100 quarto pages. The sections into which it is divided are 1. Introduction; 2, Movements of the Diatomaceæ. 3, Mode of growth of the Diatomaceæ. 4, Reproduction of the Diatomaceæ. 5, Modes of occurrence and uses to man of the Diatomaceæ. 6, The Diatomaceæ and Geology. 7, Directions for collecting, preserving, and transporting specimens of diatomaceæ. 8, How to prepare specimens of diatomaceæ for examination and study by means of the microscope. This enumeration of the sections will give an idea of the scope of the "History," which will doubtless be of eminent service in the direction for which it is intended. Unfortunately the general public know but little, and care less, about the lower Cryptogamia, except for Algæ grouped as pretty objects for the drawing room, or ornate diatoms arranged in groups to please soirée hunters, or stewed mushrooms, and Perigord pies.

ONION BLIGHT IN THE UNITED STATES.—We have received the Annual Report of the Department of Agriculture for 1872, and find an account (at p. 193) of a destructive onion blight which had made its appearance in a field of growing onions. The cause is supposed to be a species of *Peronospora*, but the rough figures forbid any such conclusion. It is very much more like a species of *Fusisporium*. There would appear from the description to be at least three parasites, one of which is an *Oidium*, and the other (beside the *Fusisporium*?) it is very difficult, as the writer is evidently no mycologist, to make out from either the rude figure or the vague description. The spores as figured resemble those of *Urocystis*; but if they are produced on the branches of erect threads, then they belong to quite another order, and may be some black mould (*Dematiei*). If so, the *Fusisporium* (?) or *Oidium* are much more likely to be the cause of the disease.

BRITISH FUNGI.

By M. C. COOKE. (Continued from Vol. ^{iii p 69 ?} ~~ii~~, p. 166.)

The following are some of the additions recently made to the British Flora. Messrs. Berkeley and Broome have described several additional species in a recent number of the "Annals and Magazine of Natural History."

Peziza (Macropodes) Ciborium. *Fr.*

Cinnamon, cups campanulate, subruinose, stem even, fibrillose, rooting at the base. Sporidia elliptical.—*Fries. Sys. Myc. ii.*, 59. *B. & Br., Ann. N.H., No.* 1479.

On the ground.

This is the largest form indicated by Fries, and not that figured in "Flora Danica," *t.* 1078, *fig.* 1. "There are a few brown myceloid fibres at the base, while the earth above is filled with scattered patches of spawn." Sporidia $\cdot 001 \times \cdot 0004\text{--}\cdot 0005$ in. *B. & Br.* $\cdot 025 \times \cdot 012$ m.m.

Peziza (Cupulares) tectoria. *Cooke.*

Sessile, or very shortly stipitate, cups at first globose, then expanded, whitish, furfuraceous, at length smooth, disc plane, subumbilicate, pale ochraceous, margin uneven, splitting; paraphyses linear, hyaline, asci cylindrical. Sporidia uniseriate, elliptical.

On damp plaster wall. Shrewsbury (W. Phillips).

At first appearing as a small white furfuraceous ball, seated on a white mycelium $\frac{1}{4}$ in. across; when old becoming very irregular in form, $1\frac{3}{4}$ in. across; margin rather thick and jagged. The tips of the asci are clear blue with iodine. Sporidia $\cdot 018 \times \cdot 009$ m.m. to $\cdot 02 \times \cdot 01$ m.m.

This species was at first confounded with *P. viridaria*, B. & Br., from which it differs in colour, larger size, uncoloured paraphyses, and different sporidia. The sporidia in *P. viridaria* are $\cdot 015 \times \cdot 008$ m.m.

Peziza (Cupulares) sepiatra. *Cooke.*

Sessile, or very shortly stipitate. Cups at first hemispherical, soon expanded and nearly plane, umber-brown, slightly furfuraceous, margin narrow, scarcely elevated; disc plane, sometimes umbilicate, darker, nearly pitch-brown; asci cylindrical. Sporidia elliptic, paraphyses clavate at the tips. (Fig. 135.)

On charcoal, Epping. On the ground, Shrewsbury (W. Phillips).

Not more than $\frac{1}{2}$ an inch broad, often less, scarcely distinguished at the first from the charcoal on which it grows, rather fleshy and brittle, gregarious. Sporidia $\cdot 02\text{--}\cdot 022 \times \cdot 011$ m.m., perhaps approaching a small form of *P. repanda*, but distinct, the sporidia are larger. The large cells of the cup in *P. repanda* have been noticed by some authors from their extraordinary size, about $\cdot 09 \times \cdot 06$ m.m., whereas the largest in *P. sepiatra* are about $\cdot 03$ m.m. diam.

Peziza (Humaria) vivida. Nyl.

Solitary or gregarious, fleshy, stipitate, cups at first clavate, then open and cupshaped, disc concave, red, becoming somewhat brownish; externally paler and fibrillose, stem thick, expanding into the cup; asci clavate. Sporidia elliptical, with 1-2 nuclei, epispore delicately granulated.—Nylander in *Flora* (1865) p. 467. *Rabh. Myc. Eur. iii.*, p. 7, t. 4, fig. 3. *Peziza Polytrichi.* *Rabh. Herb. Myc. ii. No.* 310.

Amongst moss. Wiltshire (C. E. B). Scotland (in herb. Edin.)

Cups 2-4 lines broad and high. Sporidia $\cdot 025 \times \cdot 012$ m.m. This is one of the species which has been confounded with *P. polytrichi* and *P. leucoloma*. In the Edinburgh Herbarium it is referred to the latter by Dr. Mougeot. The fibrillose coating of the cup and the large granular sporidia are sufficient to distinguish it from any of its immediate allies. It would appear that the true *P. Polytrichi*, Schum., is a smaller plant, and has smooth subglobose sporidia. Most probably the *Peziza leucoloma* of Rabenhurst's "Mycologia," and of Nylander and Karsten are also *P. Polytrichi*, with sporidia $\cdot 011$ - $\cdot 013$ m.m. diameter. The *Peziza Polytrichi* of Karsten and also of Nylander is *Peziza Crouani*, C. (*Ascobolus Crouani* of the "Handbook"), with reticulated globose sporidia. The specimens published by Fuckel as *P. leucoloma*, appear to be identical with those which Messrs. Berkeley and Broome had in view as that species (*Ann. Nat. Hist.*, No. 1156*), with elliptical nucleated sporidia, $\cdot 02 \times \cdot 01$ m.m. The figure in "Grevillea" (*iii. fig. 73*) is from Fuckel's plant. In order to render the character of the fruit in the three species clear and distinct, we will summarise our conclusions, thus:—

P. vivida, Nyl. Sporidia elliptic, granulated, $\cdot 025 \times \cdot 012$ m.m.

P. leucoloma, P. Sporidia elliptic, smooth, $\cdot 02 \times \cdot 01$ m.m.

P. Polytrichi, Sch. Sporidia globose, smooth, $\cdot 011$ — $\cdot 013$ m.m.

Peziza (Humaria) exidiiformis. B. & Br.

Orbicular, lurid purple; margin elevated, inflexed, stem incrassated upwards, hymenium cribose. Sporidia broadly elliptical, binucleate, paraphyses slightly clavate.—*B. & Br., Ann. N.H., No.* 1480.

On silver sand, and rotten wood.

Two lines or more broad. Contracting very much when dry. Sporidia ($\cdot 0007 \times \cdot 0004$ in.) $\cdot 017 \times \cdot 01$ m.m.

Peziza (Humaria) fusispora. B.

Gregarious, here and there crowded, orange-yellow, hemispherical, slightly concave, or quite flat, with a delicate membranous edge, obscurely tomentose, fixed to the soil by a little down. Asci cylindrical, obtuse, sporidia elliptic, attenuated slightly at either end, and binucleate. Berk. in "Hook. Journ.," 1846.—*B. & Br., Ann. N. Hist., No.* 1481. ("Grevillea," *iii.*, fig. 84.)

On heathy ground.

A very pretty species, varying from nearly white to orange or blood-red, 1-2 lines. Sporidia ($\cdot 001$ - $\cdot 002$ $\cdot 0005$ in.) $\cdot 025$ - $\cdot 03$ \times $\cdot 012$ m.m.

***Peziza (Dasyscypha) subtilissima.* Cooke.**

Externally scarce distinguishable from *P. calycina*, Sch. Asci subclavate; sporidia cylindrical, curved, minute, hyaline.—*Peziza calycina*, Fries. S. S. 360.

On bark of firs. Scotland (A. Jerdon).

Sporidia $\cdot 009$ m.m. long.

This species has been confounded with *Peziza calycina*, from which it differs completely in fruit. The specimens published in "Fungi Britannici," "Rehm's Ascomyceten," and "Fueckel's Fungi Rhenani," have sporidia that are oblong, $\cdot 02$ - $\cdot 023$ \times $\cdot 009$ - $\cdot 001$ m.m., and this is generally recognised as *P. calycina*. Having occasion to examine specimens received from the late A. Jerdon, it was found that in these the fruit was quite different, as described above, which led to the examination of other specimens; amongst these the specimens published by Fries in his *Scleromycetes Suecicae*, and specimens from Dr. Mougeot; these all proved to be the present species, which is evidently the species described as *P. calycina*, Sch., by Karsten and Nylander; the other form, which is the *P. calycina* of other European mycologists, is wholly unnoticed, and perhaps does not occur in Finland, or has been overlooked, as this has been with us. The question at once arises as to which is the true *P. calycina*, Schum. The answer will be simply this: that at the time Schumacher described his species, and when Fries and Mougeot (1824) distributed specimens, the fruit was not habitually submitted to examination, and as the two species are so much alike that they cannot be distinguished from each other externally, it is extremely probable that both were accepted indiscriminately as *P. calycina*.

***Peziza (Dasyscypha) calycina* var. *Trevelyani*.**

This is a singular form of *P. calycina*, which cannot claim to be regarded as a distinct species on the faith of a single specimen, but which may hereafter be proved to be distinct. It was found on larch, and the fruit differs from the typical form in the large size of the sporidia, which are very variable, and reach as much as $\cdot 03$ - $\cdot 035$ m.m. in length, or nearly double that of the typical form. The endochrome is also often bipartite, so that the sporidia have the appearance of being uniseptate. In the plates which accompany this number, the sporidia are represented \times about 400.

Fig. 166.—*Peziza calycina*, Schum.

Fig. 166b.—*P. calycina* var. *Trevelyani*.

Fig. 167.—*P. subtilissima*, Cooke.

The following species are also very similar externally to *P. calycina*, of which figures are given:—*P. chrysophthalma*, P. (fig.

168), *P. Agassizii*, B. & C. (fig. 169), *P. illota*, B. & Br. (fig. 170), *P. fusco sanguinea*, Rehm. (fig. 179), *P. simillima*, B. & Br. (fig. 198), to which might be added *P. lachmoderma*, B., and *P. rhapsidophora*, B. & Br., figures of which will appear in succeeding plates.

***Peziza (Dasyscypha) brunneola.* Desm.**

Amphigenous, stipitate, villous, small, brown, somewhat scattered; cups subglobose, then plane, marginate; disc whitish, growing pallid; stem cylindrical; sporidia very minute, spermatoid.—*Desm. Ann. Sci. Nat.* xvii. (1842) p. 96. *Desm. exs.* i. 1156, ii. 656. *Phillips exs.* No. 28.

On oak leaves. (W. Phillips.)

Asci $\cdot 04 \times \cdot 005$ m.m. (Grev. iii., fig. 184.)

***Peziza (Mollisia) rubella.* Pers.**

Gregarious, minute, sessile, between soft and waxy, becoming somewhat plane, smooth, flesh-red; margin sublaciniate; sporidia minute, cylindrical.—*Pers. Syn.*, p. 635. *B. & Br. Ann. N.H.*, No. 1484.

On decayed wood with *P. vinosa*.

Cups 1-2 lines broad; sporidia $\cdot 006 \times \cdot 002$ m.m.

***Peziza (Mollisia) Stevensoni.* B. & Br.**

Minute, subglobose, sugar-coloured, externally minutely granular; stem very short, incrassated upwards; sporidia minute, subcymbæform.—*B. & Br., Ann. Nat. Hist.*, No. 1485.

On decorticated wood. Glamis.

Sporidia ($\cdot 0005$ in. long) $\cdot 0127$ m.m. This is accompanied by white creeping threads, which give off erect branches bearing obovate spores $\cdot 001$ long. Probably a conidiiferous state.—*B. & Br.*

***Helotium melleum.* B. & Br.**

Pallid honey colour; stem short, cylindrical; cups plane, flexuose; margin elevated, inflexed; asci elongated, lanceolate; sporidia biseriate, fusiform, curved on one side, multinucleate.—*B. & Br., Ann. N.H.*, No. 1457.

On rotten wood.

About a line broad, stem half as much high, sporidia ($\cdot 0012$ in.) $\cdot 03$ m.m. long. Allied to *H. luteolum*.

***Helotium sublateritium.* B. & Br.**

Pallid, brick-red; stem short, cylindrical, delicately whitish-villose, becoming smooth; cups plane, veined beneath; margin elevated; asci linear; sporidia uniseriate, shortly fusiform, binucleate.—*B. & Br., Ann. Nat. Hist.*, No. 1488.

On stems of herbaceous plants. Glamis.

Sporidia ($\cdot 001 \times \cdot 0002$ in.) $\cdot 025 \times \cdot 005$ m.m.

***Psilopesia myrotheciodes.* B. & Br.**

Suborbicular; margin lacinate, tomentose, pallid yellow; disc

greenish-black ; asci linear ; sporidia elliptic ; margin pellucid.—*B. & Br., Ann. N.H., No. 1489, t. 2, f. 5.*

On *Prunus padus*. New Pitsligo.

Sporidia ($\cdot 0009$ in.) $\cdot 023$ m.m. long. One of the most curious circumstances about this species is that some of the asci contain a very delicate spiral thread or line.—*B. & Br.*

Patellaria Fergussoni. *B. & Br.*

Stem short, incrassated upward ; cups plane, externally brown, granulose ; hymenium plane or pulvinate, yellow ; asci elongated ; sporidia filiform, paraphyses with a globose head.—*B. & Br., Ann. N.H., No. 1490, t. 2, f. 6.*

On *Prunus padus*. New Pitsligo.

Sporidia ($\cdot 009$ in.) $\cdot 22$ m.m. long.

Ascobolus consociatus. *B. & Br.*

Cups externally rugose, granulated, pallid, yellow or whitish ; asci clavate, short ; paraphyses linear ; sporidia biseriata, broadly fusiform.—*B. & Br., Ann. N.H., No. 1491, t. 2, fig. 7.*

On the remains of *Sphaeria cupulifera*. April.

Cups $\cdot 003$ – $\cdot 01$ inch diam.

HEPATICÆ OF BORNEO.*

Professor Notaris has recently described the species of Hepaticæ found by Dr. Beccari at Sarawak, in the "Memoirs of the Royal Academy of Sciences at Turin," a reprint of which in a separate form has just been issued, fully illustrated. The number of species enumerated is 51, of which about one half are new. Most of the old species occur in Java and Sumatra, and two or three extend to Ceylon. One new genus is characterised under the name of *Diploscyphus*, to which one species is referred. From the preface we learn that Dr. Sande Lacoste enumerated 45 species of Bornean Hepaticæ in his "Jungermannia of the Indian Archipelago," which was published in 1864, of which not more than four occur in the present collection, which raises the number to 92. The twenty quarto plates add considerably to the value of the work, for though names may change, and the limits of species vary in acceptance in the course of a few generations, faithful figures will always prove valuable, even long after the letterpress which accompanies them ceases to be of much service. This is the case in all branches of Natural History, and it is especially so in Cryptogamic Botany. It is on account of their plates that Schœffer, Batsch, and Nees von Esenbeck are known to the present generation of mycologists as some of the present will be known to the future.

* Epatiche di Borneo, raccolte dal Dr. O. Beccari nel ragiato di Sarawak durante gli anni 1865 7 descritte dal Dr. G. de Notaris. Torino, 1874.

NEW AND RARE BRITISH FUNGI.

By WM. PHILLIPS AND CHARLES B. PLOWRIGHT.

(Continued from Vol. ii., p. 189, with plate 42.)

14. **Diplodia sapinea.** Fekl. Symb. Mycol., p. 393. Fr. System. Myc. ii., p. 491. sub Sphæria.

The septa in the spores are frequently deficient. On bark of *Pinus sylvestris*, Terrington, St. Clements.

15. **Diplodia viticola.** Desm. Ann. Sc. Nat., 1838. Fekl. Symb. Mycol., p. 395.

On bark of *Vitis vinifera*, North Wootton.

16. **Uredo alchemillæ.** Pers. Synop. p. 215. Fekl. Symb. Mycol. p. 65.

On *Alchemilla vulgaris*. Specimens of this and of its *Uromyces* form, *Trachyspora alchemillæ*, Fekl., have been found by Mr. T. Brittain, in Derbyshire.

17. **Cronartium Pæoniæ.** Tul. Fekl. Symb. Mycol., p. 66.

Sphæria flaccida, A. & S. On living pæony leaves. St. Leonards-on-Sea. Miss Jelly. Agreeing exactly with specimens received from Dr. P. Magnus.

17. **Torula ulmicola.** Rbh. Handb., p. 35.

On elm bark, Rev. J. Keith, Forres, N. B., June, 1874.

18. **Torula profusa.** Wallr. Fockel Symb. Mycol., p. 88.

On oak bark, Rev. J. Keith, Forres. Not in an ascigerous condition.

19. **Periconia Phillipsii.** B. & Br. in Ann. Nat. Hist., Jan., 1875.

This minute species was found growing on the perpendicular surface of damp earth in the hollows left by the falling away of stones, in company with *Thelocarpon superellum*, Nyl., a Lichen new to our Flora. The spores are spherical, verrucose, and fuscous, .0003 in. diam.

Trefriw, North Wales, May, 1874.

Plate 42, fig. 1. a. nat. size of plant; b. magnified; c. spores.

20. **Protomyces sagittariæ.** Fekl. Symb. Mycol., p. 75.

On *Sagittaria sagittifolia*. St. Leonards-on-Sea. Miss Jelly.

21. **Protomyces macrosporus.** Ung. Exanth., p. 843.

On *Ægopodium podagraria*. Shrewsbury.

- * **Mitruha paludosa.** Fr. Phillips. El. Brit., No. 2.

This species abounds in boggy water courses near Capel Curig and Betws-y-Coed, North Wales.

- * **Vibrissea truncorum.** Fr. Phillips. El. Brit., No. 4.

This is found in similar places to the preceding species, but much rarer. Those published in *El. Brit.* were on dead stems of birch lying in water. It is curious to observe the effect of change of temperature on this plant, causing the filiform sporidia to dart out suddenly from the hymenium like threads of spun glass.

- * **Peziza succosa.** B. Phillips. El. Brit., No. 10.

We found this well-marked species when with the Woolhope Field Club at Downton, near Ludlow, October, 1874. The sporidia

in mature specimens are decidedly echinulate. The summits of the asci become blue with iodine.

* **Peziza hirta.** *Sch.* Phillips. *El. Brit.*, No. 19.

We mention this for the purpose of indicating the curious and unusual host chosen by the specimens published in *El. Brit.*, viz., on decaying pilei of *Polyporus squamosus*, Fr.

22. **Peziza (Dasyscyphæ) brunneola.** *Desm.* Pl. Crypt 1, No. 1561, 2, No. 656. Phillips. *El. Britt.*, No. 28.

Amphigenous, stipitate, villous, small, brown, somewhat scattered; young cups subglobose, mature ones plane, margined; disc pallid white; stem short, glabrous, ivory-like; asci cylindrical, obtuse; sporidia oblong.

On dry oak and Spanish chestnut leaves. Trefriw, North Wales, May, 1874.

Desmazières points out (*Ann. Sc. Nat.* 1841, V. xvii., p. 96), a remarkable character in the paraphyses, viz., that they are much longer than the asci, perfectly straight, fusiform, pointed, and as broad as the asci. We have represented these as they appear to us (*fig. 2. d.*) rising above the summits of the asci, a character seen much more markedly in *Desmazievella acicola*, Libt. The faintly-fuscous hairs clothing the cups are septate, the obtuse or pear-shaped summits having a mass of hyaline cells on them, which easily fall away. No blue reaction with iodine.

P. 42, fig 2. a. nat. size of plant; *b.* the same magnified; *c.* the septate hairs with enlarged heads, clothed with hyaline cells; *d.* a portion of the hymenium; *e.* paraphyses; *f.* an ascus; *g.* sporidia; all much magnified.

23. **Peziza (Dasyscyphæ) trichodea.** *n. s.**

Congregated or scattered; stem short; cup at first globose, then cupulate; clothed externally with long rigid hemp-like hairs; disc pallid white; sporidia biseriate, oblong, binucleate.

On old decayed leaves of *Pinus sylvestris*. Trefriw, North Wales, May, 1874.

This species was found sparingly in one place only—a damp, shady spot, where the pine leaves had become black from decay. The cups when dry are closed, the long hairs that clothe them inclining together over the mouth, and even when expanded by moisture the hairs still incline inwards, forming a fringe round the edge. The colour of the whole plant is nearly uniform, and the hairs resemble in colour and texture manufactured hemp. The asci are .001 in. long, the sporidia .0002 in. long. Iodine gives no blue reaction.

P. 42, fig. 4. a. nat. size of plant; *b.* the same magnified; *c.* hairs of the cup; *d.* ascus and paraphyses; *e.* sporidia; all highly magnified.

* After searching all the sources of information open to us in vain for a description of the species, and distributing specimens to some of our leading English mycologists with a similar result, we have ventured to publish it as new.

24. **Saccobolus violascens.** *Boud.* Mem. Sur. les Ascob. t. 8. f. 19.
Phillips. El. Brit., No. 48.

Scattered or aggregate, minute, 1-2 mill. broad, rotundate, or more or less flexuose, glabrous, shining, subgelatinous, cinerioviolet; disc convex; apices of paraphyses thickened, pear-shaped, becoming violet. *Boud.*

On cow-dung, Norfolk, 1873.

25. **Desmazierella aciccola.** *Libt.* Pl. Crypt. Ardn., No. 24. Ann. Sc. Nat., 1829, p. 82, *c.i.* Phillips, El. Brit., No. 45.

Peziza-form, nearly plane, sessile, about two lines broad, coated externally with a fuscous, byssoid, compact tomentum; hairy, with long, patent, crowded, nearly black hairs; disc olivaceo-cinereous.

On dead leaves of *Pinus sylvestris*.

Wrekin, Shropshire, Jan., 1872. Trefriw, North Wales, May, 1874.

This appears at first as a minute, hairy *Chetomium*-like body, nearly black, afterwards expanding into a sublentiform disc. The brown hairs of the hymenium being prolongations of the paraphyses, give this plant a striking character. The sporidia are hyaline, binucleate, .0006 in. long, .0003 in. broad.

No blue reaction with iodine.

Plate 42, fig. 3. *a.* nat. size of plant; *b.* section enlarged; *c.* a hair magnified; *d.* a bundle of paraphyses, the summits changed into hairs; *e.* asci; *f.* sporidia, all highly magnified.

- * **Torrubia myrmecophila.** *Tul.*

A single specimen of this rare *Sphaeria* was found in a wood at Trefriw, North Wales, May, 1874.

26. **Nectria mammoidea.** n. sp.

Sub-cæspitose; perithecia medium sized, globose, minutely furfuraceous, brick-red; ostiola papillate, persistently darker than the perithecia; sporidia elliptical, uniseptate, somewhat acuminate, rather irregular in size and form, .001 in. \times .0004 in.

Sphaer. Brit., Cent. ii. (inedit.).

On furze stumps, North Wootton. On birch bark, Ercall. W.P.

Plate 42, fig. 5. *a.* perithecia enlarged; *b.* sporidia.

27. **Dothidea angelicæ** *Fr.* System. Mycol. II., p. 561.

On *Angelica*. Dr. Buchanan White, 1874.

- * **Dothidea Johnsonii.** *B. & Br.*

Spores uniseptate, unequal, .0008 in. long.

28. **Diaporthe samaricola.** n. sp.

Perithecia minute, immersed, covered by a circumscribed thin black stroma, variable in size and outline; ostiola minute, prominent; sporidia biseriata, colourless, quadrinucleate, somewhat acuminate, .0007 in. \times .002 in.; asci .003 in. \times .0004 in.

On the samari of ash, Terrington, Jan., 1875.

Plate 42, fig. 6. *a.* ascus; *b.* sporidia.

29. **Diaporthe spina.** *Fekl.* Symb. Mycol., p. 210.

On ozier, North Wootton, 1874.

30. **Sphaeria (Didymosphaeria) applanata** (*Niessl.* in litt.) n. s.

On *Rubus Idæus*, Shrewsbury, 1874.

CARPOLOGY OF PEZIZA.

By THE EDITOR.

(Continued from page 74.)

The figures contained in Plates 38, 39, 40, and 41, are drawn by the same means, and to the same scale as in the preceding plates. The scale will be found drawn at the bottom of plate 28.

ALEURIA.

- Fig. 122. *P. luteo-nitens*, *B. & Br.*, ex. herb. M. C. C.
 ,, 123. *P. perlata*, *Fr.*, Karst. Fungi Fenn., 521.
 ,, 124. *P. atrovinosa*, *Gerard*, ex. herb., W. R. Gerard.
 ,, 125. *P. echinospora*, *Karst.*, Karst. Fungi Fenn., 541.
 ,, 126. *P. perforata*, *Karst.*, Karst. Fungi Fenn., 529.
 ,, 127. *P. sylvatica*, *Karst.*, Karst. Fungi Fenn., 819.
 ,, 128. *P. isabellina*, *Sm.*, fide W. G. Smith.
 ,, 129. *P. saniosa*, *Sch.*, fide W. Phillips.
 ,, 130. *P. phlebophora*, *B. & Br.* ex. herb. M. J. B.
 ,, 131. *P. griseo-rosea*, *Gerard*, ex. herb. W. R. Gerard.
 ,, 132. *P. cerea*, *Sow.*, ex. herb. M. J. Berkeley.
 ,, 133. *P. radula*, *B. & Br.*, ex. herb. M. J. B.
 ,, 134. *P. bufonia*, *Pers.*, ex. herb. M. J. B.
 ,, 135. *P. sepiatra*, *Cooke*, ex. herb. M. C. C.

LACHNEA.

- ,, 136. *P. varicolor*, *Fr.*, ex. herb. Bloxam.
 ,, 137. *P. flammea*, *A. & S.*, Karst. Fungi Fenn., 37.
 ,, 138. *P. virella*, *Karst.*, Karst. Fungi Fenn., 627.
 ,, 139. *P. candidata*, *Cooke*, ex. herb. M. C. C.
 ,, 140. *P. subochracea*, *C. & P.*, ex. herb. C. H. Peck, 93.
 ,, 141. *P. rufo-olivacea*, *A. & S.*, Rabb. Fung. Eur., 1420. Fckl. 1192. *a*,
 cells of the cup.
 ,, 142. *P. escharodes*, *B. & Br.*, ex. herb. C. E. Broome. Portion of cup.
 ,, 143. *P. griseo-vitellina*, *Fckl.*, Fckl. Fungi Rhen., 1873.
 ,, 144. *P. pineti*, *Batsch.*, Fckl. Fungi Rhen., 1167.
 ,, 145. *P. cenangium*, *Not.*, Erb. Critt. Ital., 637.
 ,, 146. *P. corticalis*, *Pers.*, *Desm.*, Exs., 703.
 ,, 147. *P. barbata*, *Kze.*, Fries Sci. Suec., 333.
 ,, 147* *P. plano-umbilicata*, *Grev.*, ex. herb. Greville.
 ,, 148. *P. Berkeleyi*, *Blox*, ex. herb. Bloxam.
 ,, 149. *P. nidulus*, *Kze.*, ex. herb. Rabb.
 ,, 150. *P. Grevillea*, *B.*, ex. herb. Bloxam.
 ,, 151. *P. aureola*, *Rabb.*, Rabb. Fung. Eur., 1622, with base of hair.
 ,, 152. *P. relicina*, *Fr.*, Moug. & Nest., Exs., 686.
 ,, 153. *P. leucophæa*, *Pers.*, *Cooke*, Fungi Brit., 569.
 ,, 154. *P. fuscescens*, *P.*, Erb. Critt. Ital., 272.
 ,, 155. *P. brevipila*, *Desm.*, *Desm.* Exs., 1742.
 ,, 156. *P. nigrocincta*, *B. & C.*, ex. herb. Ravenel, 1185.
 ,, 175. *P. albotestacea*, *Desm.*, *Desm.* Exs., 1415.
 ,, 158. *P. Aspidii*, *Lib*, hairs of cup, *Lib.* Exs., 226.
 ,, 159. *P. jucundissima*, *Desm.*, *Desm.* Exs., 1540.
 ,, 160. *P. pollinaria*, *Cooke*, ex. herb. Ellis, 2158.
 ,, 161. *P. marginata*, *Cooke*, ex. herb. Ellis, 2151.
 ,, 162. *P. dumorum*, *Desm.*, *Desm.* Exs., 1002.
 ,, 163. *P. misella*, *Desm.*, *Desm.* Exs., 1539.
 ,, 164. *P. stercicola*, *Cooke*, ex. herb. Edinensis.
 ,, 165. *P. bicolor*, *Bull.*, ex. herb., Dr. E. Capron.
 ,, 166. *P. calycina*, *Schum.*, *Cooke* Fungi Britt., 474, *b.* var. *Trevelyani*.
 ,, 167. *P. subtilissima*, *Cooke*, ex. herb. Jerdon.
 ,, 168. *P. chrysophthalma*, *Pers.*, *Rehm* Ascomyceten, 55.
 ,, 169. *P. Agassizii*, *B. & C.*, ex. herb. Sprague, Curtis, Rav.
 ,, 170. *P. illota*, *B. & Br.*, *Wright* Fungi Cubensis, 682.
 ,, 171. *P. cupressina*, *Batsch.*, Fckl. Fungi Rhen., 1207.

- Fig. 172. *P. pithya*, *P.*, Rabb. Fungi Eur., 1814.
 „ 173. *P. rorida*, *Wallr.*, Fekl. Fungi Rhen., 1203.
 „ 174. *P. pygmaea*, *Fr.*, ex. herb., C. E. Broome.
 „ 175. *P. sauciella*, *Karst.*, Karst. Fungi Fenn., 549.
 „ 176. *P. cerinea*, *Pers.*, Mong. and Nestl. Exs., 687.
 „ 177. *P. calyculæformis*, *Sch.*, ex. herb. Bloxam.
 „ 178. *P. clandestina*, *Bull.*, Fekl. Fungi Rhen., 1202.
 „ 179. *P. fusc sanguinea*, *Rehm.*, Rehm. Ascomy., 112.
 „ 180. *P. latebricola*, *Rehm.*, Rehm. Ascomy., 111.
 „ 181. *P. impudicella*, *Karst.*, Karst. Fungi Fenn., 534, with cells of surface of the cup.
 „ 182. *P. albopileata*, *Cooke*, ex. herb. Ellis, 2149.
 „ 183. *P. apala*, *B. & Br.*, Cooke Fungi Britt., 287.
 „ 184. *P. brunneola*, *Desm.*, Rabb. Fungi Eur., 426.
 „ 185. *P. ciliaris*, *Sch.*, Fekl. Fungi Rhen., 1209.
 „ 186. *P. echinulata*, *Awd.*, Rabb. Fungi Eur., 1009.
 „ 187. *P. pulverulenta*, *Lib.*, Libert. Exs., 125, with the waxy granules of the surface.
 „ 188. *P. Schwein'zii*, *Rabb.*, Rabb. Fungi Eur., 1118.
 „ 189. *P. caduca*, *Rehm.*, Rehm. Ascomy., 160.
 „ 190. *P. patula*, *Pers.*, Libert. Exs., 225.
 „ 191. *P. Carestiana*, *Rabb.*, Rabb. Fungi Eur., 913.
 „ 192. *P. rosea*, *Rehm.*, Rehm. Ascomy., 157.
 „ 193. *P. palearum*, *Desm.*, Rabb. Fungi Eur., 519.
 „ 194. *P. aspidicola*, *B. & Br.*, Cooke Fungi Britt., 565.
 „ 195. *P. globulifera*, *Fekl.*, Fekl. Fungi Rhen., 2576.
 „ 196. *P. variegata*, *Fekl.*, Fekl. Fungi Rhen., 2577.
 „ 197. *P. tricolor*, *Sow.*, ex. herb. M. J. B.
 „ 198. *P. simillima*, *B. & Br.*, ex. herb. M. J. B.

The external hairs of the cup are figured, in many instances, to the same scale as the fruit.

ON A NEW BRITISH SPECIES OF XYLOGRAPHA.

By the Rev. J. M. CROMBIE, F.L.S., &c.

Xylographa laricicola, Nyl., in Flora, 1875, p. 13. Thallus effuse, very thin, greyish-white, or scarcely any visible; apothecia minute, superficial, oblong, or slightly flexuose, irregularly scattered, at length somewhat explanate, with evanescent margin, black, internally whitish; spores 8næ, ellipsoid, simple, colourless, 0.0012-15 mm. long, 0.007-8 mm. thick, apothecium brown, paraphyses none, or not seen in a normal condition; hymenial gelatine tawny, wine-red with iodine.

On the bark of larch trees, near the base. Ben Lawers, Crombie, August, 1874.

The above characters sufficiently distinguish the present species from all the others of this genus. It probably derives its greatest interest from being a purely corticole species, growing on the bark of living trees, a habitat hitherto unknown for any other *Xylographa*, though, according to M. Fries, *Scand* II., p. 638, *X. parallela* has been gathered corticole in Finland. The present species was not met with but very sparingly on a single tree in Lawers glen.

HEPATICÆ SCANDINAVICÆ EXSICCATA QUARUM
SPECIMINA EDIDERUNT

S. O. LINDBERG ET E. FR. LACKSTRÖM. Fasc. 1. Helsingforsiae.
1874.

The few copies of this work which have reached this country have been secured for the national Herbaria at Kew, the British Museum, Edinburgh and Oxford; and nothing can surpass the exquisite neatness of the mounting and completeness of the specimens distributed. These are not fastened down, but enclosed in folded cases, and to Herr Lackström we believe is due the credit of so carefully executing this part of the work. The labels also are not merely a record of the name and locality, but embrace a full synonymy of the species, in the style which Prof. Lindberg has made so peculiarly his own, viz., that to every author quoted is also appended the date of publication of his work, thus establishing the change in name of so many species, which however dissonant at first, must, we think, eventually be adopted, if the laws of priority are to be respected.

Besides the strictly Scandinavian species, five supplementary sheets are devoted to rare specimens collected in Ireland, no doubt with the intention of affording northern hepaticologists a means of identifying some species not certainly recorded as indigenous to the Scandinavian peninsula.

We believe the whole work will occupy eight parts, and the first of these comprises the following:—

1. *Marchantia polymorpha*, L.
 - a. pl. masc. et fr. Helsingfors.
 - b. pl. masc. et fr. Ostrobothniæ.
2. *Frullania tamarisci* (L.) Dum.
 - c. fr. jun. Skane, Suecia.
3. *Porella lævigata* (Schrad.) Lindb.
 - pl. fem. ster. Skane, Suecia.
4. *Porella dentata* (Hartm.) Lindb.
 - a. c. coles. Uppland.
 - b. pl. fem. ster. Smaland.
 - c. pl. fem. ster. Ins. Aland.
 - d. pl. fem. ster. Ins. Aland.
5. *Pleurozia cochleariformis* (Weiss) Dum.
 - ster. Hibernia.
6. *Bazzania trilobata* (L.) Gray.
 - a. pl. fem. ster. Fennia.
 - b. pl. masc. Ins. Aland.
7. *Bazzania triangularis* (Schleich.) Lindb.
 - a. pl. fem. ster. Ostrobothnia.
 - b. pl. masc. Fennia.
 - c. pl. masc. Ostrobothnia.

8. *Harpanthus Flotowii*, N. Es.
 - a. pl. fem. ster. Ostrobothnia.
 - b. pl. masc. Angermanland.
 9. *Trichocolea tomentella* (Ehrh.) Dum.
 - a. pl. fem. ster. Stockholm.
 - b. pl. masc. Skane.
 10. *Blepharozia ciliaris* (L.) Dum.
 - a. c. fr. Ostrobothnia.
 - b. ster. Ostrobothnia.
 11. *Anthelia setiformis* (Ehrh.) Dum.
 - a. c. coles. perfect. Angermanland.
 - b. c. coles. junior. Lapponia.
 - c. ster. Angermanland.
 12. *Jungermania cæspiticia*, Lindemb.
 - pl. masc. et. c. fr. Helsingfors.
 13. *Jungermania bicrenata*, Schmid.
 - a. c. coles. Helsingfors.
 - b. c. coles. Ostrobothnia.
 14. *Jungermania saxicola*, Schrad.
 - c. coles. Ins. Hogland.
 15. *Jungermania minuta*, Cranz.
 - a. c. coles. Ostrobothnia.
 - b. c. coles. Ostrobothnia.
 - c. pl. masc. Ins. Aland.
 16. *Jungermania rigida*, Lindb.
 - ster. Fennia.
 17. *Nardia compressa* (Hook.) Gray.
 - c. coles. Hibernia.
 18. *Nardia repanda* (Hüb.) Lindb.
 - c. coles. Ostrobothnia.
 19. *Nardia emarginata* (Ehrh.) Gray.
 - a. c. coles. Tavastland.
 - b. ster. Ostrobothnia.
 - c. c. coles. Hibernia.
 20. *Nardia sphacelata* (Gies.) Carringt.
 - a. pl. masc. et c. coles. Tavastland.
 - b. pl. masc. Tavastland.
 - c. pl. fem. ster. Lapponia.
 21. *Nardia sparsifolia*, Lindb.
 - c. coles. Ostrobothnia.
 22. *Scalia Hookeri* (Lyell.) Gray.
 - pl. masc. et pl. fem. ster. Helsingfors.
 23. *Fossombronia cristata*, Lindb.
 - c. fr. Helsingfors.
 24. *Blasia pusilla*, L.
 - c. fr. Helsingfors.
 25. *Pellia epiphylla* (L.) Corda.
 - c. fr. Ostrobothnia.
-

- I. *Frullania Hutchinsiae* (Hook.) N. Es.
autoica, c. coles. Hibernia.
- II. *Lejeunea Mackayi* (Hook.) Spreng.
autoica, c. coles. Hibernia.
- III. *Mastigophora Woodsii* (Hook.) N. Es.
ster. Hibernia.
- IV. *Herberta adunca* (Dicks.) Gray.
ster. Hibernia.
- V. *Plagiochila spinulosa* (Dicks.) Dum.
pl. fem. ster. Hibernia.

ELVELLACEI BRITANNICI.

Mr. W. Phillips, of Shrewsbury has just issued the first fasciculus of dried specimens of *Peziza* and allied genera, under the above title; the following species are represented:—*Morchella esculenta*, P., *Mitrula paludosa*, Fr., *Spathularia flavida*, P., *Vibrissia truncorum*, Fr. (everywhere rare), *Geoglossum olivaceum*, P., *Peziza acetabulum*, L., *Peziza tuberosa*, Bull., *Peziza venosa*, Fr., *Peziza badia*, P., *Peziza succosa*, B., *Peziza leporina*, Batsch., *Peziza aurantia*, Fr., *Peziza vesiculosa*, Bull., *Peziza pustulata*, P., *Peziza rutilans*, Fr., *Peziza granulata*, Bull., *Peziza fascicularis*, A. & S., *Peziza furfuracea*, Fr., *Peziza hirta*, Sch., *Peziza theloboloides*, A. & S., *Peziza virginea*, Batsch., *Peziza calycina*, Sch., *Peziza bicolor*, Bull., *Peziza hyalina*, P., *Peziza sulphurea*, P. (it is the variety *leucophæa*, which is found in Great Britain, which some mycologists consider a distinct species from *P. sulphurea*), *Peziza aspidiicola*, B. & Br., *Peziza apala*, B. & Br., *Peziza brunneola*, Desm. (new to Britain), *Peziza aurelia*, P., *Peziza Rosæ*, P., *Peziza rosæ*, P., var. *prænorum*, Fr., *Peziza Curreiana*, Tul. (a most interesting species, developed from a *Sclerotium*), *Peziza echinophila*, Bull., *Peziza Pteridis*, A. & S., *Peziza sphaerioides*, P., *Peziza erumpens*, Grev., *Peziza atrata*, P., *Peziza Plantaginis*, Desm., *Peziza cerastiorum*, Wallr., *Peziza resinæ*, Fr. (or rather *Lecidea resinæ*, for doubtless, as Rev. W. Leighton has pointed out, this is a lichen), *Peziza strobilina*, Fr., *Helotium citrinum*, Fr., *Sphinctrina turbinata*, Fr. (this also has stronger claims to be regarded as a lichen than as a fungus), *Cenangium rubi*, Fr., *Desmazierella ucicola*, Lib. (an interesting addition to the British Flora, from North Wales), *Ascobolus furfuraceus*, P., *Ascobolus atrofuscus*, P. & P., *Sac cobolus violascens*, Boud., *Bulgaria inquinans*, Fr., and *Ascomyces trientalis*, B.

MYCOTHECA UNIVERSALIS.—Baron Thümen has just issued the first fasciculus of this collection, which we shall have occasion to notice more fully in our next issue.

NEW EUROPÆAN MOSSES.

Juratzka has lately erected *Barbula convoluta* β , *Sardoa*, of C. Muller's Syn. p. 516, into a species, under the name of *Barbula commutata*, Jur., and gives the following characters:—*

Barbula (Tortula) commutata. *Jur.* n. sp.—Very similar to *Barbula convoluta*, but more robust. Tufts dense, yellowish-green above, reddish-brown below; stem taller, 2 c.m. high, sparingly furnished with radicles; leaves larger, firmer, densely and minutely papillose, subsquarrose; lower leaves smaller, ovate, lanceolate; leaves from the middle of the stem lanceolate; comal leaves lanceolate from an ovate, concave, and slightly sheathing base, acute, carinate; the margin minutely crenulate with papillæ, reflexed and subundulate towards the base; nerve rather thick, not excurrent, becoming reddish in the older leaves, the leaves incurved and twisted when dry; cells hyaline at base, elongate, rectangular, above minute, subquadrate and opaque. Inflorescence dioicous; perigonial leaves obovate, acuminate, toothed above nerve, thin; perichæatial leaves sheathing beyond the middle, thence narrowly lanceolate, subsquarrose; the inner leaves longer, convolute, sheathing, obtuse, or shortly apiculate, yellowish, and membranaceous; nerve thin or absent, capsule longer, narrow, oblong, incurved, reddish, becoming brown when old; pedicel pale yellow, 1-1½ c.m. long, twisted to the right below, and to the left above; annulus broad, deciduous (?); operculum half the length of the capsule or more, subulate, conical; teeth of the peristome three or four times twisted, pale red, minutely papillose. Spores smooth, yellowish, rather larger.

This species is distinguished from *B. convoluta*, to which it is most nearly allied, by its larger size, by the leaves being more squarrose in the moist state, more strongly incurved and twisted when dry; the leaves of the apex of the stem are almost crisped and difficult to moisten.

The capsule is on the average 2 m.m. long, and therefore half a m.m. longer than that of *Barbula convoluta*, which is only 1½ m.m. The lid is also longer in proportion. In the barren state it has much the size and aspect of the cæspitose form of *Barbula paludosa*, from which, however, it is easily distinguished by its softness, the entire tips of the more recurved leaves, the reflexed lower margin of the leaves, and the hyaline basilar cells.

SYN. { *Barb. convoluta* β , *Sardoa*, C. Mull. Syn., p. 516.
 { *Barb. convoluta* var. *densa*, Milde., Bryol. Siles, p. 116.

Hab.—Sardinia, Cyprus, Westphalia, Zante, Majoric.

The same bryologist has also described a new species of *Hypnum* under the name of

Rhyncostegium mediterraneum. *Jur.*—Very similar to *R. tenellum*. Tufts intricate, silky, greenish, or yellowish-green;

* "Hedwigia," August, 1874, p. 4.

stem sparingly beset with radicles, sparingly branched, branches irregularly pinnate; leaves patent, secund, narrowly elongate, lanceolate, not narrowed to the base, narrowly acuminate; nerve thin, extending to the middle of the leaf; the margin plane, areolæ narrowly hexagonal-linear, broader and shorter at the extreme base, the primordial utricle not conspicuous; inflorescence monœcious; parichætal leaves erecto-patent, leaves few, pale, suddenly acuminate, entire, nerveless; capsule oval, yellowish, arcuate, constricted below the mouth when dry and after the lid has fallen; annulus (?); teeth of the peristome narrowly lanceolate, densely articulated, orange coloured at the base, paler above, teeth nearly entire, ciliæ binate or ternate nodulose.

Observations.—From *Rhyncostegium tenellum*, which it closely resembles in appearance, it is distinguished by its delicate habit, by the nerve not extending beyond the middle of the leaf, and by the rough fruit stalk; from *Rhynch. curvisetum* (Brid.), Lindberg (*Rh. Teesdalii*, Br. eur. et Schpr. Syn. p. pte.; *Hyp. rigidulum*, Bruch.,) by the base of the leaf not being narrowed, and of a longer lancet-shape, by the acuminate apex, by the thinner nerve, and by the areolation of the leaves.

Hab.—Iglesias, in Sardinia (Fr. Mull.), Sierra de Palma, near Algeiras, in Spain (R. Fritze).
E. M. H.

REVISION OF GEOGLOSSUM.

By M. C. COOKE

The species of *Geoglossum* enumerated in the "Handbook," at pp. 662, are imperfectly described in so far as the fruit is concerned. The following revision of these characters will therefore be noted by those who are in possession of that work.

1856. *Geoglossum viride*. *P.*—Asci cylindrico-clavate; sporidia narrowly elliptical, or somewhat lanceolate, obtuse at the ends, hyaline, simple ($\cdot 03 \times \cdot 01$ m.m.); paraphyses linear, scarcely thickened at the tips.

1857. *Geoglossum olivaceum*. *P.*—Asci cylindrico-clavate; sporidia narrowly elliptical, obtuse at the ends, hyaline, simple ($\cdot 025 \times \cdot 008$ m.m.); paraphyses linear, scarcely incrassated.

1858. *Geoglossum glutinosum*. *P.*—Asci cylindrico-clavate; sporidia cylindrical, straight or curved, 3-septate, brown ($\cdot 08$ m.m. long); paraphyses filiform, with pyriform tips.

1859. *Geoglossum viscosum*. *P.*—Asci cylindrico-clavate; sporidia cylindrical, straight or slightly curved, 3-septate, brown ($\cdot 09$ - $\cdot 01$ m.m. long); paraphyses filiform, globose at the tips, not septate.

1960. *Geoglossum glabrum*. *P.*—Asci cylindrico-clavate; sporidia cylindrical, straight or slightly curved, 7-septate, brown (0.85-0.9 m.m. long); paraphyses filiform, thickened at the tips, septate, the four ultimate cells oval, concatenate, moniliform.

1961. *Geoglossum hirsutum*. *P.*—Asci cylindrico-clavate; sporidia fasciculate, cylindrical, slightly curved, 15-septate, brown (0.15 m.m. long); paraphyses septate, slightly incrassated at the tips, curved, or circinate.

1962. *Geoglossum difforme*. *Fr.*—Asci cylindrico-clavate; sporidia cylindrical, straight or slightly curved, 7-septate, brown (0.11 m.m. long); paraphyses filiform, very long, septate, flexuous and contorted at the tips.

A species of *Geoglossum* allied to *G. glutinosum* occurs in the United States, the sporidia of which are 15-septate. Another hirsute species has at length been found in Australia (*G. Walteri*); with sporidia shorter than in *G. hirsutum*, and 7-septate. A singular variety of *Geoglossum hirsutum* occurs in the United States which does not exceed an inch in height; the clubs, and indeed the whole plant, is nearly smooth, the bristles which spring from the base of the hymenium are slender, and scarcely longer than the paraphyses; the paraphyses are the same as in *G. hirsutum*, of which it is probably a variety.

It is hoped that coloured figures, with analyses, will be published shortly of all known species of *Geoglossum*, as part of an Atlas of figures of Fungi, which will at first be chiefly devoted to the *Discomycetes*.

ATLAS DER DIATOMACEÆ-KUNDE.

By ADOLPH SCHMIDT.

Archideaconus in Ascherleben.

Since the publication of Ehrenberg's elaborate work (the "Microgeologie") nothing has appeared to assist the modern student in his labours, excepting papers published in various scientific journals, many of them not now to be obtained. The above-named work, judging from the first part, will be found a valuable addition to the literature of the Diatomaceæ.

The author is assisted by M.M. Gründler, Grunow, Janisch, Weissflog, and Witt—names well known to the student of the Diatomaceæ, names which the author considers will guarantee the accuracy of the figures, of which over 9,000 have been drawn during the past six years. These drawings were for the most part made to a scale of 900 diameters, thus enabling the author to give a greater amount of detail than when the magnification usually adopted, viz., 400 diameters, is employed. The drawings are afterwards reduced

to 660 diameters (excepting, of course, where the original is less than 900 diameters). Photography has been employed for the purpose of this reduction, and the negatives printed by the autotype process (Lichtdruck). The plates have thus all the permanence of those produced by lithography or engraving, and also the advantage of every figure being an exact *fac simile* of the author's drawings. The absence of correctness in copying has frequently been complained of by Greville, Donkin, and others.

The first part contains four plates (16 × 11). The first plate contains 26 figures of Actinoptychi, six of which are devoted to *A. undulatus*, the others to those forms known as Heliopelta and Omphalopelta, two species of Triceratium, viz, *T. Marylandicum*, Brightwell, and *T. Amblyoceros*, Ehrenberg, and placed in this genus. The correctness of this is, perhaps, open to question. The beauty and accuracy of these figures will strike every observer who is acquainted with these remarkable forms.

Plate II. contains 37 figures of the lyrate group of Navicula, many of them new.

Plate III. contains 34 figures, of the *N. Henedeyi* type. The figures in these plates are the best I have ever seen. I would particularly call attention to the following examples:—*N. genifera* (? *gemmifera*), *N. Kittoniana*, *N. inhalata*, *N. diffusa*, *N. Henedeyi*, *N. spectabilis*, *N. prætexta* and its varieties.

Plate IV. contains 24 figures of Surirellæ of the Fastuosa type, most of them admirably executed.

In a letter from the author he informs me that in Part II., pl. 5, the *N. humerosa* group will be given, in pl. 6 the *N. Smithii* forms, (plates 9 and 10) will contain 152 figures of Cymbellæ, to be followed by the *Diploneis* group, and then the *Campylodisci*, after which he will probably take in hand the *Amphoræ*. This genus will probably take six plates to illustrate it.

Each part is accompanied by an index to the figures, which, however, only gives the generic and specific names and localities, but ultimately a more complete and perfect one will be given, in which will be embodied the necessary corrections in nomenclature, synonyms, &c. As this work is undertaken by the author without any hope of profit, it is desirable that the cost should be covered by the subscriptions, and we hope that those interested in the study of these remarkable organisms will become subscribers.* The subscription is six marks (= six shillings) per part. After the publication of the fourth part it will be advanced to nine marks, one part to be published every two months.

F. KITTON.

N.B.—The second part has been issued since this notice was in type.

* Mr. Hardwicke, publisher, 192, Piccadilly, is the agent for England.

ON CORTICIUM AMORPHUM. FRIES.

By the EDITOR.

In the year 1801, Persoon published in his "Synopsis" (p. 657), the description of a fungus which he names *Peziza amorpha*, and remarks that it is subcoriaceous, peculiar, and allied to *Thelephora*. Subsequently, Mougeot and Nestler published specimens, under No. 398 of their "Exsiccati." In 1815 De Candolle included it, still under the name of *Peziza amorpha*, in "Flore Française," Vol. v., p. 23, and in 1822, Persoon included it in his "Mycologia Europæa," Vol. i., p. 269, under the same name, giving as its habitat the bark of *Abies*, which was omitted in the "Synopsis."

Fries, in his "Elenchus Fungorum," which was published in 1828, transfers this fungus to his genus *Thelephora* (p. 183), under the name of *Thelephora amorpha*. In his "Epicrisis," in 1838, it is removed to *Corticium*, as *Corticium amorphum*, which name it for a long time retained. In the new edition of the "Epicrisis" published in 1874, whilst still retaining it as *Corticium* (?) *amorphum* (p. 648), Fries questions whether Persoon might not have had two distinct fungi in view in his *Peziza amorpha*, one of which was referable to *Corticium*, but the genus is queried, as if Fries himself began to doubt the propriety of retaining it amongst the Hymenomyces. It would appear that Fuckel, in his "Symbolæ Mycologicæ" (p. 28), published in 1869, remarked that the basidia were asciform, filled with large ovate corpuseles, and Fries, in citing this authority, seems to indicate the source of his doubts.

In 1872, Mr. C. H. Peck described in the 24th Report of the State Museum of New York (p. 96), a new genus under the name of *Nodularia*, for the reception of a fungus found by him on the bark of *Abies balsamea*, and which he considered intermediate between *Peziza* and *Patellaria*, although his reasons for not including the species in *Patellaria*, on account of the absence of paraphyses in the latter genus, was evidently a slip of the pen, since paraphyses are usually highly developed in *Patellaria*. From the description and figure of *Nodularia balsamicola*, it was impossible to determine the nature of the American species with certainty, but having been favoured by Mr. Peck with specimens, it became at once evident that he had met with the *Peziza amorpha* of Persoon, of which his *Nodularia balsamicola* is a synonym.

In 1874, Dr. Rabenhorst published specimens in his "Fungi Europæi," No. 1824, under a new generic name, that of *Aleurodiscus*, with figures of the fruit from three localities—from Switzerland, the Carpathians, and Germany, intimating its connection with *Discomycetes*. He there cites *Peziza Willkommii*, Hartig., as another synonym of this remarkable plant, which appears in "Hedwigia" for 1874, page 184, as *Aleurodiscus amorphus*. We may remark that previous to this, the Rev. M. J. Berkeley had called our attention to the Pezizoid character of this fungus, and we examined specimens from him with distinct asci and paraphyses.

From the above remarks it is clear that the true character of this fungus was more nearly approached by Persoon than by his successors. It is true that there is a peculiar coriaceous texture, and other points which would exclude it from *Peziza*, but it is clearly Discomycetous. There are asci, and nodulose paraphyses, and sporidia, but it is not clear how many of the latter are ultimately perfected in each ascus, as seldom more than two or three can be detected, mixed with a granular plasma, and these have a spheroid or ovate form.

From its coriaceous texture, irregular form, as well as some other features, this fungus cannot well be referred to any constituted genus, except such as have been constructed to receive it as the type. These, apparently, are two—the *Nodularia*, of Peck (1872), and *Aleurodiscus*, of Rabenhorst (1874). The claim of priority on the part of Peck is, however, set aside by the fact of *Nodularia* being appropriated by Karsten, in his "Monographia Pezizarum Fennicarum," pp. 104 (in 1869), for a Pezizoid fungus, found on the bark of *Betula*. Although he only uses it with the value of a subgenus, it is a prior name. In the next place the characters of Peck's *Nodularia* are not borne out by his type specimen, for he describes it as "fleshy," which *Peziza amorphia* is not. His "spores globose, echinulate," is doubtless an error in examination, for though decidedly granular, the sporidia cannot be characterised as echinulate. *Aleurodiscus* appears to have the best claim for acceptance, since the original name of Persoon cannot well be retained.

The last point to which allusion should be made is the position in Discomycetes which *Aleurodiscus* should occupy. The limits of *Patellariacei* and *Dermatei* are not clearly defined, but it appears to us that the present genus is somewhat intermediate between *Cenangium* or *Dermatea* and *Patellaria*.

Mr. Peck has referred a second species to *Nodularia*, under the name of *Nodularia acericola*, which is allied to and congeneric with *Peziza carpinea*, Fr., a species sometimes referred to *Patellaria* and sometimes to *Dermatea*. This second species of *Nodularia* is certainly not congeneric with the first, and we have not hesitated, on examination of an authentic specimen, to call it *Dermatea acericola*, as an ally of the *Dermatea carpinea*, Tul. The following, therefore, is our estimate of the synonymy of the species to which this note is specially addressed.

Aleurodiscus amorphus, Rabh. Fung. Eur. No. 1824. Hedwigia (1874) pp. 184.

Peziza amorphia, Pers. Syn., 657 (1801). Moug. & Nest. Exs. 398. Myc. Eur. i., 269 (1822). De Cand. Fl. Fr. v., 23 (1815). Secr. Myc. Suis. iii., 303 (1833).

Thelephora amorphia, Fries Elenchus, p. 183 (1828).

Corticium amorphum, Fries Epicr., p. 559 (1838). Fckl. Sym. Myc. p. 28 (1869).

Corticium (?) *amorphum*, Fries Epicr. ii. ed., p. 648 (1874).

Peziza Willkommii, Hartig, Wichtige Krank. der Waldbäume (fide Rabh.).

Nodularia Balsamicola, Peck, in 24th Report of N. Y. State Museum, p. 96 (1872).

HAB.—On the bark of *Abies*, &c., in Europe and North America.

OBSERVATIONS ON THE FRUIT OF *NITOPHYLLUM* *VERSICOLOR*.

By MRS. MERRIFIELD.

Of the British species of *Nitophyllum*, the fruit of all, with the exception of that of *N. versicolor*, is well known. But although this species was discovered so long ago as the year 1800, the fructification was unknown to algologists until 1872 or 1873, when I received from a friend, who kindly divided her only specimen with me, a frond of this plant in fruit. Some time ago I sent a fragment, with fruit, of my plant to Prof. Agardh, but I have not yet heard his opinion of it. The fruit being unknown in this country, a brief description of it may perhaps be acceptable.

The specimen bears coccidia, which are very minute, and are scattered over the lamina of the frond. In size, the coccidium is about equal to four of the polygonal cells of which the surface is composed. The frond is pale in colour; the fruit appears to be fully ripe, so much so that many of the coccidia were empty.

I could not succeed in cutting a section of a coccidium, but when pressed between two plates of glass I could distinguish that the spore threads were much branched dichotomously, with wide axils, and appeared to be arranged in tufts.

Although in some of the English species of *Nitophyllum*, as in *N. punctatum* and *N. laceratum*, the spore threads are very slightly branched, none are so much so as those of *N. versicolor*. In this respect it is nearer to the Australian species *N. curdianum* (Phyc. Austr. pl. 151), in which, however, the spore threads are more erect and less branched, and the spores are in a chain of two or three on each spore-thread; whereas in *N. versicolor* I did not see more than one spore on each thread.

It will be observed that in this fruitful specimen the calli usually found at the apices of the frond are entirely absent.

The plant was found in Ilfracombe, in July, some years ago, but was not identified as *N. versicolor*.

As the fruit was over ripe in July, it would be desirable to search for fruitful specimens in the latter part of June or beginning of July, when perhaps some algologist may be fortunate enough to find other specimens, and not improbably some bearing tetraspores (*Journ. Linn. Soc.* xiv., pp. 421).

SPHAGNUM INTERMEDIUM, &c.

Dr. R. Braithwaite has given descriptions and plates of two additional species of Bog Mosses in the "Monthly Microscopical Journal" for February, 1875, to which we must refer for a copious synonymy and other particulars not included in the following abstract.

Sphagnum intermedium. *Hoffm.* (*S. cuspidatum* var. β . *recurrum*. "Wils. Bry. Brit.," p. 21.)

Dioicous. Plants robust, straight, in large dense or lax tufts, yellow-green, pale green, or sometimes pale ferruginous above, pale brown or whitish below. Stems 6-12 in. high, greenish-white; the cortical cells small, thin, not porose, in 2-3 layers; woody zone narrow, pale yellowish. Cauline leaves reflexed, rather small, ovato-triangular, minutely auricled, without fibres or pores, broadly bordered with narrow cells, the apex somewhat obtuse with 3-5 small teeth, not involute at margin.

Branches 4-5 in a fascicle, two divergent, and arched downward, the rest pendent, attenuated, closely adpressed to the stem, and concealing it; those of the coma numerous, short, obtuse, squarrose-leaved, forming a large dense capitulum; retort-cells elongated, perforated, and slightly recurved at apex.

Branch leaves densely imbricated, erecto-patent, broadly lanceolate, involute in the upper part, when dry with the margins undulate, and points recurved; apex with 2-3 minute teeth. Border of 2-4 rows of extremely narrow elongated cells; hyaline cells of the upper half elongated, filled with annular and spiral fibres, and with a few small pores; of the lower half very long, with annular fibres only and no pores; chlorophyll cells free on the posterior surface, trigono-compressed in section.

Male amentula fusiform, subclavate, ochraceous, the bracts ovate, acuminate. Capsules numerous in the capitulum, exserted, and also in the upper fascicles. Perichatium yellow-green, the bracts broadly oval, pointed, concave, without fibres or pores; lower ovate, acuminate, recurved at apex, upper elliptic, oblong, emarginate. Spores yellow. (Plate xcii.)

var. β . *riparium*.

var. γ . *robustum*.

Hab.—Open moorlands, wet heaths, &c. β . in deep pools. Woolston Moss, Cheshire. γ . Eastern Europe.

Sphagnum cuspidatum. *Ehrhart.* ("Eng. Bot.," t. 2092.)

Dioicous. Plants very soft, in loose, submersed, or floating tufts; light green, deep green, or more or less tinged with yellow or brown.

Stems slender, flaccid, pale green, 6-18 in., or sometimes several feet in length; cortical cells not porose, larger, well defined, in 2-3 strata.

Stem leaves ovate-oblong, pointed, with the margins involute at

apex, broadly bordered with very narrow cells, the hyaline cells of the upper half with numerous spiral fibres.

Branches 3-5 in a fascicle, longer, often turned to one side and falcate at points; all divergent, or 1-2 pendent, but not concealing the stem, those of the coma few and more lax.

Branch leaves laxly imbricated, narrowly lanceolate, flexuose when dry, often somewhat falcato-secund, 3-6 toothed, and with a broader border of narrow cells; chlorophyll cells free on the posterior surface, trigono-elliptic in section.

Capsules in the capitulum, or more frequently scattered in the stem, the peduncles being often much elongated. Perichætical bracts distant from each other, very broadly oval, involute at apex, laxly areolate, with fibres in the upper cells. Spores ferruginous. Male plants more slender, amentula fusiform, the bracts ovato-lanceolate. (Plate xciii.)

var. β . *plumosum* (*S. cuspidatum*, "Musc. Brit.," p. 4, t. iv.).

var. γ . *hypnoides*.

var. δ . *Torreyi*.

Hab.—Stagnant pools in moorlands. β . in deeper water, γ . in Lake Hornsee, δ . ponds, in pine barrens of New Jersey, U.S.

(*Monthly Micro. Journ.* (1875) xiii., p. 61.)

INTRODUCTION TO "FUNGI."*

ALTHOUGH precluded from any remarks on this volume other than a mere statement of facts, it may not be wholly out of place to suggest that those students who have long been inquiring for a promised "Introduction" to the Handbook, will find in this volume probably much of the information which such an introduction would have contained. The present notice is intended to be confined solely to an enumeration of the contents of the volume, which is published at a price within the limits of all, and of a size convenient and portable.

Chapter I., on the "Nature of Fungi," concludes with some observations on the Lichen-gonidia question, and the relations of Lichens to Fungi.

Chapter II., on the "Structure of Fungi," deals with the orders in their usual sequence. Allusion is made under Agaricini to the supposed asci on the gills of *Agaricus melleus*. Since this chapter was written, we have been favoured by Mr. C. H. Peck with a specimen of his *Agaricus ascophorus*, a description of which was published in 1872. It was then stated that the spores were produced in subglobose sacs at the apex of thick pedicels, twelve or more in each ascus. From an examination of this species we find that in addition to the *basidia* there are two other kinds

* "Fungi: Their Nature, Influences, Uses, &c.," by M. C. Cooke; edited by the Rev. M. J. Berkeley, being the xiv. vol. of the International Scientific Series. London: H. S. King & Co.

or forms of projections from the hymenium, one capitate, answering to the supposed asci, the other attenuated. The Rev. M. J. Berkeley has also examined the structure, and is of the same opinion as ourselves—that both these organs are of the nature of *cystidia*. A portion of the hymenium has also been forwarded to M. de Seynes, who has had considerable experience in the examination of the hymenium of the Hymenomycetes, in the hope that he will add his opinion as to the nature of the bodies which have been called asci. In this chapter illustrations are given of the principal types of structure.

Chapter III., on “Classification,” explains, as far as the limits of the volume would permit, the bases of classification, and the relation of the different groups to each other, concluding with a Tabular Arrangement of Families and Orders.

Chapter IV., on the “Uses of Fungi,” commences with an enumeration of edible species, and concludes with those employed in the arts.

Chapter V., on “Notable Phenomena,” gives a record of known cases of phosphorescence, of changes in colour, of peculiar odours, and other phenomena worthy of note.

Chapter VI., on “The Spore and its Dissemination,” details the form and distribution of Basidiospores, Stylospores, Spermata, Trichospores, Sporangia, Thecaspores, &c., illustrated by some of the principal types.

Chapter VII., on “Germination and Growth,” passes through the different orders detailing the observations made by various authors during the past five years on the germination, and in some instances the production of secondary spores, with the different phases through which certain species pass.

Chapter VIII., on “Sexual Reproduction,” gives a summary of all that is known of the supposed sexuality of Fungi, especially of conjugation in the Mucors and other groups.

Chapter IX., on “Polymorphism,” deals with the different forms under which the same fungus presents itself, in the first instance such as present two or more forms of fruit, either consecutively or simultaneously, on the same individual, and afterwards “suspected” cases, in which the series is supposed to be completed in other plants.

Chapter X, on “Influences and Effects,” treats of the relation of fungi to disease, and their influence on man, lower animals, and plants. Under the latter section parasitic species and their checks to vegetation are reviewed.

Chapter XI., on “Habitats,” treats the subject from two positions—one the relation of Habitats to the different orders and suborders, the other of the varied species which affect the same Habitat.

Chapter XII., on “Cultivation,” is not confined to such species as may be cultivated for economic use, but also relates to experimental cultivation for scientific purposes.

Chapter XIII., on "Geographical Distribution," attempts an estimate of the general distribution of Fungi over the globe, whilst admitting that a very large portion still remains to be explored.

Chapter XIV. concludes the volume with some observations on "Collection and Preservation."

It is hoped that the volume thus summarised will satisfy the expectations of all who have anticipated its advent, and will fulfil the conditions, and serve the purposes for which it was written.

NOTE ON LECIDEA DIDYMOSPORA, STIRN., &C.

By the REV. J. M. CROMBIE, F.L.S.

In repudiating my identification of his *Lecidea didymospora* ("Grevillea," iii., p. 25), it was much to be desiderated in the interests of Lichenological Science that Dr. Stirton, according to the course usually followed by botanists, should have pointed out in what respect his plant differed from *L. melina* (Kphb.). A bare contradiction, affirming only that my identification was "conjecture," is in such a case absolutely worthless. As will, however, be seen from what follows, there was no "conjecture" whatever, as he is pleased to call it, in the matter, otherwise I should have marked it with [?] as in the case of his *Lecidea epiphorbia*. The brief description which he gave of *Lecidea didymospora* was, of itself, quite sufficient to prove the identity to any one who had once read the diagnosis of *Megalospora melina*, Kphb., and left no room whatever for "conjecture." In "Grevillea," ii., p. 60, it is said of the supposed *new species* that it is, *inter alia*, *minora*, "nearly allied to *L. sanguinaria*, but differing in having two spores in each ascus, which are besides only half the size of those of the latter, and oval in shape instead of oblong." Similarly, the description of *L. sanguinaria*, var. *Melina* (Kphb.), given by Nylander in "Lich. N. Gran.," p. 72, and in "Lapp. Or.," p. 166, is "theeis bisporis, sporis 0.052-64 mm. longit. 0.034-44 mm. crassit." (*i.e.*, nearly half the size of those of the type), adding "nix est nisi forma bispora varietatis (*sanguinariæ*) *affinis*, Schær." The other and lesser points of difference referred to by Dr. Stirton are only such as may be seen in states of the type. There can therefore be no question that the two are identical, and my identification has since been independently confirmed (if such confirmation was needed) by Dr. Th. Fries, in "Lich. Scand.," ii., p. 480. Or if any farther question can possibly arise as to the identity, it can only be on the grounds that Dr. Stirton's plant was a 2-spored variety of the type itself, and not of its var. *affinis*. But even in this case it evidently did not require a *new* name, since that of Krempelhuber would be amply sufficient for both forms. As to the specific value attributed to *Lecidea didymospora*, when it is

said, "it is as much entitled to a specific place as *Lecidea geminata*," I beg to state that such a conclusion by no means logically results from the premises. For though a normally 2-spored plant (*L. geminata*) is regarded as specifically distinct from a normally 8-spored one (*L. petræa*), it does not follow that another 2-spored plant should also be regarded as specifically distinct from a normally solitary spored species (*L. sanguinaria*). In fact, the occurrence of solitary spores in *L. geminata* tends rather to show how unwarrantable in the other case would be such a separation.

So much, then, for *Lecidea didymospora*, Strn. In "Grevillea," iii., p. 25, Dr. Stirton is so good as to hint that I may be able to suggest an analogous, if not identical name for his *Lecidea subretusa*, on the grounds of "the scattered state of the literature of the subject!" I venture to suggest that it may possibly be *Lecidea accedens* (Arn.). Probably, however, it is only a mere and probably old state (such I have gathered on Ben Lawers) of the very variable *Lecidea sabuletorum*, which, in some conditions, presents spores "which in size and shape" are not different from those described by Dr. Stirton. As to the other "new species" described pp. 33-37, I might readily "conjecture," with more or less probability, the identity of several with old and well-known species. Such conjectures, however, in the absence of the specimens themselves, I prefer not to indulge in at present. I shall therefore content myself with stating that *Lecidea scutulata*, Strn., = *L. consentiens*, Nyl., with thallus coloured such as it rarely occurs on Ben Lawers, and that *Xylographa scaphoidea*, Strn., = *X. parallela*, var. *pallens*, Nyl., such as I observed it some years ago in the neighbourhood of Dalwhinnie and elsewhere.

With regard to *Lecidea alpicola*, Schær., which Dr. S. seems to intimate that he had gathered for the first time in Great Britain on Ben Lawers, this was omitted from my *Lich. Brit. Enum.* simply because I had not then gathered it on Ben Nevis, and previous records of the plant were too doubtful. *L. galbula* was not "inserted in its place," but on information since ascertained to be erroneous, that it had been gathered on that mountain by Dr. Lindsay. Mr. Leighton therefore did right in omitting *L. galbula* altogether from his valuable *Lich. Fl.* *L. alpicola*, previously recorded by me as an addition in "Journ. Bot.," was inserted by Leighton not "in its place," but because in the Nylanderian arrangement followed it comes next in order. There was thus no mistake in the matter. A mistake, however, is committed by Dr. S. when, in censuring Mr. Leighton for speaking of the spores of *L. alpicola* as being colourless, he says that "when mature they are of a beautiful green colour, merging ultimately to brown." Here the censor must himself be censured, for the fact is they ultimately become "blackish!"

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Grevillea,

A QUARTERLY RECORD OF CRYPTOGAMIC BOTANY
AND ITS LITERATURE.

NOTICES OF NORTH AMERICAN FUNGI.

By the REV. M. J. BERKELEY, M.A., F.L.S.

(Continued from page 112.)

682. **Zygodesmus fibrosus.** B. & C.— Effusus fuscus, fibrillis repentibus; sporis fortiter echinulatis.

On putrid leaves. Car. Inf. No. 2427.

Effused, brown, mixed with creeping fibres, composed of slender threads, which do not show the peculiar Zygodesmoid structure, visible however, in those which produce the short fertile threads crowned by the strongly echinulate globose spores.

683. **Zygodesmus ramosissimus.** B. & C.—Atro-fuscus; floccis ramosissimis, fertilibus simplicibus divisisque; sporis minoribus.

On pine wood. Car. Inf. No. 2274.

Dark-brown; threads very much branched; fertile threads simple or divided; spores few, small, coarsely echinulate.

684. **Zygodesmus effusus.** B. & C.—Effusus, alutaceus; sporis globosis in spiculas sitis.

On decayed oak. Car. Inf. No. 2598.

Effused, bright tan-coloured; threads of two kinds, some with the Zygodesmoid joints, others branched and studded all over with short prickles, which bear the globose spores. This curious species combines the characters of *Zygodesmus* and *Rhinotrichum*.

685. **Zygodesmus olivascens.** B. & C.—Luteo-olivaceus, effusus, tenuis; floccis fertilibus digitatis.

Under decayed pines. Car. Inf. No. 3204.

Forming bright-yellow olive thin patches; fertile threads digitate.

686. **Virgaria fuscopurpurea.** B. & C.—Floccis tenuibus flexuosis simplicibus articulatis atropurpureis, sporis subellipticis.

On oak twigs. Car. Inf. No. 371, 2173.

Forming a thin purple-black stratum; flocci simple, erect, flexuous, articulated; spores subelliptic.

687. **Virgaria uniseptata.** B. & C.—Floccis tenuibus, simplicibus articulatis; sporis oblongis uniseptatis.

On putrid oak wood. Dark brown; threads simple, more closely articulated than in the last; spores oblong, short, uniseptate.

These two species depart in some measure from the characters of the genus, inasmuch as the flocci are unbranched.

688. **Campotrichum circinatum.**—*B. & C.*—Floccis sursum cirrhosis anastomosantibus.

On leaves of *Magnolia grandiflora*. Car. Inf. No. 1374.

Forming brown orbicular little patches on the under side of the leaves; flocci rising from the decumbent mycelium, branched above and curved, anastomosing with each other.

689. **Campotrichum tenue.** *B. & C.*—Sparsum, molle; floccis rectis hic illic anastomosantibus; sporis minutis globosis.

On leaves of *Magnolia grandiflora*. Car. Inf. No. 1027, Ravenel.

Forming minute scattered soft tufts; threads straight, slightly divided, springing from the decumbent mycelium; sometimes anastomosing by little lateral processes; spores minute, globose.

690. **Oichitonium melleum.** *B. & C.*—Granulæforme, floccis divaricatis, apicibus furcatis.

On fallen branches in moist places. Car. Inf. No. 256.

Forming little scattered honey-coloured granules, which externally bear divaricately branched threads, the tips of the branchlets forked. Unfortunately no spores were found in this very curious production, which belongs to the genus proposed by Durieu and Montagne. No. 2329, on oak, seems to be a minute *Tubercularia*.

691. **Myxotrichum simile.** *B. & C.*—Molle nigrum; floccis fertilibus brevibus lateralibus, sursum divis; capitulis sporarum concatenatarum terminatis.

On decaying *Arundinaria*. Car. Inf. No. 2161.

Forming soft, dark-brown tufts, running frequently into lines; flocci articulated, bearing short lateral branchlets, divided into two or three lobes above, and bearing a globose head of minute spores, which form little necklaces.

692. **Menispora apicalis.** *B. & C.*—Nigra; floccis simplicibus, articulatis; sporis apicalibus curvatis pluri-nucleatis.

On the under side of fallen branches. Car. Inf. No. 2238, 2517.

Dark-brown; flocci springing from decumbent threads, simple, articulated; spores apicular, linear, curved, containing a row of about eight nuclei.

* **Fusisporium aurantiacum.** *Lk.*—On *Carphephorum tomentosum*. Car. Inf. No. 2359.

On decayed cotton seed. Ravenel. No. 1582.

693. **Fusisporium cinnabarinum.** *B. & C.*—Effusum, demum crustaceum, cinnabarinum; sporis brevioribus quadrinucleatis.

On *Acer negundo*. Alabama, Peters. No. 3990.

Forming a continuous stratum, which in drying cracks up into detached portions; spores short, with four nuclei.

694. **Fusisporium miniatum.** *B. & C.*—Effusum miniatum; sporis brevioribus quadrinucleatis.

On the wounded bark of *Cornus florida*. *Car. Inf.* No. 6389.

On pine wood recently felled. Alabama, Peters. No. 6340.

Differs from the last in its much brighter colour. The spores are the same.

* **Fusisporium Solani.** *Mart.*—On putrid potatoes. Pennsylvania, Michener. No. 4323.

Spores $\cdot 002$ - $\cdot 0013$ long.

695. **Fusisporium Pezizoideum.** *B. & C.*—Sparsum minutum; sporis 3-5 septatis ad commissuras incrassatis.

On stems of herbaceous plants. Pennsylvania, Michener.

Scattered, minute, dirty white; spores with from three to four septa, which project all round at the commissures, $\cdot 001$ - $\cdot 001$ long. Closely resembling *Fusidium torulosum*; the spores are similar, but with fewer septa.

696. **Fusisporium ossicola.** *B. & C.*—Pallide aurantiacum; sporis apicalibus quadrisepatis; articulis ultimis quandoque curvato-acuminatis uncinatis.

On old decaying bones. *Car. Inf.* No. 3200.

Forming a pale orange stratum; spores borne at the tips of short forked threads with about four septa, the terminal articulations often strongly acuminate and curved (uncinate).

697. **Fusisporium Berenice.** *B. & C.*—Punctiforme albidum; sporis oblongis curvatis vel sigmoideis plurinucleatis erectis in globulum congestis.

On some decayed *Peziza*. Boston, Murray. No. 6232.

Forming little dirty white specks; spores linear oblong, curved or sigmoid, containing several nuclei, erect, collected into a little globe. This departs from the usual form of the spores, but as they are doubtless septate when old, I hesitate constituting a new genus from imperfect specimens.

* **Fusisporium Buxi.** *Fr.*—On box leaves. *Car. Inf.* No. 1768.

* **Sepedonium chrysospermum.** *Lk.*—On *Boleti*. *Car. Inf.* No. 2302.

698. **Sepedonium subochraceum.** *B. & C.*—Effusum alutaceum; sporis globosis granulatis.

On dead wood. Alabama, Peters. No. 6104.

Forming a continuous tan-coloured stratum; spores globose, studded with little papillæ, $\cdot 0004$ in diameter.

699. **Psilonia cylindrospora.** *B. & C.*—Punctiformis fulva; sporis oblongo-linearis.

On *Tillandsia usnoidea*. *Car. Inf.* No. 3018.

Forming little tawny tufts; spores oblong-linear, $\cdot 0006$ long, surrounded by the inflexed obtuse hairs. *Asterophora agaricicola*,

Cd. Ravenel. No. 1497. Glens springs, Car. Inf., will come in its place in *Hyphomyces*, as will *Trichoderma viride* under *Hypocrea*.

* **Ptychogaster albus.** Cd.—*Institale acariforme*, Fr. Boston, Murray. No. 6249. Ravenel. No. 1860. On *Ostrya virginica*, is a state of *Hypoxyylon fragiforme*.

* **Pilacre Petersii.** B. & Br.—On dead wood of *Ilex*. Alabama, T. M. Peters. No. 3811.

* **Pilacre faginea.** B. & Br.—On dead wood. Texas, C. Wright. No. 3100. Santee River, Ravenel. No. 1580.

* **Ascophora Mucedo.** Tode.—On strings of *Hibiscus Edulis*. Car. Sup. No. 562.

* **Ascophora Nucum.** Cd.—On *Batatas*. Car. Inf. No. 2286.

* **Phycomyces nitens.** Kze.—On excrement in dark woods. Alabama, Beaumont. No. 6402.

* **Mucor ramosus.** Bull.—On decayed *Agarics*. Sartwell. No. 3259.

700. **Mucor paradoxus.** B. & C.—Floccis hyalinis curtis; vesiculis globosis obovatisque; sporis oblongis majoribus minoribusque.

On decaying *Boletus*. Pennsylvania, Michener. No. 4057.

Flocci short, hyaline; vesicles of two kinds, the larger globose on longer flocci; spores .00057 long; the smaller obovate but narrow, on short pedicels springing from the mycelium; spores .0004 long each, about $\frac{1}{4}$ as much wide.

* **Mucor capitato-ramosus.** Schwein.—On-decaying *Boleti*. Car. Inf. No. 2304.

* **Mucor fusiger.** Lk.—On decayed *Agarics*. Car. Inf. Ravenel. No. 1335.

* **Mucor caninus.** P.—On dog's dung. Pennsylvania, Michener.

Spores oblong, .0005-.0003 long.

701. **Mucor cucurbitarum.** B. & C.—Lanosus; vesiculis demum nigris; columella clavata; sporis breviter fusiformibus.

On decaying gourds and melons. Car. Inf. No. 6188. Ravenel. No. 1864. New England, Sprague. 5841.

Forming a woolly mass; vesicles at length black; columella clavate; spores shortly fusiform, .0005 long, about half as much wide. Differs principally from *M. clavatus* in the spores.

702. **Mucor Beaumontii.** B. & C.—Floccis curtis hyalinis; sporis oblongis vel ellipticis obtusissimis atropurpureis.

On decaying cabbage leaves. Alabama, Beaumont. No. 4648.

Flocci short, hyaline; spores elliptic or oblong, very obtuse, .008 long, about half as much wide, dark purple.

703. **Mucor curtus.** B. & C.—Floccis curtis nigris; sporis fusiformibus utrinque subappendiculatis.

On a decaying musk melon. Car. Inf. No. 3179.

Forming thin black patches; flocci short; spores fusiform, with minute appendage at either end, binucleate, .00057 long, about $\frac{2}{3}$ as much wide.

* *Pilobolus crystallinus*. Tode.—On dung. Car. Inf. No. 3024.

* *Morchella esculenta*. Fr.—Ohio, Lea. No. 59. Var. *Conica*. P. Rhode Island, Olney. No. 1825. Ohio, Lea.

* *Morchella elata*. Fr.—New England, Sprague. No. 5385.

* *Gyromitra esculenta*. Fr.—Boston, Sprague. No. 5857.

* *Helvella costata*. Schwein.—On sand banks. Car. Sup. No. 2247.

Sporidia rough, .001-.0013 long.

* *Helvella lacunosa*. Afz.—Car. Inf. 2975.

* *Helvella atra*. König.—About rotten trunks. Car. Inf. Ravenel.

* *Mitrlula paludosa*. Fr.—Alabama, Beaumont. No. 4630.

On mud in low grounds. Car. Inf. No. 1199.

704. *Mitrlula lutescens*. B. & C.—Flavida subviscosa; stipite solido squamoso.

On earth in damp woods. Aug. Car. Inf. No. 2990.

Dull yellow, $1\frac{1}{2}$ - $2\frac{1}{2}$ inches high; head brighter, compressed, somewhat twisted, smooth, rather viscid; stem solid, scaly; sporidia oblong, sometimes curved with about five nuclei, .0013 long. The sporidia of *M. paludosa* are far more delicate and shorter.

* *Mitrlula crispata*. Fr.—New England, Sprague. No. 5758.

Sporidia elliptic uniseriate.

705. *Mitrlula elegans*. B.—Clavula parva obovata; stipite longissimo. United States, Green. No. 66.

Head not two lines high, gradually attenuated into the stem, which is nearly three inches high, and slightly thickened at the base; asci clavate; sporidia oblong.

* *Leotia lubrica*. P.—Car. Sup. No. 508. Car. Inf. No. 2400. Jan.

* *Leotia viscosa*. Fr. TREMELLA STIPITATA. Bosc.—Car. Inf. No. 2976. Ravenel. No. 1784.

This is referred by Ravenel, Fasc. iv., No. 22, to *L. chlorocephala*, Schwein, but it neither agrees with it in habit nor in fruit.

Sporidia curved, .001 long. Growing in light sandy beds, generally preferring roads but little used, the pileus only for the most part appearing above ground.

* *Leotia chlorocephala*. Schwein.

Sporidia .0008 inch long, rather pointed at either end, with three nuclei smaller than the last. Car. Inf. Ravenel. No. 1633. Penns., Michener. No. 3979.

* **Vibrissea truncorum.** Fr.—New England, Sprague. No. 5668.

Sporidia filiform.

* **Geoglossum Peckianum.** Cooke MSS.—New England, Murray. No. 5339. Glabrum, subviscosum, nigrescens. Sporidiis linearibus 15-septatis, brunneis. Paraphysibus septatis, supra curvatis circinatisque, flexuosis.

Sporidia .0045 in long. The entire plant resembling *G. glutinosum* but fruit and paraphyses different.

* **Geoglossum difforme.** Fr.—Car. Inf. No. 1227.

* **Geoglossum hirsutum.** P.—Car. Inf. No. 1625. Louisiana, Dr. Hale. No. 3661.

706. **Peziza (Helvelloideæ) irrorata.** B. & C.—Cupulæformis, demum applanata fuliginea; subtus late affixa; sporidiis uniserialibus ellipticis demum granulis exasperatis; paraphysibus clavatis.

On soil. Texas, C. Wright. No. 3138.

About an inch across, cup shaped, then depressed, dingy, fixed widely at the base; sporidia with the inner membrane distant from the outer, with a single globose nucleus, .0004 long, surface studded with little obtuse granules.

707. **Peziza (Helvelloideæ) sordescens.** B. & C.—Cupula expansa primum aureo-flava; hymenio spadiceo; stipite cylindrico pallido tomentoso; sporidiis ellipticis binucleatis.

On soil, over which a thin mycelium is spread which binds together the particles. New England, Murray. No. 5327.

An inch or more across; cups expanded, at first golden-yellow; hymenium bright brown; stem cylindrical, pallid, tomentose; sporidia elliptic, binucleate, narrow, .0005 long. Outer surface of cups dark when old.

708. **Peziza (Helvelloideæ) microspora.** B. & C.—Parva gregaria stipata irregularis carnosâ fragilis, extus pallida pruinosa, intus aurantio-flava; stipite brevissimo vel obsoleto; sporidiis minoribus ellipticis lævibus binucleatis.

On damp rotten wood near the ground. Car. Inf. No. 2970.

Very irregular from being densely crowded, fleshy, brittle; externally pallid pruinose, internally orange-yellow; stem very short; sporidia .00028 long.

709. **Peziza (Helvelloideæ) decolorans.** B. & C.—Cupula parva obconica, ex albo fuliginea; sporidiis ellipticis binucleatis.

On the ground. Alabama, Peters. No. 6059.

Cups small, obconical, white, then dingy; sporidia elliptic, binucleate, .00057 long.

710. **Peziza (Helvelloideæ) Petersii.** B.—Gregaria crispata extus pallida; hymenio spadiceo; sporidiis ellipticis angustis binucleatis.

On burnt soil. Alabama, Peters. No. 6063.

An inch or more across, rather shallow, gregarious, crisped, externally pallid; hymenium bright brown; sporidia narrow, elliptic, binucleate, .00038 long.

* **Peziza (Helvelloideæ) vesiculosa.** *Bull.*—On dung. Maine. No. 5291, 5307.

Sporidia .0008 long.

711. **Peziza (Helvelloideæ) phlebophora.** *B. & Br.* "Cooke's Handb.," p. 667. Var.

On moist sandy soil. Alabama, Peters. No. 4560.

The sporidia are .00074 long, whereas in the British plant they are .0004. There is apparently no other difference. They are not elongated as in *P. leporina*.

* **Peziza (Helvelloideæ) succosa.** *B.*—On the ground. New England, Sprague. No. 5337.

Sporidia .0006-.0008 long.

* **Peziza (Geopyxis) cupularis.** *L.*—On the ground. Car. Inf. No. 1893.

* **Peziza (Geopyxis) rapulum.** *Bull.*—On the ground. Car. Inf. No. 2111.

712. **Peziza (Geopyxis) macropus.** *P.* Var.—Hymenio rufo-olivaceo; extus pallidior.

On the ground. Santee River. No. 1628.

Hymenium rufous-olive; cups externally paler; sporidia .001 long, exactly resembling those of the normal form.

713. **Peziza (Humaria) Agassizii.** *B. & C.*—Cupula extus tomentosa candida, intus aurantia breviter stipitata; margine undulato; sporidiis subfusiformibus lævibus minutis.

On bark. Lake Superior, Agassiz. No. 2631. New England, Oakes. No. 3098.

Cups a line or two broad, gregarious, externally white, tomentose; hymenium orange; margin undulated; stem short; sporidia narrowly oblong or subfusiform, even, .0002 long.

* **Peziza (Humaria) Wrightii.** *B. & C.* "Ann. Nat. Hist."—On bark covered with moss.

Sporidia globose, echinulate, .00045-.0006 in diameter.

* **Peziza (Humaria) subhirsuta.** *Schum.*—On the ground. Rhode Island, Olney. No. 1748 bis.

Sporidia .0005-.0006 long.

* **Peziza (Humaria) globifera.** *B. & C.* "Fung. Cub."—On earth in damp places. Car. Inf. No. 1991, 2974.

Sporidia globose, even, .0005-.00045 in diameter. This species was formerly distributed under the name of *P. sphaeroplea*.

714. **Peziza (Humaria) cremoricolor.** *B.*—Minuta applanata cremoricolor; paraphysibus linearibus; sporidiis ellipticis lævibus.

On human ordure. Car. Inf. No. 1748.

Minute, about a line broad, flattened, cream-coloured; paraphyses linear; sporidia elliptic, even, .0006 long. This may probably be an *Ascobolus*.

715. **Peziza (Humaria) spissa.** *B.*—Cupula irregulari; margine lobato; hymenio crasso spadiceo; stipite brevissimo candido; sporidiis ellipticis binucleatis.

On the ground. Alabama, Peters. No. 6074.

Cups $\frac{3}{4}$ inch across, irregular; margin lobed; hymenium thick, bright brown, rather convex; stem very short, white; sporidia elliptic, binucleate, .00057 long.

716. **Peziza (Humaria) exasperata.** *B. & C.*—Coccinea; cupula subglobosa extus verruculosa; margine inflexo; sporidiis globosis echinulatis.

On burnt earth. Alabama, Peters.

Cup $\frac{1}{2}$ inch across, scarlet, subglobose, clothed externally with minute warts; margin inflexed; sporidia globose echinulate, .0005 in diameter.

* **Peziza (Humaria) omphalodes.** *Bu l.*—On burnt earth. Alabama, Peters. No. 6095.

On refuse from a paper-mill. Boston, Sprague. No. 6237.

* **Peziza (Humaria) melaloma.** *A. & S.*—On burnt earth. Alabama, Peters. No. 5306. Texas, C. Wright. No. 3137.

* **Peziza (Humaria) ollaris.** *Fr.*—On soil, Connecticut, C. Wright. No. 5614, 5624. Golden yellow. Sporidia .0006 long.

* **Peziza (Humaria) humosa.** *Fr.*—On soil. Boston, Murray. No. 6238. Sporidia elliptic, even, .001 long.

* **Peziza (Encœlia) fascicularis.** *A. & S.*—On *Alnus serrulata*. Car. Inf. No. 2191. *Cornus Florida*. Car. Inf. No. 2457. Car. Sup. (No. 1517, Rav.)

717. **Peziza (Encœlia) Ravenelii.** *B. & C.*—Parva sub-sessilis concava flexuosa extus albida subtiliter tomentosa, intus rufescens; stipite brevissimo.

On *Patellaria nigro-cinnabarina*. Car. Sup. No. 1778. (No. 551, Rav.)

About a line broad, concave, flexuous, dirty-white externally, minutely tomentose, red-brown within; stem very short or obsolete.

718. **Peziza (Encœlia) ustalis.** *B. & C.*—Congesta irregularis extus rufa subtiliter tomentosa; hymenio spadiceo; stipite cylindrico brevi.

On decayed twigs. Alabama, Peters. No. 6068.

Crowded, irregular, externally rufous, minutely tomentose; hymenium bright brown; stem short, cylindrical.

719. **Peziza (Encœlia) extricata.** *B. & C.*—Erumpens, congesta margine undulato; extus pallide umbrina sericeo-tomentosa, intus albida.

On dead stem of some Umbellifer. Alabama, Peters. No. 4566.

Bursting through the cuticle ; crowded ; margin undulated, externally pale-umber, hymenium dirty-white.

A highly curious species, of which unfortunately the specimens are not in very good condition.

* **Peziza (Sarcoscyphæ) floccosa.** *Schwein.*—On earth. New York, Sartwell. No. 3465. Ohio.
Sporidia fusiform ; flocci articulated.

* **Peziza (Sarcoscyphæ) occidentalis.** *Schwein.*—On the ground. New York, Sartwell. No. 3454. Ohio. Alabama, Peters. No. 6069. Sporidia .0006 long. In *P. coccinea* the sporidia are .001-.0013, sometimes emarginate at either end ; sometimes the inner membrane only is emarginate.

720. **Peziza (Sarcoscyphæ) Stygia.** *B. & C.*—Pusilla nigra ; cupula turbinata extus hispidula ; disco plano-concavo olivaceo-nigro ; stipite longe radicato fibris floccosis strigoso ; paraphysibus linearibus apice curvatis ; sporidiis globosis lævibus.

Sides of moist banks amongst moss. *Car. Inf.* No. 2971. Cup $\frac{1}{2}$ inch wide, $\frac{3}{4}$ high, top-shaped, black externally, somewhat hispid ; disc plano-concave, olive-black ; stem deeply rooting, strigose, with floccose fibres ; paraphyses linear, curved above ; sporidia globose, even. Allied to *P. rhizopus*.

721. **Peziza (Sarcoscyphæ) alphitodes.** *B.*—Cupula hemispherica stipiteque elongato hispidulis pallidis ; margine undulato ; sporidiis subfusiformibus.

On bark amongst moss. Boston, Murray. No. 6230.

Cup hemispherical, slightly hispid, as well as the elongated stem ; margin waved ; sporidia subfusiform, .0004 long.

722. **Peziza (Sarcoscyphæ) pusio.** *B. & C.*—Cupula hemispherica in stipitem crassum costato-venosum glabrescentem decurrente ; extus albida, intus aurantia.

Rooting into the soil, the particles of which it binds together. Texas, C. Wright. No. 3145. From 1 to $1\frac{1}{2}$ line across, hemispherical, dirty-white externally, running down into the ribbed stem ; hymenium orange. Closely allied to the last.

723. **Peziza (Sarcoscyphæ) semitosta.** *B. & C.*—Umbrina extus velutino-hispidula intus spadicea ; cupula hemispherica in stipitem rugoso-costatum decurrente ; margine inflexo ; sporidiis subfusiformibus granulatis.

On the ground. Pennsylvania, Michener. No. 3936. Cup $1\frac{1}{2}$ inch across, hemispherical, umber, finely velvety, rugose behind ; stem ribbed ; sporidia subfusiform, .00117 long.

724. **Peziza (Sarcoscyphæ) pubida.** *B. & C.*—Cupulis congestis hemisphericis, margine inflexo extus stipiteque brevi velutinis ; paraphysibus brunneis ; sporidiis fusiformibus granulatis.

On the ground. Alabama, Peters. No. 6075. Cups $\frac{3}{4}$ inch across, crowded, hemispherical, with an inflexed margin, velvety

externally as well as the short stem; paraphyses brown; sporidia spindle-shaped, granulated, .001-.0015 long. Mycelium densely betulose. Closely allied to the last.

* **Peziza (Sarcoscyphæ) hemispherica.** *Wigg.*—On dead wood. Car. Sup. No. 255. Penns., Michener. No. 3584. Sporidia .001 long.

* **Peziza (Sarcoscyphæ) erinacea.** *Schwein.*—Penns., Michener. No. 5122. Sporidia, .0005-.0006 long.

725. **Peziza (Sarcoscyphæ) texensis.** *B. & C.*—Cupula appplanata sordide aurantiaca extus parce setis fusiformibus pallidis basi sulbosis septatis sparsa; margine ciliato; sporidiis ellipticis granulatis.

Texas, C. Wright. No. 3134. Cup depressed, dull orange, clothed with scattered fusiform pale bristles, which are bulbous at the base; margin fringed; sporidia elliptic, coarsely granulated, .006 long.

* **Peziza (Sarcoscyphæ) hinnulea.** *B. & Br.*—"Ann. Nat. Hist." Jan., 1875. = *P. ammophila*, *B. & C.*

On sand. No. 3802. Sporidia globose, even, .0005 inch in diameter.

726. **Peziza (Sarcoscyphæ) albo-cincta.** *B. & C.*—Cupula coccinea concava extus margineque floccis niveis ornata; sporidiis ellipticis echinulatis.

On the ground amongst moss. Car. Inf. No. 2592. About a line broad, concave, scarlet, clothed, as also is the margin, with white hairs; sporidia elliptic echinulate, .00075-.0008 long, .0006 wide.

* **Peziza (Sarcoscyphæ) scutellata.** *L.*—On decayed wood. Car. Inf. No. 1538, 3480 (No. 1618 Rav.). Texas, C. Wright. No. 3135.

* **Peziza (Sarcoscyphæ) stercorea.** *P.*—On dung, with *Ascolobolus furfuraceus*. Texas, C. Wright. No. 3140.

* **Peziza (Sarcoscyphæ) diversicolor.** *Fr.*—Car. Inf. No. 3043.

* **Peziza (Dasyscyphæ) virginea.** *Batsch.*—On dead twigs and leaves. Car. Inf. No. 2432. Texas, C. Wright. No. 3136. Penns., Michener. No. 4133.

* **Peziza (Dasyscyphæ) nivea.** *Hedw. f.*—On dead wood of *Carpinus*. Car. Inf. No. 698, 1938. Santee River. No. 1680.

* **Peziza (Dasyscyphæ) calycina.** *Schum.*—On fir twigs. Car. Inf. No. 1077, 2252, 2973.

* **Peziza (Dasyscyphæ) bicolor.** *Bull.*—On dead twigs. Maine. No. 5318.

* **Peziza (Dasyscyphæ) cerinea.** *P.*—On dead wood. Car. Inf. No. 73.

* **Peziza (Dasyscyphæ) clandestina.** *Bull.*—On oak. Car. Inf. No. 2118.

* **Peziza (Dasyscyphæ) caulicola.** *Fr.*—On *Arundinaria*. Car. Inf. Ravenel. (No. 991.)

727. **Peziza (Dasyscyphæ) Arundinariæ.** *B.*—Parva, cupula cyathiformi extus albo-tomentosa; stipite demum glabrato discoque concavo pallide umbrinis.

On dead stems of *Arundinaria*. Car. Inf. No. 2979.

Cyathiform, clothed with white down; stem at length naked, pale umber, as well as the concave disc.

* **Peziza (Dasyscyphæ) fuscescens.** *P.*—On oak leaves. Car. Inf. Ravenel. (No. 1215.)

728. **Peziza (Dasyscyphæ) translucida.** *B. & C.*—Minuta hyalina gregaria; cupulis hemisphæricis margine inflexo; stipite brevissimo.

On twigs of *Castanea*. Penns., Michener. No. 4232. Minute, gregarious; cups hemispherical, with an inflexed margin; stem very short.

729. **Peziza (Dasyscyphæ) puberula.** *B. & C.*—Cupulis globosis cervinis furfuraceo-tomentosis; pedicello brevi pallido; disco concolor, sero expanso lætiore.

On pallid spots of fallen leaves of *Fraxinus*. Car. Inf. (No. 688, Rav.). 1959.

Cups fawn-coloured, globose, furfuraceo-tomentose; stem short, pallid, as is the hymenium, which becomes brighter with age.

* **Peziza (Dasyscyphæ) albo-violascens.** *A. & S.*—On *Hibiscus syriacus*. Car. Inf. No. 2663.

This and the next species are more properly *Cyphellæ*.

* **Peziza (Dasyscyphæ) villosa.** *P.*—On Vine. Car. Inf. No. 1417, 1735. On *Liriodendron*. No. 6008.

* **Peziza (Dasyscyphæ) flammea.** *A. & S.* = *P. maculincola*, Schwein.—It is strange how Schweinitz forgot some of his own most distinctly marked species.

* **Peziza (Dasyscyphæ) cinereo-fusca.** *Schwein.*—On *Gleditschia*. Car. Sup. No. 950. Car. Inf. No. 1083. On *Vitis vulpina*. Car. Inf. No. 2183.

* **Peziza (Dasyscyphæ) melaxantha.** *Fr.*—On dead branches. Car. Inf. (No. 1686. Rav.)

* **Peziza (Dasyscyphæ) varicolor.** *Fr.*—On *Hibiscus*. Car. Inf. No. 2664. Penns., Michener. No. 4369.

* **Peziza (Dasyscyphæ) hyalina.** *P.*—On dead twigs. Car. Inf. No. 214.

730. **Peziza (Dasyscyphæ) nigrocincta.** *B. & C.*—Minuta punctiformis plana coccinea extus pilis brevibus nigris hispidula; ascis clavatis; sporidiis oblongis curvatis.

On sheaths of grasses. Car. Inf. Ravenel. No. 3082.

Minute, dot-like, plane, scarlet, rough with short black hairs externally; asci clavate, sporidia oblong, curved.

* **Peziza (Dasyscyphæ) punctiformis.** Fr.—On dead leaves. Car. Inf. No. 1490.

* **Peziza (Tapesia) aurelia.** P.—On dead wood. Penns., Michener. No. 3547.

* **Peziza (Tapesia) anomala.** P.—On bark, sticks, &c. Car. Inf. No. 1101. Car. Sup. No. 4457. New England, Sprague. No. 5405. This is properly a *Solenia*.

* **Peziza (Tapesia) mollisioides.** Schwein.—New England, Sprague. No. 5353.

* **Peziza (Tapesia) candido-fulva.** Schwein.—Car. Inf. No. 2614.

Very near *P. aurelia*, but the specimens are without fruit, so that a satisfactory comparison cannot be made.

* **Peziza (Tapesia) Bloxami.** B. & Br.—Cooke, "Handbk.," p. 694. Car. Sup. No. 408.

731. **Peziza (Tapesia) tela.** B. & C.—Subiculo expanso albido; margine ebyssino; cupulis minutis concavis fuscis.

On dead wood. Car. Inf. Ravenel. No. 1905.

Minute, concave, brown, cups seated on an expanded weblike subiculum, with a byssoid margin. Undoubtedly very nearly allied to the last, but the general aspect is different; the cups are not confluent, nor do they leave conspicuous white interstices of subiculum.

* **Peziza (Tapesia) pruinata.** Schwein = *Arthonia confluens*.—On bark of various trees as *Liquidambar*. Car. Inf. No. 2290. *Cornus florida*, No. 2377. *Myrica cerifera* (No. 1388, Rav.), Car. Sup. No. 876.

* **Peziza (Tapesia) Rosæ.** P.—On dead Rose twigs. Car. Inf. No. 1154.

732. **Peziza (Tapesia) atro-fusca.** B. & C.—Cupulis atro-fuscis; margine inflexo crenulato granulato nitido e subiculo ochroleuco membranaceo oriundis; sporidiis ellipticis binucleatis.

On dead wood. Alabama, Peters. No. 6083.

Cups dark brown, with an inflexed crenulated granulated margin springing from a pale ochre membranaceous stratum; sporidia elliptic, binucleate, .0003-.0004 long. A very pretty species.

733. **Peziza (Tapesia) scariosa.** B. & C.—Cupulis tenuibus confluentibus collapsis nigris; margine albido e subiculo nigro oriundis; ascis clavatis; sporidiis lineari-subfusiformibus.

On dead branches in moist places.

Cups thin, collapsing, confluent, black, with a whitish margin springing from a black subiculum; sporidia slender, subfusiform. Allied to *P. fusca*.

* **Peziza (Tapesia) sanguinea.** *P.*—On oak rails. Car. Inf. with *P. lecideola*, No. 2503.

* **Peziza (Fibrina) chlorascens.** *Schwein.*—On bark of *Taxodium distichum*. Car. Inf. (No. 1246, Rav.). On dead limbs of oak. Sulphur springs. Car. Sup. (No. 1515, Rav.).

734. **Peziza (Fibrina) umbilicata.** *B. & C.*—Depresse subglobosa; ore minuto umbilicata umbrino-gilva.

On the decorticated stem of a Rose. Pennsylvania, Michener. No. 4384.

About $\frac{3}{4}$ line across, subglobose, somewhat depressed, umbilicate, with a minute orifice.

A very neat species, but received in such a small quantity that it is impossible to give a perfect character.

735. **Peziza (Fibrina) pomicolor.** *B. & R.*—Sparsa subhemispherica sero aperta extus pomicolor furfuracea; disco olivaceo.

On bark of *Taxodium distichum*. Car. Inf. (No. 1417, Rav.).

Scattered, subhemispherical, at length exposing the olive disc; externally apple-green, furfuraceous.

* **Peziza (Mollisia) clavus.** *A. & S.*—Boston, Murray. No. 6235.

736. **Peziza (Mollisia) Brassicæcola.** *B.*—Tenuis expansa flexuosa extus intusque rufa; sporidiis ellipticis concatenatis uninucleatis.

On dead cabbage stems. New England, Sprague. No. 5407.

Cup thin, flexuous, expanded, rufous; sporidia elliptic, .0004 long, each with a single nucleus, which also contains a cytoblast. Habit that of *P. vulgaris*.

* **Peziza (Mollisia) vinosa.** *A. & S.*—On *Liriodendron*. Santee River (No. 1334, Rav.). On *Ribes*. Car. Inf. (No. 1809, Rav.). On *Morus rubra*. Car. Inf. No. 3730. *P. Liriodendri*, *B. & C.* Car. Inf. No. 1808, 1923.

* **Peziza (Mollisia) rubella.** *P.*—On *Liquidambar*. Alabama, Peters. No. 5208. On *Acacia Julibrissin*. Car. Inf. No. 3711. On *Ulmus*. Car. Inf. (No. 1452, Rav.) On maple. Pennsylvania, Michener. No. 3481. On oak. Car. Inf. No. 867.

737. **Peziza (Mollisia) fibriseda.** *B. & C.*—Irregularis aurantiaca extus saccharina; margine fracto laciniato; disco concavo.

On *Ulmus Americana*. Virginian Mount. No. 3311.

Irregular, orange, externally clothed with sugar-like granules; margin broken, lacinate; disc concave.

738 **Peziza (Mollisia) saccharifera.** *B.*—Mollis gregaria pallide aurantiaca irregularis extus saccharina; margine tumidula; disco concavo.

On *Liquidambar*. Alabama, Peters. No. 5208.

Soft, gregarious, pale orange, irregular, externally saccharine; margin swollen; disc concave.

Resembles the last, but has not the same laciniate margin.

739. **Peziza (Mollisia) Russellii.** *B. & C.*—Erumpens fasciculata lateritia; margine obtuso; disco leviter concavo; ascis clavatis; sporidiis biseriatis oblongis utrinque angustatis demum uniseptatis.

On bark. New England, Russell. No. 5982.

Erumpent, fasciculate, brick-red; margin obtuse; disc slightly concave; sporidia biseriate, oblong, attenuated at either end, at length uniseptate, .0006 long. Looks at first like a very collapsed *Nectria*. Hymenium pulverulent when dry.

740. **Peziza (Mollisia) exidiella.** *B. & C.*—Gregaria regularis extus intusque flavo-rufa; ascis clavatis; sporidiis oblongis angustis hyalinis.

On *Cornus florida*. Car. Inf. No. 2474.

Gregarious, regular, yellow-rufous; sporidia oblong, narrow, hyaline.

741. **Peziza (Mollisia) miltophthalma.** *B. & C.*—Minuta hemispherica extus nigra intus cinnabarina; ascis linearibus paraphysibusque flexuosis; sporidiis oblongis minutis hyalinis.

On *Cornus florida*. Car. Inf. No. 2474.

Minute, hemispherical, externally black, hymenium vermilion; asci linear, flexuous, as well as the paraphyses; sporidia oblong, minute, hyaline.

* **Peziza (Mollisia) cinerea.** *Batsch.*—On dead branches. Car. Inf. No. 1087. Connecticut C. Wright. No. 6367.

741* **Peziza (Mollisia) eustegiæformis.** *B. & C.*—Applanata facie decidua picea e subiculo maculæformi orbiculari oriunda, disco pallido.

On *Arundinaria macrosperma*. Car. Inf. No. 1023.

Flat, easily deciduous, pitch-brown, seated on an orbicular spot; disc pallid. A miniature of *Eustegia arundinacea*, Fr.

742. **Peziza (Mollisia) fracta.** *B. & C.*—Minuta erumpens nigra subglobosa cito expansa fracta; ascis clavatis; sporidiis biseratis oblongo-clavatis hyalinis.

On *Hydrangea vulgaris*. Virginian Mount. No. 3332.

Minute, erumpent, subglobose, black, aperture at first dot-like, then expanded, fragile; asci clavate; sporidia biseriate oblongo-clavate, hyaline.

743. **Peziza (Mollisia) Andropogonis.** *B. & C.*—Apala primum clausa nigra, demum expansa placentæformis; margine undulato; disco badio-flavo; ascis clavatis; sporidiis biseriatis oblongis utrinque angustatis triseptatis.

On *Andropogon*. Car. Inf. No. 5045.

Minute, with at length very much the appearance of *Patellaria rhabarbarina*; disc yellow-bay; asci large, clavate; sporidia oblong, slightly attenuated at either end, .0006 long.

* **Peziza (Mollisia) atrata.** *P.*—On *Sarracenia flava*. Car. Inf. No. 1217. On *Eupatoria*. Car. Inf. No. 1798. On *Solidago*. Alabama, Peters. No. 4586. Beaumont. No. 4615. On ash petioles. Car. Inf. No. 2008.

744. **Peziza (Mollisia) stenostoma.** *B. & C.*—Erumpens elongata aterrima, ore angusto; ascis clavatis; sporidiis oblongis angustis uniseriatis binucleatis.

On *Andropogon*. Car. Inf. No. 5945.

Erumpent, elongated, jet-black, with a narrow mouth; ascis clavate; sporidia oblong, narrow, uniseriate, binucleate. Looks at first like a minute *Hysterium*.

* **Peziza (Mollisia) vulgaris.** *Fr.*—On oak. Wisconsin, Lapham. No. 6214. Car. Inf. No. 1133, 2795. Penns., Michener. No. 3587.

Var. **Myceticola.**—On decaying *Polyporus*. Santee River. No. 1571. On oak. Car. Inf. No. 2683.

More concave than the usual form. It occurs on *Polypori* in England.

Var. **Sanguinella**, white externally, disc pale orange.

On *Liquidambar*. Car. Inf. No. 2180. New England, Sprague. No. 5372, 5380.

745. **Peziza (Mollisia) protrusa.** *B. & C.*—Erumpens punctiformis epidermide hic illic circumdata; ore flexuoso, extus granulata castanea, intus concava alba.

On the under side of dead leaves of *Magnolia glauca*. Car. Inf. No. 1194.

Erumpent, dot-like, here and there surrounded by the cuticle, externally granulated, chestnut, within concave, white; mouth flexuous.

746. **Peziza (Mollisia) olivaceo-lutea.** *B.*—Minuta erumpens cito decidua, extus olivacea margine albido; disco concavo pallide luteo.

On dead leaves. Car. Inf. No. 1204.

Minute, erumpent, so deciduous that it is difficult to preserve specimens, externally olive, with a whitish margin; disc concave, pale yellow.

747. **Peziza (Mollisia) Taxodii.** *B.*—Cupulis extus nigris intus concavis pallide cinereis, margine inflexo; ascis clavatis amplis; sporidiis quaternis majoribus obovatis fenestratis.

On bark of *Taxodium distichum*. Car. Sup. No. 633.

Black, concave, within pale cinereous; margin inflexed; ascis ample, clavate; sporidia quaternate, obovate, cellular, .003 long.

* **Peziza (Patellea) lecideola.** *Fr.*—On dead *Cercis*. Car. Sup. No. 904. On lime, Virg. Mount. No. 3344. On oak. Car. Inf. No. 1092, 2109, 2503. Penns., Michener. No. 4155.

* **Peziza (Patellea) compressa.** *A. & S.*—On oak. Car. Inf. No. 2082, 2426.

* **Peziza (Patellea) lignyota.** *Fr.*—On dead wood. Car. Sup. No. 1785.

* **Peziza (Patellea) flexella.** *Fr.*—On dead Juniper. No. 4596.

* **Peziza (Hymenoscyphæ) firma.** *P.*—On dead wood. New England, Sprague. No. 5674.

* **Peziza (Hymenoscyphæ) ciborioides.** *Fr.*—On dead twigs. Car. Inf. (No. 1316, Rav.) 5674.

* **Peziza (Hymenoscyphæ) fructigena.** *Bull.*—On various dead twigs, &c. Connecticut, C. Wright, No. 5612.

748. **Peziza (Hymenoscyphæ) soleniiformis.** *B. & C.*—Minuta candida primum hemispherica, margine tumido, dein cylindrica, demum ore expanso flexuoso.

On dead wood. Alabama, Peters. No. 6100.

Minute, white, at first hemispherical, with a swollen margin, then cylindrical; mouth at length expanded, flexuous. A curious little species.

* **Peziza (Hymenoscyphæ) cyathoidea.** *Bull.*—On dead herbaceous plants. Massachusetts. No. 3385. Penns., Michener.

On *Cicuta maculata*. No. 3538. Canada, Poe. No. 6160.

Var. **Major.**—Connecticut, C. Wright. No. 5611, 5626. New England, Murray. No. 5702. Alabama, Peters. No. 6061.

* **Peziza (Hymenoscyphæ) crocea.** *Schwein.*—On *Abies Fraseri*. Car. Sup. No. 44, 22.

Sporidia minute obovate, .0002 inch long.

749. **Peziza (Hymenoscyphæ) crocitincta.** *B. & C.*—Sessilis, primum globosa vivide crocicolor; hymenio concavo citrino.

On rotten oak logs. Cotoosa Springs, Georgia. No. 1730. Rav. Penns., Michener. No. 3602.

Sessile, at first globose, bright saffron, hymenium concave, lemon-coloured.

A lovely species. Specimens occur in which the outer surface is pallid.

750. **Peziza (Hymenoscyphæ) exarata.** *B.*—Mellea; cupula irregulari concava margine inflexo; stipite crasso eximie costato pruinoso; sporidiis minutis oblongis.

On dead wood. Car. Inf. No. 2119.

Honey-coloured; cup irregular, concave, with an inflexed margin; stem thick, ribbed, pruinose, sporidia minute, oblong.

* **Helotium (Calycella) æruginosum.** *Fr.*—On dead wood. White Mountains. New England, Oakes. No. 3095. Ohio.

* **Helotium (Calycella) versiforme.** *Fr.*—On oak. Alabama, Peters. No. 5249. Pennsylvania, Michener. No. 4358. Connecticut, C. Wright. No. 3640.

Sporidia oblong, narrow, .0004-.00025 long.

HUNGARIAN GEASTERS.

By PROFESSOR F. HAZSLINSZKY.

(Plate 47.)

The publication of the British species of Geaster from the "Gardeners' Chronicle" has induced me to review the Hungarian species of Geaster. Not having succeeded in the cultivation of these remarkable fungi, the development of which is yet very little known, I am obliged to confine myself to those characteristics that have until the present time been most in use.

Of *Myriostoma coliiforme* (*Dicks.*) there is one specimen in the Hungarian National Museum among the cryptogamous plants prepared by Professor Sadler, as it is said, for the continuation of his Flora of Pest; but the place where it is to be found is not mentioned for any of the cryptogams of Mr. Sadler.

Plecostoma fornicatum (*Huds.*) has been collected in the southern parts of the Zips by Mr. Kalchbrenner, Neupauer and myself. The typical form of this fungus as represented in "Grevillea," Plate xv., fig. 2, is not found in Hungary. In the Hungarian plant is wanting the cylindrical basis of the inner peridium above the stem. In our country there are only the varieties:—

β. globosum.—Inner peridium globose; mouth first conical, ultimately shortly cylindrical; stem very short, hardly two millim. long. Specimens like those given by Quelet, "Les champignons du Jura et des Vosges," Tab. iii., fig. 9, as *G. umbilicatus*, are very seldom met with in this country.

γ. urceolatum.—Inner peridium, when the peristome is open, urceolate (pitcher-shaped) chestnut-brown; mouth of a dirty yellow, with a brown margin. Peduncle is wanting, therefore very much like *G. lagenæformis* (*Vitt.*). "Grevillea," Plate xiv., fig. 1—not "Cooke's Handbook," fig. 113. Outer inverted. Peridium at the top brown, smooth; below yellowish white, and is connected by the points with its exterior layer on the ground, as is the case in the typical form. Spores globular, smooth .0004-0.0005 millim. thick. Fig. 5 represents the fungus in its natural size.

Geaster limbatus (*Fr.*) among Hungarian botanists known as *G. striatus*, in every respect agrees with the English fungus. "Grevillea," Plate xvii., fig. 1. As yet collected only by Kalchbrenner in the county Zips.

G. striatus (*D. C.*) distinguished by the membranaceous acuminate lobes of the outer peridium, from which the exterior layer is often separated, as in *G. fornicatus*, and by its conical, sericeo-striate peristome. But the circular disc is not so distinctly bordered, as shown in the representation, "Grevillea," Plate xvi.

This fungus was found by Schulzer in the neighbourhood of Vin Kovire in the southern parts of the country, by Lojka, on Mount Kralovo Hola, by Kalchbrenner, near Olaszi, by myself on the meadows of the forest near Kesmark.

G. fimbriatus (*Fr.*) very much like the preceding, but its mouth being but little raised, the lobes are rolled up semiglobularly; the inner peridium is also in this species sometimes pedicellate; the pedicel, however, is very short, hardly perceptible. I collected this fungus in the neighbourhood of Kesmark, in the forest under the Tatna, and in the meadows therein. Lojka found it on the Kralova Hola.

G. rufescens. (*Fr.*)—Outer peridium is rigid, pandiment-shaped, and so on bursting the soily lobes spread horizontally. The teeth of the peristome are twisted cylindrically. Spores small, warty .0,004 millim. in diameter. Colour is variable. In the pine forest of the Tatra I found quite white specimens; on the mountains in the neighbourhood of Hertnek, County Saros, one with a rose-coloured inner peridium; by Kalchbrenner it was found in the southern parts of the County Zips.

G. cryptorhynchus. (*Hzs. Klchbr.*)—This remarkable Geaster was found by Kalchbrenner in the neighbourhood of K. Olaszi, and placed among the fungi as *G. mammosus* in *Rbh. fung. eur.* n. 814. But *G. mammosus*, according to "Grevillea," vol. ii., p. 77, Plate xix., fig. 1, as well as *Fuekl. symb.*, p. 36, being an entirely different plant, I proposed the name above. *G. cryptorhynchus* is the greatest of our species of Geaster; its expanded outer peridium measuring .10-14 centimeters. The exterior peridium split into .4-6 ovate long acuminate laciniae. The most remarkable characteristic is the long thin beak of the peristome, which breaks off when the outer peridium bursts, leaving behind a short conical mouth on a radial-fibrous, impressed and strictly confined orbicular basis (*disc.*); Plate 47, fig. 2, exhibits, according to Mr. Kalchbrenner's communication, the vertical section of the closed fungus; fig. 3, the peristome with its beak; fig. 4, the breaking off of the beak; fig. 5, the conical mouth, with its circular radial-striate basis; fig. 6, the developed fungus, with its starlike expanded peridium; fig. 7, rough spores $\times 400$; fig. 8, spores still further magnified. Fig. 1 represents the fungus natural size.

Besides this form, where the interior fleshy layer sits on the surface of the outer peridium in the shape of rags, there occur also smaller forms of it, which to illusion resemble *G. lageniformis*, "Cooke's Handbook," fig. 113, and from this almost only by the circular disc is distinguishable. In this last form the exterior peridium is smooth on both sides, parchment-shaped; outside of a dirty yellow; the upper part brown, spores finely aculeate, whilst in its normal state they appear only to be verrucose; diameter of both, .0,004-0,006 millim.

Of the Geasters with large spores, there is found in Hungary only—

G. hygrometricus (*P.*), distinguished especially by the suberous, hard and deeply divided exterior peridium, besides the large verrucose spores, and its mouth without a discus. The fleshy layer, which always adheres to the inner surface of the exterior peridium, and splits into regularly arranged fissures, may also be taken into consideration in the diagnosis of it. The lobes are mostly unequal, sometimes involute, at others revolute. It had been collected by Hi Saibel and Sadler in the Matra, in the neighbourhood of Gyöngyös; by Schulzer, near Rëzbánya, Karansebes and Orsova, by Holuby, near N. Podhràgy, by myself, near P. Peklén, in the Matra, near Eger, and in the south-eastern part of the country, near Soborsin, Vaskapu and Mehadia.

Eperies.

FUNGI EXSICCATI.

We have before us such a number of Fasciculi of dried specimens of Fungi published during the past three months that we are constrained to devote a page or two to a cursory notice of them. Not having had an opportunity of examining the 1000 species contained in these collections critically, our remarks must necessarily be general.

Mycotheca Veneta. By P. A. SACCARDO. Cent. i. ii. iii.—This collection resembles Thümen's Fungi Austriaci in style, and inasmuch as Italian Fungi have not hitherto been published alone, will be welcome. In the valuable "Erb. Critt. Ital." all the Cryptogamia are included; hence the student of Fungi was compelled to purchase Lichens, Mosses, and Algæ, which were of little service to him, in order to secure his own specialty. Our space will not permit us to enumerate the species contained in this, or any other of the numerous collections to which we have to direct attention, and must content ourselves with a general commendation.

Thümen's Fungi Austriaci. Fasc. xiii.—Maintains the excellent character of former fasciculi, and notwithstanding some few errors to which all such collections are liable, and from which our own is not exempt, will become essential to all mycologists who would keep pace with Continental Mycology. The specimens are usually supplied in excellent quantity as well as quality.

Mycotheca Universalis. By Baron F. THUMEN. Cent. i.—This is the first attempt which has been made to publish specimens of Fungi from all parts of the world, and we are glad to see that the United States of America are represented in this collection. Inasmuch as Baron Thümen has published thirteen centuries of

Austrian Fungi, it would have been as well not to have included so large a proportion of these in his *Mycotheca Universalis*. The idea, however, of such a collection as this is a good one, and we hope that extra European countries will gradually exclude those in which good collections have already been published.

Rabenhorst's Fungi Europæi. Cent. xix.—This series is too well known to need commendation. It contains contributions from the majority of European Mycologists of note, whose names are a sufficient guarantee, although perhaps not of uniformity, yet of general accuracy.

Sphæriacei Britannici. Cent. ii. C. B. PLOWRIGHT.—It is an excellent plan which Mr. Plowright has adopted to confine his fasciuli to the *Sphæriacei*, whilst Mr. Phillips illustrates the *Elvellucei*, and the Rev. J. E. Vize the leaf parasites. This method secures to students of special groups specimens belonging to such groups in a larger number and at a more moderate price than if mixed with others in a general collection, for which probably they care little. This plan is also calculated to confine the attention of the Editors themselves within narrower limits, and greater accuracy, as well as the acquisition of new or rare species, is more likely to result. This second Fasciculus of the "Sphæriacei Britannici" contains amongst rarities *Torrubia entomorrhiza*, *Hypocrea delicatula*, *Hypomyces tomentosus*, *Dothidea Piggotii*, *Melanconis longipes*, *Lophiostoma angustilabra*, and *Sphæria (macrospora) Scirpi*, and of species entirely new, or new to Great Britain, we notice *Hypocreopsis pulchra*; *Nectria mammoidea*, *Diaporthe Beckhausii*, *Diaporthe samaricola*, *Diaporthe spina*, *Cucurbitaria Dulcamaræ*, *Sphæria (sordaria) equorum*, *Sphæria carbonaria*, *Sphæria (Delitschia) Wintéri*, *Sphæria appplanata*, *Sphærella Iridis*, and *Sphærella Typha*. Most of these have been announced or described in previous numbers of "Grevillea," and we trust that Mr. Plowright will continue his Fasciuli until he has exhausted the British Sphæriacei, even though he does not reap the substantial reward of pecuniary remuneration commensurate with the labour entailed.

Fungi Britannici. By the Rev. J. E. VIZE. Fasc. i. & ii.—These two centuries profess to be confined to such groups as the parasitic *Coniomycetes*, the *Peronosporiacei*, and such Fungi as are parasitic on living plants; at least, so we comprehend the scope of the Editor's intentions. We cannot exactly comprehend what may be gained by the introduction of such species as *Torula herbarum*, *Sporocybe byssoides*, &c., unless the collection is intended to merge into a general collection of Microscopical Fungi. If this is not the intention, then we would submit that in the end its editor will find a manifest advantage in confining himself within definite limits, however artificial those limits may be. We observe in the two fasciuli published some very interesting species, such as

Septonema elongatispora, *Ustilago Salveii*, *Graphiola Phœnicis*, *Æcidium Calthæ*, *Puccinia truncata*, *Puccinia chryso-splenii*, *Puccinia Vincæ*, which latter, as we think, without good reason, Professor Passerini calls *Puccinia Berkleyi*, on the assumption that it is not the species called *Puccinia Vincæ* by Castagne. The habit is different when the bilocular spores are produced amongst the *Uredo* spores, but there is no appreciable difference in the spores themselves, and we have certainly found both forms on the same plants at different periods of the year. Other welcome species included in this series the purchaser will find in *Tubercinia Trientalis*, *Puccinia Tripolii* (No. 25), *Ustilago antherarum*, *Puccinia Thesii*, *Æcidium Thesii*, &c. Some of the specimens seem rather too scanty for practical purposes.

Fungi Britannici. By M. C. COOKE. Second Series. Cent. i.—This new series is mentioned with the rest, as recently issued, and it may be remarked without egotism that a special feature has been introduced in this second series which will probably commend itself. Figures of the spores of a large number of the species are given side by side with the specimens. These figures are drawn by camera lucida to an uniform scale, and photo-lithographed from the original drawings, so as to ensure absolute accuracy in the dimensions. These can always be found by measurement with the scale at the bottom of Plate 28 in the present volume of "Grevillea."

FUNGI FROM INTERIOR OF A WHITE ANT-HILL.

At a meeting of the Agri. Horticultural Society of India the following letter from Mr. W. F. Gibbon, of Doolha, Goruckpore, was read. In an article in the *Gardener's Chronicle*, on Mushrooms in India, the writer says:—"I cannot conceive white-ant earth being any use in gardening. The only growth I have ever observed on it, or in the nests, was that of a very small fungus, less in size than any ordinary pinhead, and often mistaken for the egg of the termites, in shape resembling a button mushroom, of a white colour. I now send you a bottle containing mushrooms I extracted a few days ago from the centre of a white ant hillock. When I collected them they were in appearance like asparagus, over 14 inches in length, and the people about here consider them particularly good eating, partaking of them both raw and cooked, and call them 'bhuephor.'"

When I read the above article in your Society's Journal, somewhat over a year ago, I was then aware that mushrooms existed in the interior of ant-hills, for I had often seen them, but I did not know their season of sprouting, and whenever I searched was unsuccessful till the other day. I have now ascertained the season they sprout is the end of August, or the beginning of September, and I believe all ant-hills produce them then. These mushrooms

appear to me to proceed from a peculiar substance always found in ant-hills in this country (whether white or black), generally called ants' food, a bluish gritty substance, like coarse wheat flour turned mouldy and adhesive. In dry weather brittle, and in damp weather like soft leather. It is this substance, under the combined influence of heat, damp, and darkness, from which the mushrooms grow. As my experience is at variance with the writer in the *Gardener's Chronicle*, you may care to record it. The liquor in the bottle with the mushrooms is white wine vinegar, which I thought would best preserve them; and to ascertain their true shape and length, I would advise your breaking the bottle, for I do not think you can possibly extract them entire otherwise. I would like these mushrooms, if possible, referred to some mycologist, and their names ascertained; and I would like also to know if the bluish substance, the ants' food, was collected and treated artificially, could similar mushrooms be raised. I know of several other fungi which are eaten by the people here, and considered good food, which, on procuring, I will forward to you to be recognised. One in particular I am desirous of knowing more about, to all appearances like a small potato, and considered the best of all. It is procured from under the ground, and its presence is indicated by the earth cracking, generally near the stumps of saul trees.

The Secretary next read the following remarks furnished by Dr. D. D. Cunningham:—

“I herewith return the letter sent to me more than a month ago, along with specimens of fungi said to have been procured from the interior of a white ant-hill. The specimens apparently belong to some species of *Lepiota*, and are chiefly remarkable for the extreme length and coarse fibrous contents of the stem. The occurrence of fungi in connection with ant-hills is well known, but in so far as I am aware, those hitherto described as occurring on the hills of the white-ant belong to species of the Gasteromycetous order, *Podaxinei*, so that the occurrence of a species of one of the sub-genera of *Agaricus* in such localities is a new and interesting fact.

With regard to the material from which they arise, and which must apparently be of the same nature as the so-called spawn of the cultivated mushroom, consisting of vegetable *débris* permeated by the mycelium of the fungus, it may be noted that a similar substance is described by Belt as occurring in the nests of the leaf-culling ants of Nicaragua, and is supposed by him to serve as food—the ants culling and storing the leaves for the sake of the fungi which are subsequently developed in the *débris*. (Naturalist in Nicaragua, pp. 80.)

Were this spawn artificially exposed to conditions similar to those which it naturally encounters in the interior of the hillocks—heat, darkness, and moisture—I believe that the pilei might very probably be raised at will, and if they really are good eating the experiment would be well worth trying.

LICHENOLOGICAL MEMORABILIA.—No. 7.

By the REV. W. A. LEIGHTON, B.A., Camb., F.L.S., F.B.S.Ed.

ADDITIONS TO THE LICHEN-FLORA OF GREAT BRITAIN, &c.

I judge it right to place on record an estimate which I have this day (March 8, 1875) made of the additions to our Lichen-Flora, since the publication of the second edition of my "Lichen-Flora" in 1872. These additions comprise genera, species, varieties, and forms or states, and amount, so far as my present knowledge extends, to 200 in number, thus raising the number of British lichens to very nearly a thousand. The fact manifests that the number of students of lichens is greatly on the increase. For these additions we are chiefly indebted to the careful and painstaking researches and observations of Rev. J. M. Crombie in Scotland and various parts of England, Mr. Larbalestier in the Channel Islands, Mr. Curnow at Penzance, Mr. Joshua in Gloucestershire, Mr. Martindale in Westmoreland, and my own wanderings in Shropshire and adjacent counties, and in North and South Wales.

Spilonema	...	...	...	1	Brought forward	52			
Pyrenopsis	...	...	...	1	Physcia	...	...	...	1
Collemopsis	...	...	...	1	Umbilicaria	...	...	...	1
Collema	...	...	...	20	Pannaria	...	...	...	2
Leptogium	...	...	...	7	Squamaria	...	...	...	3
Leptogonidium	...	...	...	1	Placodium	...	...	...	2
Calicium	...	...	...	2	Lecanora	...	...	...	38
Coniocybe	...	...	...	1	Pertusaria	...	...	...	2
Roccella	...	...	...	1	Lecidea	...	...	...	71
Alectoria	...	...	...	5	Xylographa	...	...	...	4
Evernia	...	...	...	2	Ptychographa	...	...	...	1
Ramalina	...	...	...	3	Opegrapha	...	...	...	7
Peltigera	...	...	...	1	Arthonia	...	...	...	4
Solorina	...	...	...	1	Melaspilea	...	...	...	1
Nephromium	...	...	...	1	Thelocarpon	...	...	...	2
Peltigera	...	...	...	1	Verrucaria	...	...	...	8
Parmelia	...	...	...	3	Obryzum	...	...	...	1
				<hr/> 52					<hr/> Total 200

ON THE CHARACTERS OF PELTIGERA CANINA, P. MALACEA,
AND P. RUFESCENS.

Mr. Crombie *in litt.* has very properly and kindly called my attention to No. 361 of my *Lichenes Britannici Exsiccati*, collected on the High Rock, Bridgnorth, Shropshire, and labelled *P. rufescens*, by stating that "your No. 361 in Herb. Carroll in Brit. Mus. from High Rock, Bridgnorth, is not *Peltigera rufescens*, but *P. malacea*, with young apothecia, and otherwise not very typical (as thallus is here and there discoloured) but sufficiently clear. No doubt widely distributed in subalpine districts of W. Britain, but rare." I must candidly confess that my notions respecting *P. rufescens* have been hitherto very muddled and confused, but now that my attention has been aroused to a more careful and special examination of the specimens in my herbarium, I at once observe

that there are really well marked and characteristic features by which it and its allies may be clearly distinguished and recognised. This renewed examination also proves that *P. malacea* is more generally distributed, and occurs frequently in Shropshire and North Wales, whilst *P. rufescens* is comparatively much rarer.

The following revised characters may be therefore useful :—

Peltigera canina (L.), upper surface of thallus *appresso-tomentellose*; under surface longitudinally appresso-albo-tomentose, with prominent pale anastomosing villosa-tomentose nerves extending to the very margin, and clothed with tufts of pale rhizinae; margin of apothecium entire; back of receptacle tomentose, almost subfurfuraceous.

FIG.—Dill. t. 27, fig. 102 E.

EXS.—M. & N. 154. Welw. 15. Schær. 28. Hepp. 575. Richardson 84. Anzi It. Sup., 91. Maudon 18. Bohl. 30. Reich. & Schub. 114. Wagn. 19. Mudd 59. Leight. 141.

The localities in my Lich. Fl., 2nd ed., p. 108 may be taken as correct.

Peltigera malacea, Ach., upper surface of thallus smooth, but minutely punctato-tomentellose upwards immediately below the apothecia; under surface tomentose, with broad, flattened, confluent, brown, tomentose spongiose nerves terminating below the paler-brown uniformly tomentose margin, densely nigricanti-spongiose towards the centre and base; margin of apothecium crenato-incised, connivent or incurved; back of receptacle coarsely furfuraceous.

FIG.—Sturm, D. Fl. t. 17.

EXS.—M. & N. 1048. Zw. 223. Anzi Ital. Sup. 89. Rabh. 765. Reich. & Schub. 116. Hepp. 50. Leight. 361.

ENGLAND.—High Rock, near Bridgnorth! Sharpstones Hill! Craigforda! all in Shropshire.

WALES.—Benarth! near Conway; between Corwen and Bala! Craig Breidden!

The sterile thallus is almost invariably quite smooth on the upper surface.

Peltigera rufescens (HFFM.). Upper surface of thallus smooth; under surface floccose, or reticulato-tomentose, with prominent dark nigro-fuscous nerves, terminating in appressed flattened confluent pale-brown smaller nerves at the margin, and bearing scattered tufts of dark rhizinae towards the centre; margin of apothecium crenulate; back of receptacle verrucoso-furfuraceous.

FIG.—Dill. t. 27., fig. 103.

EXS.—Reich. & Schub. 115. Spruce 57. Richardson 85. Mudd 60.

ENGLAND.—Near Easby! Cleveland, Mr. Mudd.

Immediately below the apothecia the thallus is slightly longitudinally plicate or plicato-rugose, but doubtful if constant.

P. rufescens, Fellm. Lapp. Or. 69, having upper surface of thallus granulose elevato-punctate, is no doubt = *P. pulverulenta*. Tayl. in "Hook. Journ. Bot.," 1847, p. 184.

ON AGARICUS ASCOPHORUS. PECK.

By MONS. J. DE SEYNES.

(Plate 46.)

In 1872 Mr. C. H. Peck described, in the Twenty-Fourth Report of State Museum of Natural History for New York, a new species of *Agaricus* under the name of *Ag. (Hebeloma) ascophorus*, of which he says "spores produced, in globose asci, borne on a thick tapering, penetrating peduncle, twelve or more spores in ascus." I had the advantage of examining a specimen of this *Agaricus* sent by M. Cooke; it showed all the outward characters of sincere *Agaric*, though it ought to be classed among the *Ascomycetes*, if it showed asci on the hymenium. This is the real structure of this hymenium; the basidia have the same appearance as in most *Agarics*, sterigmata are seen on the dried specimen. It is difficult to find spores still borne on basidia; I have, nevertheless, seen a young spore borne on a basidium by the sterigma. The loose spores are oval, ferruginous, and the youngest sometimes bear a fragment of sterigmata; they are in length $\cdot 0,006$ m.m. or $\cdot 0,007$ m.m., and in width $\cdot 0,004$ m.m.

I have not discovered other spores, but the hymenium shows numerous *Cystidia*, more or less deformed by dessication, and containing a thick yellow and condensed protoplasma. Warm water is not sufficient to give back to the *Cystidia* their former shape, but after they have been boiled in a solution of potash they can be seen returning to a regular shape. They nearly all have the form of a bottle; the lower part swelled, oval, attenuated at the bottom, and surmounted by a neck attenuated at its end. This neck is itself slightly swelled in the middle. I suppose these *Cystidia* to exude the protoplasma they contain, as I have noticed it to be the case on the *Ag. rimosus, rutilus*, etc. It is a mass of substance exuded from the extremity of the *Cystidium*, that must have been taken for an ascus borne on a penetrating peduncle.

I have met with some disposed in the same manner in the *Ag. rimosus*. It is no wonder that spores are found glued in the inside of that secretion, and that they easily cause illusion; but what makes us hesitate is the number of spores indicated—12 or more. Such a large number of spores contained in the secretion of a *Cystidium* would produce a mass superior to the dimension of the *Cystidium* itself, and it is very possible that vacuoles, or fat nucleoles gathered in the secreted substance, have been the reason of that illusion. It would be easy to explain if we could suppose from the description that it is the *Cystidia* itself the author has taken for an ascus; but the indication of an ascus borne by a tapering peduncle penetrating can only be explained by a secretion borne by the tapering extremity of a *Cystidium*. I have never found any *Cystidium* in that state on the specimen I have studied, but I have often met

with specimens of the *Ag. rimosus*, in which the secretion was concentrated at the inside of the Cystidium before it was excreted outside. I do not know if that difference depends from a particular state of the plant, or from atmospheric influences, but as I have noticed it several times, I am not surprised that the specimen observed by Mr. Peck presents that secretion, while the one that has been sent to Mr. Cooke showed no trace of it. I am almost sure that if Mr. Peck continues his observations on all the specimens he will meet with, he will find many of them deprived of the ascus he thought he had discovered. There is nothing (except in the hymenium) in the texture of the pileus that resembles an ascus; there are only cells prolonged, some wide and some narrow, and cells chromogenous, narrow, like those I have described in the *Fistulina*, and that I have often found in other *Dermini*.*

The following observations on the same subject, by the Rev. M. J. Berkeley, appeared in the *Gardener's Chronicle* for April 17, 1875:—"We have lately received through Dr. M. C. Cooke a specimen of *Agaricus ascophorus* (Peck), sent by that gentleman from New York. The species clearly belongs to the subgenus *Flammula*, and we, therefore, felt greatly interested in examining the gills for the supposed asci. We readily discovered the bodies in question, but we could by no means satisfy ourselves that they were really asci containing speridia. We, therefore, forwarded the only specimen to Mr. Broome, who has sent a sketch of what he himself saw, confirming our own observations, and which is here reproduced (fig. 106). The singular matter is that besides these bodies there are forked ascidia, which are far less numerous than the bodies in question. These, according to Mr. Broome's and our own observations, are shortly pedicellate, somewhat top-shaped bodies with a reticulate surface, the reticulations increasing in number with the process of growth. We do not at all consider them as asci, but as analogous to the hispid bodies which occur on the gills of some species of *Marasmius*, and possibly of the same nature with the echinulate bodies which are so obvious on the pileus of *Marasmius Hudsoni*. It is true that asci have been observed on the gills of *Agaricus melleus*, but this was probably due to the presence of some species of *Hypomyces*, and the observation has not been confirmed. Indeed, late examinations of the spores of some *Coprinus* under germination seem to show that impregnation takes place at a very early period, and that the result is a sporiferous fungus; as in *Ascobolus* or *Peziza*, we have from the same process a sporidiiferous fungus. The spores of *Agaricus ascophorus* were like those of allied *Flammulæ*, and were .0004 in. in length. The dried gills did not show the spicules when moistened."—*M. J. B.*

* N.B.—The figures in plate 46 are—2, 3, 4, 5, and 7 magnified 580 dia.; and fig. 6 is 350 dia.

PHRAGMIDIUM.

(Plate 45.)

Figures have been executed of several species of *Phragmidium*, which will be found on plate 45. These are drawn by camera lucida to the same scale as the figures of *Peziza*, about 400 diam., but the accurate scale will be found at the bottom of plate 28, by means of which the figures may be measured.

Xenodochnus carbonarius. *Schl.*—Cooke "Handbook," No. 1455. (Plate 45, fig. 1.) Fungi Britt., ii., No. 97.

On living burnet leaves.

Phragmidium bulbosum. *Schl.*—Cooke "Handbook," No. 1458. Fungi Britt., ii., No. 99. *P. incrassatum*, Jh. Rabh., F. E., 1181. Thümen, F. Aust., No. 227. *P. asperum*, Rabh., F. E., No. 476. (Plate 45, fig. 2.)

On living bramble leaves.

Phragmidium mucronatum. *Lk.*—Cooke "Handbook," No. 1456. "Fungi Britannici," ii., No. 98 (fig. 3.)

On living rose leaves.

Phragmidium mucronatum. Var. *rubi.*—Cooke "Fungi Britannici," i., No. 18 (fig. 8.)

On living leaves of *Rubus cæsius*.

Phragmidium speciosum.—Fr. Sys. Myc., iii., 496. Rav. "Fungi, Car.," iii., 90.

On rose branches (United States).

Phragmidium obtusum. *Fr.*—Cooke "Handbook," No. 1460, (fig. 5.) Fungi Britt., ii., No. 100.

On living leaves of *Potentilla*.

Phragmidium acuminatum. *Fr.*—Cooke "Handbook," No. 1487 (fig. 6.).

On living burnet leaves.

Phragmidium bullatum. *West.*—"Grevillea," iii., p. 65. (fig. 7.)

On twigs of sweet briar, &c.

Phragmidium gracile. *Grev.*—Cooke "Handbook," No. 1459. *P. effusum.* Fckl. Exs., No. 316. (fig. 9.)

On living raspberry leaves.

All the above are British, with the exception of *Phragmidium speciosum*, Fr., which is North American. *Phragmidium granulatum*, Rabh., on leaves of *Potentilla alba*, would seem to be a good species, although most of the continental names are merely synonyms of one or other of the species which we have figured.

We have just received from Professor Passerini a species of *Triphragmium* on *Spiræa filipendula* which differs from *Triphragmium Ulmaricæ* in the spores having a smooth and more delicate epispore. It should, perhaps, be regarded as a distinct species.

ON *CORTICIUM OAKESII*. B. & C.

By the EDITOR.

This communication is, to a certain extent, a continuation of the remarks at p. 136, on *Corticium amorphum*. For many years the above fungus has been distributed in the United States, and elsewhere, under the name of *Corticium Oakesii*, B. & Br. It was published by Ravenel in his "Fungi Caroliniani," fasc. iii., No. 32, under that name, and the description occurs in "Grevillea," Vol. 1, p. 166, where it is said to look at first "like a little *Cyphella* or *Peziza*." In fact it so closely resembles *Corticium amorphum*, Fr., in external features, that Fries has not hesitated to include it as a synonym under *Corticium? amorphum*, in the new edition of his "Epicrisis" (p. 648). That this is an error, will presently be shown. Since the previous communication, we have examined a specimen of this fungus published by Ravenel many years ago, and a more recent specimen kindly furnished for the purpose by Mr. C. H. Peck. Our conclusion is that it is congeneric with the *Aleurodiscus amorphus* of Rabenhorst.

That it is not identical with *C. amorphum* may be inferred from its external features. The disc is never so brightly coloured, it is more decidedly hairy, and though occurring on the bark of various trees, it has not been found on any Conifer. All these points are presumptive in favour of its being distinct.

Internally the structure is just that of *C. amorphum*, there are the same incipient asci, the same nodulose paraphyses, and large sporidia. In this instance the presumed sporidia are elliptic instead of globose, about 0.025×0.014 mm. in size. Hence there is good reason for believing that *Corticium Oakesii* is congeneric with *Corticium amorphum*, but a distinct species, which should bear the name of *Aleurodiscus Oakesii*.

We are not convinced that the whole structure of these two species is yet completely revealed or understood. It seemed to us on examining the specimens from Ravenel, that we could detect on the surface of the disc the tips of threads bearing minute spicules, and a number of minute oval bodies, which resembled conidia or basidiospores, whilst the substratum of the hymenium presented the structure already alluded to. This, however, requires confirmation, but it is not improbable that the disc may produce conidia which give to it that peculiar glaucous appearance—which is seen in both species—when somewhat fresh. Specimens should be examined in the moist condition, so that no soaking in water is required, and if conidia are present they may be detected seated on the spicules. There is some difficulty in accounting for these minute bodies, and their origin and function, except on some such hypothesis.

The Rev. M. J. Berkeley remarks that a similar *Corticium* occurs in India, which may prove to be a third species of *Aleurodiscus*.

PARMELIA MILLANIANA.

(A REJOINDER.)

By DR. JAMES STIRTON.

In reference to the Revd. W. Leighton's remarks under *Parmelia Millaniana* in the preceding number of this Journal (p. 117), perhaps I may be allowed, as on a similar occasion lately, to put in a plea on my own behalf.

At page 140 of Mr. Leighton's "Lich. Flora" is given the diagnosis of *P. endochlora*, and at page 79 of the 26th number of *Grevillea* is given that of *P. Millaniana*.

In order to compare, or rather contrast, more succinctly the two descriptions, the various items are here given in a tabulated form.

<i>P. endochlora.</i>	<i>P. Millaniana</i>
Thallus whitish.	Thallus albedo-glaucouscent.
„ very uneven.	„ smooth.
„ tuberculoso—nigricanti—so radiate.	„ no soredia whatever.
Medulla yellow.	Medulla, pale, yellow, thin.
Rhizinae not mentioned, a presumption being afforded that there is nothing peculiar about them.	Rhizinae, branching in a tree-like form from a common stock.

In order to show the contrast more completely, Mr. Leighton says that K. produces a yellowish brown re-action on *P. endochlora*, while the same re-agent does not produce the slightest change of tint in *P. Millaniana*, but merely, as in many other cases, swells the medullary fibres, and renders them more transparent and gelatinous. On the other hand C. produces instantaneously a clear, bright yellow, &c. (see description). Such a contrast in the chemical re-actions appears to me to be of itself quite sufficient to keep the two lichens distinct. I may add that *P. Millaniana* was exhibited before the Glasgow Society of Field Naturalists, and its diagnosis recorded in the minutes nearly a month before Mr. Leighton's decision was arrived at.

In view of such manifest differences, I had no hesitation in separating the two lichens, and I have as little hesitation now.

Mr. Leighton's criticisms on *Lecidea emphysa* in the next paragraph require, also, some consideration. In the first place he has quite mistaken the purport of my remarks on it in two particulars. 1st—I did not allude to the mutual re-actions of potash and iodine on one another, which, quoad the lichen, are worthless; but of each re-agent in succession on two organic substances, viz., the so-called chrysophanic acid and the hymenial gelatine. After the chrysophanic acid had been changed in constitution and dissolved out by means of liq. potassæ, and the addition of abundance of water to clear off the solution, iodine was added, not only to neutralize any potash that may have remained, but to saturate the whole hymenium.

After this treatment the hymenial gelatine, or that substance as now modified, revealed a vivid blue instead of the vinous red, which is the usual re-action as stated by authors.

2nd—The presence of paraphyses, or what may be reckoned equivalent to such, is only revealed after the chrysophanic acid has been dissolved out; in fact, in the specimens quoted, to such an extent was this acid developed that neither thecæ, spores, nor any distinctive part of the hymenium were discernible. Different relative quantities of this acid may, and do, exist in different specimens, clouding more or less the hymenium; hence the discrepancies of writers, as quoted by Mr. Leighton, in their statements of the appearances presented by the hymenium.

In every instance of *Arthonia lurida* that has come under my observation, the presence in abundance of distinct and definite branching fibres has been revealed by the process explained above, and not only so, but they may also be seen more regularly disposed in the sub-hymenial spaces. It is scarcely necessary to say that the presence of these fibres in the hymenium determined me to classify the lichen in question with the *Lecideæ* under the name of *L. emphyssa*, and that it was only when authentic specimens of *A. lurida* revealed identical phenomena that I was constrained to revert to the genus *Arthonia*; whether this and one or two other species are still entitled to rank with the *Arthonia* is another question.

The coerulescent tint assumed under the action of iodine, by the gelatine not dissolved out by the potash, and which, accordingly, is presumably of a different constitution from the general gelatinous mass, has also been developed in every instance.

As hinted at in my remarks under *A. lurida*, I have detected similar phenomena in two or three others of the same genus; but I deemed it prudent to defer further consideration of the subject until a more extended series of experiments had either defined the limits of such a section, or disproved the existence of any such.

I may not, as Mr. Leighton suggests, know *A. lurida*, or rather the group of forms that may be said to constitute that species. I certainly have not dissected, as he has done, several hundred specimens of it, but I have examined pretty minutely several, and amongst them specimens from Dr. Nylander, as well as from one or two other continental botanists. Notwithstanding this it may be a matter of regret that, previous to the determination of *Lecidea emphyssa*, I had not secured genuine specimens of *A. lurida* from Mr. Leighton.

JAMES STIRTON.

The Editor has permitted me to peruse the MS. of Dr. Stirton's courteous and gentlemanly reply to my remarks on his *P. Millaniana*, and has suggested the desirability of my adding a note to that communication in the present number. But all that I can say on the subject is simply to repeat that the sterile thallus which

was sent by Dr. Macmillan for comparison and determination is undoubtedly identical with Dr. Taylor's Dunkerion specimen of *P. endochlora*, Leight. Lich. Fl., p. 140, notwithstanding some trivial minor differences in the condition of the specimens.

W. A. LEIGHTON.

March 24th, 1875.

CRYPTOGAMIC PARASITES OF LIVING INSECTS.

The following abstract of a note upon cryptogamic parasites of insects may have some interest for the readers of "Grevillea." It is from the "Bulletin entomologique" (Séances de l'année, 1873, pp. cxxix.-cxxxii.) of the Entomological Society of France. MM. J. Fallou and Maurice Girard found, near Paris, in the spring of 1873, larvæ of two species of moths killed by parasitic fungi. Specimens of these larvæ were sent to M. Maxime Cornu, one of the members of the commission on *Phylloxera*, who reports to M. Girard that one of the two species of larva—that of *Bombyx rubi*—had perished from the attacks of a fungus closely allied to, if not identical with *Botrytis bassiana*, Bals., the muscardine of the silk-worm.

The other species of larva—that of *Chelonia Hebe*—had been killed by a very different fungus, belonging to the genus *Empusa* (Cohn), *Entomophthora* (Fresenius), and perhaps the same species as that which destroys flies in autumn. M. Cornu, after some remarks upon *Empusa muscæ*, writes—"I have been able to examine an *Entomophthora* upon the *Puceron* (aphis?) of the elder, at Montpellier, in last April. . . . I have studied the parasite of this *Puceron* completely, and one of the most singular facts is the following: a *Puceron*, containing in its interior fifty-two young in various states of development, was full of the corpuscles of the *Entomophthora* (it had them even in the ant. nnae!), whilst the young were all perfectly healthy, and did not contain a single corpuscle. This seems to show that the fungus must find, in order to get into the animal, a natural opening, a wound, &c., and that it is incapable of perforating the coverings and integuments of insects. . . . The question of the penetration is still full of obscurity; the time at which it takes place, and the conditions under which it is effected, are not known. The remarkable fact of the present case is the existence of the *Entomophthora* in a larva; I believe that this is the first time that this has been recorded."

After alluding to other insects (*Trachea piniperda* and *Tenthredo* sp.) attacked by *Entomophthora*, M. Cornu says—"It is possible that in these different insects there is only one and the same parasite, *Entomophthora muscæ*; at the present time neither this nor the contrary can be affirmed."

At a subsequent *séance* M. Girard called attention to the fact that Audouin had observed similar parasites in the larvæ of two species of beetles, and remarked that a perspicuous classification of the cryptogamic parasites of living insects was to be desired.

I commend this subject to the attention of some of our young mycologists.

F. BUCHANAN WHITE.

THE CRYPTOGRAMIC SOCIETY OF SCOTLAND.

On April 16th a meeting of botanists from various parts of Scotland was held at Perth, to hear the report of the committee, appointed at the Aberdeen Fungus Show, to organise a Scottish Cryptogamic Society. A constitution having been adopted, the following office-bearers were elected for the present year:—*President*, Sir T. Moncreiffe, of Moncreiffe, Bart. ; *Vice-President*, Professor Dickie, Aberdeen ; *Secretary*, Dr. Buchanan White, F.L.S. ; *Treasurer*, Rev. J. Stevenson, Glamis ; *Members of Council*, Rev. J. Fergusson, Fern, near Brechin ; Rev. M. Anderson, Menmuir ; Rev. J. Keith, Forres ; Mr. J. Roy, Aberdeen ; Colonel Drummond Hay, C.M.Z.S., of Seggieden, Perth ; Professor Ogilvie, Aberdeen ; and Mr. C. Howie, Largo. It is intended to have a show of Cryptogamic Plants, especially of Fungi, every year in various districts of Scotland in rotation, and the show for this year is to be in Perth in the last week of September, when it is expected that a very large number of specimens will be exhibited. It is possible also that the Society will issue from time to time a few fasciculi of "New or Rare Scottish Cryptogamic Plants." English cryptogamists desirous of becoming corresponding members of the Society, should communicate with the Secretary (Dr. Buchanan White, Perth—from whom information regarding the Show may be obtained), or with any member of council.

THE HOLLYHOCK FUNGUS.—*Puccinia Malvacearum*, Corda, Your mycological readers will probably be interested in learning that this plant has made its appearance in Ireland. I observed it about a week since (April 18) in great abundance on some Hollyhocks raised last season from seed obtained from an English house. Can the germs have been in the seed, as the *Cystopus* of *Cruciferae* is said by Dr. Bury to make its way into the plants through seeds? As far as I can learn this is the first appearance of this *Puccinia* in Ireland ; no doubt Hollyhock growers would devoutly wish it might be the last. It is evidently a terrible pest, withering up the leaves attacked, like a hot blast. My plant agrees in every respect with that figured in "Grevillea" for December, 1874.—GREENWOOD PIM, Easton Lodge, Monkstown, Co. Dublin.

BRITISH FUNGI.

By M. C. COOKE.

(Continued from page 123.)

The species described or enumerated by Messrs. Phillips and Plowright (see page 124) are not again referred to. About fifty species of Hymenomycetes remain to be included in a subsequent number.

Leptostroma glechomatis. *B. & Br. Ann. N.H., No. 1449.*

Spots tawny; perithecia irregular, minute, epiphyllous; spores minute, oblong.

On leaves of ground ivy. Scotland.

Leptothyrium pictum. *B. & Br. Ann. N.H., No. 1450.*

Spots rufous, here and there paler, when fertile margined with brown; perithecia shining, ocellate; spores subcymbæform, curved.

On leaves of *Lonicera*. Glamis.

Septoria Hyperici. *Desm. Ann. Sci. Nat., 1842, xvii., p. 110.*

Epiphyllous; spots suborbicular, oblong, or indeterminate, rufous-brown, with a yellowish margin; perithecia minute, innate, rather prominent; mouth orbicular, broadly open; tendrils delicate, pale red; spores linear, somewhat curved with 8-16 nuclei.—*Desm. Exs. i., 1178, ii., 678. Berk. & Br. Ann. N.H., No. 1460.*

On leaves of *Hypericum*. Glamis (Rev. J. Stevenson).

Spores ($\cdot 002$ in.) $\cdot 05$ m.m. long.

Septoria Stachydis. *Desm. Ann. Sci. Nat., 1847, viii., p. 19.*

Spots amphigenous, subolivaceous, then pallid brown or bleached, irregular, girt by the veins, scattered or confluent; perithecia epiphyllous, very minute, brownish-black, pierced; spores linear, delicate, curved, or flexuous.—*Berk. & Br. Ann. N.H., No. 1461.*

On leaves of *Stachys sylvatica*. Glamis (Rev. J. Stevenson). Shere (Dr. Capron, 1864).

Spores slender, threadlike ($\cdot 001$ - $\cdot 0015$ in.) $\cdot 025$ - $\cdot 03$ m.m.

Septoria Veronicæ. *Desm. Ann. Sci. Nat. 1849, xi., 348.*

Spots amphigenous, small, roundish, brown or grey, then bleached and whitish, with an umber margin; perithecia epigenous, globose, brown becoming blackish; spores elongated, very thin, straight or curved.—*Desm. Exs. i., 1710. Phyllosticta Veronicæ, Cooke Fungi Britt. i., 615.*

On living leaves of *Veronica*. Shere.

Phoma Vitis. *Bon.*

Minute, punctiform, scattered; perithecia globose, black, piercing the cuticle with the minute ostiola; spores narrowly elliptical, hyaline.—*Cooke Fungi Britt., No. 618, ii. No. 14, with fig.*

On vine twigs. King's Lynn (C. B. Plowright).

Spores $\cdot 01$ - $\cdot 012$ m.m. long.

Phoma projecta. *Cooke.*

Gregarious, erumpent; perithecia globose, black, piercing the blackened cuticle with the prominent ostiola; spores narrowly elliptical with 1-3 nuclei.—*Fungi Britannici*, ii., 20, with fig.

On stems of *Umbelliferæ*. Mickleham. June.

Spores .015 m.m. long.

Phoma Pinastri. *Lev. Ann. Sci. Nat.*, 1846., v. p. 282.

Perithecia gregarious, innate, globose, black, covered by the lacerated epidermis, pierced at the apex. Spores oblong, brown.—*Cooke Fungi Britt.*, ii., No. 16.

On scales of fir cones. Eastbourne (C. J. Muller).

Spores .01 × .006-.007 m.m.

Hendersonia exigua. *Cooke.*

Perithecia scattered, minute, punctiform, membranaceous, blackish brown, becoming flattened. Spores small, elliptic, bi-septate, pale brown.—*Fungi Britannici*, ii. 24, with fig.

On smooth bark.

Perithecia not more than .085 m.m. in diameter. Spores .01-.012 m.m. long.

Excipula congregata. *Cooke.*

Gregarious, forming dark patches on the stems. Receptacle immersed, furnished with stiff erect black bristles, which burst through the cuticle. Spores linear, curved, obtuse.

On dead stems of wood spurge. Darenth.

Melanconium elevatum. *Ca. Icon. iii. 22, fig. 60.*

Stroma broad, white, rarely obliterated, spore-mass very black, diffuent. Spores ovoid or oblong, brown.—*Berk. & Br. Ann. N. H.* No. 1462.

On oak. Langridge. Dec.

Spores (.0005 in.) .0127 m.m. long.

Pestalozzia funerea. *Desm. Ann. Sci. Nat.*, 1843., xix., p. 335. *Cooke Handbook*, No. 1402. *Berk. & Br. Ann. N. H.*, No. 1463.

On *Cupressus macrocarpa*. Hatton.

Torula splendens. *Cooke. (Pl. 48, fig. 1.)*

Effused in dense black velvety patches. Flocci attenuated upwards, sometimes with one or two patent branches, joints subglobose, compressed, not readily separating, dark brown.

On bark. Forres (Rev. J. Keith).

A truly splendid species, the flocci have no tendency to break up, and are fully .25 m.m. long, the joints are .01 m.m. diam. towards the base, but smaller above. We know of no described species to which it can be referred.

Helicomycetes tubulosus. *Riess. (Pl. 48, fig. 3.)*

White, pellucid, farinaceous. Spores concatenate in a long spiral thread, with a very short stem, joints subquadrate, nucleate.—*Riess in Bot Zeit.*, 1853, fig. 11-13.

On rotten wood. Hereford (J. G. Morris).

This curious fungus we have referred to the above with some hesitation, never having seen a specimen of the plant described by Riess, with the description of which the Hereford specimens appear to agree in many points; the spore threads are decidedly coloured brownish, joints about $\cdot 01$ m.m. dia.

Puccinia silenes. *Rabh. Fung. Eur., No. 1783.*

Spots yellowish; sori roundish or oblong, scattered or aggregated; pseudospores elongated, elliptical, slightly constricted at the septum, on short pedicels, brown; stylospores globose, smooth.—*Puccinia Lychnidearum, Fekl.*

On leaves of *Silene inflata*. Basingstoke (R. S. Hill).

This is quite distinct from other species on Caryophyllaceous plants, the pseudospores being of a different character, each cell rounded above, or sometimes somewhat obtusely triangular, $\cdot 03\text{--}\cdot 032 \times \cdot 018$ m.m.; whilst the stylospores (*Uredo* form) are globose, smooth, and about $\cdot 02$ m.m. diam.

Puccinia Andersoni. *B. & Br. Ann. N.H., No. 1464.*

Spots epiphyllous, orbicular, surrounded by a brown border; sori hypophyllous, minute, crowded, almost concealed by the pubescence of the leaf; pseudospores oblong, constricted in the centre, obtusely apiculate.

On leaves of *Cnicus heterophyllus*. Glen Ogle. June.

Pseudospores very like those of *P. discoidearum*, as figured by Corda.

Puccinia Fergussoni. *B. & Br. Ann. N.H., No. 1465.*

Spots pallid; sori minute, crowded in orbicular clusters; pseudospores oblong, obtusely apiculate. Pl. 49, fig. 10c.

On leaves of *Viola palustris*. New Pitsligo (Rev. J. Fergusson).

Very different from *P. violarum*, not only in the minute crowded sori, but in the elongated spores.—*B. & Br.* So closely resembling *Puccinia Asari* that undoubtedly the specimens published in "Fungi Britannici," No. 110, belong to this species.

This is one of at least four good species of *Puccinia* that occur on leaves of *Viola*; the other British species is *P. Violarum*, found also in the United States. Pl. 49, fig. 10 a. The pseudospores are about $\cdot 02\text{--}\cdot 03 \times \cdot 013\text{--}\cdot 016$ m.m. Another species occurs on *Viola hastata*,* in North America, with pseudospores $\cdot 035\text{--}\cdot 04 \times \cdot 02\text{--}\cdot 025$ m.m., a very considerable difference in size. The fourth species is *P. alpina*, Fekl., on *Viola biflora*, with still longer and rough pseudospores. Pl. 49, fig. 10 d.

Puccinia senecionis. *Lib. Fungi Exsic., No. 92.*

Sori gregarious, circinate, minute, punctiform, convex, covered

* *Puccinia hastata*. Cooke.—Amphigenis; acervulis sparsis, pulverulentibus, atro-brunneis; pseudosporis ellipticis, leniter constrictis, lævibus ($\cdot 035\text{--}\cdot 04 \times \cdot 02\text{--}\cdot 025$ m.m.), breviter pedicellatis; stylosporibus globosis, lævibus ($\cdot 02 \times \cdot 022$ m.m.), ad foliis *Violæ hastatæ*. Maine, U.S. (E. C. Bolles, 68). Pl. 49, fig. 10b.

with the epidermis, which is depressed in the centre and perforated, nearly black; pseudospores subovoid, rather small, somewhat apiculate, brown, smooth, peduncles very short.—*Corda Icones*, iv. f. 54. *B. & Br. Ann. N.H.*, No. 1466.

On *Senecio aputica*. Menmuir (Rev. M. Anderson).

This is clearly allied to *P. glomerata*, Grev., and *P. conglomerata*, Kze.; indeed they have been confounded together as synonymous, but without good reason, since all three appear to be distinct from each other.

***Puccinia Tripolii*. Wallr. Fl. Germ.**, 223.

Sori large, compact; pseudospores elongated, truncate at the apex, binodulose, or with a thick mammæform appendage.—*B. & Br. Ann. N.H.* No. 1467. *Pucc. Asteris*, *Cooke Fungi Britt. i.*, No. 631.

On leaves of *Aster tripolium*. New Pitsligo (Rev. J. Ferguson). Near King's Lynn (C. B. Plowright).

British specimens agree with those found on the continent on the same *Aster*, and which are referred to *Puccinia Tripolii*, Wallr. Fckel has described and published specimens of *Puccinia Asteris* (Fckl.) on leaves of *Aster simplex*, which does not appear to be specifically distinct. To this latter form we referred the specimens published in *Fungi Britannici* (ed. i., No. 631), but are convinced that all would be better placed under *Puccinia Tripolii*, Wallr. *Puccinia Asteris*, Schwein, is different, of which doubtless *Puccinia Gerardi*, Howe, is a variety. There appears to be slight variations peculiar to the different species of *Aster*, on which this common North American *Puccinia* is found, but none of them are sufficient to warrant the conclusion that they are distinct species.

***Puccinia Scrophulariæ*. Libert Exs.**, No. 193. *Cooke Handbook*, No. 1476.

As far as Libert's specimens go this is not a species of *Puccinia* at all, but of *Uromyces*. If the specimens found at Penzance, and cited by Berk. & Br. in *Annals Nat. Hist.*, No. 471, be the same thing, then it must henceforth be included in its correct genus as *Uromyces Scrophulariæ*.

***Uromyces Geranii*. DC.** (Sub. *Uredo*.)

Trichobasis Geranii. *Cooke Handbook*, No. 1589. *Fungi Britannici*, i., 440, ii. 50, with fig.

The specimens published, as above cited, are certainly *Uromyces*, and not *Trichobasis*.

***Coleosporium senecionis*. Fr. S. V. S.**, 512.

Fckl. *Sym. Myc.*, p. 43.—*Trichobasis senecionis*, *Cooke Handbook*, No. 1485. *Fungi Britannica*, i., 66, ii. 53, with fig.

It seems very doubtful whether this has any relation to *Puccinia glomerata*, as some authors have stated.

***Coleosporium pingue*. Lev. Var. *Alchemillæ*.**

Berk. & Br. Ann. N. H., No. 1468. *Uredo alchemillæ*. P. & Ph. in "Grevillea," iii., p. 124.

Scotland, Wales, &c.

Coleosporium ochraceum. *Fckl. Fungi Rhen.* 302.

Hypophyllous; sori ochraceous, usually confluent, occupying the whole under surface, pulverulent, pseudospores subglobose, ochrey-yellow, epispore minutely rough.—*Uredo potentillarum v. Agrimonice D. Cand. Fl. Fr. vi. p. 81.* *Cooke Fungi Britt. i., 635.*

On *Agrimonia eupatoria*. (Also New York, U.S.)

Æcidium incarcerationatum. *B. & Br. Ann. N. H., No. 1469.*

Sori minute, crowded in irregular spots, peridia included in the parenchyma of the leaf, pseudospores pallid.—*Rabh. Fungi Eur., No. 1492.*

On leaves of *Sagittaria*. Bungay (D. Stock).

The tissue of the peridium is far more delicate than in most of the species. *B. & Br.*

Uromyces concomitans. *B. & Br. Gard. Chron.* 1874, p. 228.

Sori crowded in a ring, irregular, plane; pseudospores obovate, even, pedicels attenuated downwards.—*Ann. N. H., No. 1470.* *Grevillea iii. p. 74, with fig.*

On *Scrophularia nodosa*, surrounding pustules of *Æcidium*.

Protomyces microsporus. *Ung. Ecanth.*

Spots white; spores globose, pallid.—*Berk. & Br. Ann. N. H., No. 1471.*

On leaves of *Ranunculus ficaria*. New Pitsligo.

Protomyces Chrysosplenii. *B. & Br. Ann. N. H., No. 1472.*

Spots white, rather thick. Spores globose, hyaline, pedicellate.

On leaves of *Chrysosplenium oppositifolium*. New Pitsligo (Rev. J. Fergusson).

Protomyces Fergussoni. *B. & Br. Ann. N. H., No. 1473.*

Spots or points brown, irregular. Spores obovate, at first hyaline, very shortly pedicellate, even, then brown.

On leaves of *Myosotis*. New Pitsligo (Rev. J. Fergusson).

Protomyces menyanthi. *De Bary Brandpilze, p. 19.*

Cooke in Grevillea i., p. 7.—*B. & Br. Ann. N. H., No. 1474.* *Cooke Fungi Britt. ii., 47.* *Rabh. Fung. Eur. No. 1500.*

On leaves of *Menyanthes* and *Comarum*.

Stilbum cuneiferum. *B. & Br. Ann. N. H., No. 1451, t. 1, f. 2.*

Stem attenuated upwards, simple, or slightly divided, consisting of compacted threads, which are free above, and bear the obversely wedge-shaped pale greenish-brown spores, head ovate.

On rotten cabbage stalks. Batheaston. April.

Habit that of *S. rigidum*. Spores (·0004-·00045 in.) ·01-·011 m.m. long. *B. & Br.*

We have observed another *Stilbum* in company with the *Periconia*, in specimens distributed by Mr. Broome, with a long clavate head and globose spores half the diameter of those of the *Periconia*. It is a very interesting form, and will probably be met with again.

Periconia brassicæcola. *B. & Br. Ann. N. H. No. 1452 t., i. f. 3.*

Stem black, heads globose, at first grey, then black, spores cine-

reous, more or less attenuated towards each end.—*Rabh. Myc. Eur.*, No. 1662. *Cooke Fungi Britt. i.*, 647.

Forming dense masses in the inside of rotten cabbage stalks. Batheaston. April.

Spores ($\cdot 0002$ – $\cdot 0004$ in.) $\cdot 005$ – $\cdot 01$ m.m. long.

Periconia Phillipsii. *B. & Leight. Ann. N. II.*, No. 1453.

Very minute, stem attenuated upwards, head globose, spores globose, granulated.—*Phillips in Grevillea iii.*, pl. 42, fig. 1. *Cooke Fungi Britt. ii. ined.*

On soil. Trefriw.

Spores ($\cdot 0004$ in.) $\cdot 01$ m.m. diam. Looks at first sight like a little *Sphinctrina*, so minute that it is quite invisible to the naked eye. *B. & Br.*

Cladotrichum uniseptatum. *Cooke.*

Effused, black; flocci branched, furcate, nodulose, septate, upper joints inflated or cupulate; spores oblong, obtuse, constricted, uniseptate, often collapsed at the extremities, and then apparently truncate. Pl. 48, fig. 2.

On sticks. Darenth. March.

Forming thick black velvety patches, sometimes nearly an inch in length. Closely allied to *C. triseptatum*, but the spores are never more than uniseptate. The collapsed extremities cause the spores to assume a quadrate form, and then there is some resemblance to terminal septa in the line of the collapsed epispore, $\cdot 02 \times \cdot 01$ m.m.

Virgasporium. *Cooke.*

Flocci erect, septate; spores terminal, clavate or baculæform, multinucleate or multiseptate, hyaline.

In habit very similar to *Cladosporium*, which the threads also resemble, but the spores are very different. The flocci are not so rigid, so highly developed, or so carbonized as in most species of *Helminthosporium*, indeed, but for the fruit, the closest affinity is with *Cladosporium* and *Passalora*.

Virgasporium maculatum. *Cooke. (Pl. 48, fig. 4.)*

Epiphyllous; flocci fasciculate, short, scattered over sub-orbicular or irregular tawny spots, simple or slightly branched, septate; spores terminal, linear, slightly thickened toward the base, multiseptate, hyaline ($\cdot 04$ – $\cdot 08 \times \cdot 005$ m.m.).—*Cladosporium (?) maculatum*, *Cooke Fungi Britt. ii.*, with fig.

On fading leaves of *Reseda*. Jersey.

To this genus also belongs *Helminthosporium clavatum*, Gerard,* and probably *Helminthosporium olivaceum*, B. & C., which we have not seen.

* VIRGASPORIUM CLAVATUM. (*Ger.*) Pl. 48, fig. 4. Hypophyllis, floccis olivaceis, fasciculatis, erectis, brevibus, septatis. Sporis obclavato-elongatis, multiseptatis ($\cdot 05$ – $\cdot 75 \times \cdot 005$ m.m.).—On fading leaves of *Asclepias incarnata* (Gerard), and *Gerardia* (Peck). New York, U.S.—There are no definite tawny spots as in *V. maculatum*.

Botrytis argillacea. *Cooke, Fungi Britt. ed. ii., ined.*

Effused for 6-12 inches in length, clay-coloured. Fertile flocci branched, dichotomous above, tips slightly thickened, spores oval. Pl. 48, fig. 6.

On sticks. Darenth. April.

Peronospora calotheca. *D. By. Mem. Peronospora. p. 111, No. 9.*

Flocci slender, 7-9 times dichotomous, primary branches oblique, erect, the rest patent, squarrose, slender, ultimate ramuli short, straight or curved; conidia ellipsoid; oospores globose, epispore bay, minutely reticulated.—*Berk. & Br. Ann. N. H., No. 1454. P. galii, Fckl. Fungi Rhen. No. 28.*

On *Galium aparine*. Forden. Ap. (Rev. J. E. Vize.)

Peronospora interstitialis. *B. & Br. Ann. N. H., No. 1455.*

Spots hypophyllous, yellow, confined to the interstices of the veins, or very rarely extending slightly beyond them, flocci very short, flexuous, spores terminal, ovate, often seated obliquely.

On leaves of primrose. Glamis.

Allied to *P. obliqua*. Spores ($\cdot 0006$ - $\cdot 0007$ in.) $\cdot 015$ - $\cdot 0175$ m.m. long.

Peronospora rufibasis. *B. & Br. Ann. N. H., No. 1456.*

Epiphyllous. Spots shining; tawny, pallid on the opposite surface, flocci linear, spores obovate or elongated, variable, obliquely attached, very shortly pedicellate.

On leaves of *Myrica gale*. Glamis (Rev. J. Stevenson).

Spots very conspicuous; closely allied to *P. obliqua* and *P. interstitialis*.

Penicillium megalosporum. *B. & Br. Ann. N. H., No. 1457.*

Snow white, short, flocci fasciculate; spores globose or elongated, even.

In an old chicken coop. Menmuir (Rev. M. Anderson).

Spores ($\cdot 0005$ - $\cdot 001$ in.) $\cdot 0125$ - $\cdot 025$ m.m. diam., or equally variable when oblong.

Fusarium minutulum. *Ca. Icon. ii., fig. 18.*

Minute, punctiform, white, stroma superficial, convex, fibrous, white, spores minute, oblong, somewhat rounded at the extremities.—*Berk. & Br. Ann. Nat. Hist., No. 1457.**

On rotten boards. St. Catherine's, Bath. Jan.

Spores ($\cdot 0002$ in.) $\cdot 005$ m.m. long.

Cylindrosporium. *Unger. Exanthema, p. 166. (Not Greville.)*

Spores cylindrical, fasciculate, springing from the stroma.

The Rev. M. J. Berkeley thinks it probable that *Protomyces* is connected with the species as oospores.

Cylindrosporium rhabdospora. *B. & Br. Ann. N. H., No. 1458.*

Amphigenous, spots orbicular, brown; spores forming little radiating fascicles, oblong, slightly hollowed out at the sides, obtuse, triseptate.

On leaves of *Plantago*. Glamis (Rev. J. Stevenson).

Spores ($\cdot 0008$ - $\cdot 002$ in.) $\cdot 02$ - $\cdot 05$ m.m. or more long. Sometimes a second is developed at the top of the first.—*B. & Br.*

Cylindrosporium ficariæ. *Berk.*

Glæosporium Ficariæ. Cooke Handbook, No. 1413.

Cylindrosporium niveum. *B. & Br. Ann. N. H., No. 1459.*

Spots numerous, crowded (1-2 lines) often confluent, brown-marginate. Spores snow-white, oblong, uniseptate, shortly pedicellate.

On *Caltha palustris*. New Pitsligo (Rev. J. Fergusson).

Spores, when mature, ($\cdot 002$ in.) $\cdot 05$ m.m. long.

Myxotrichum ochraceum. *B. & Br. Ann. N. H., No. 1475, t. 1, f. 4.*

Yellow, then greenish, flocci elongated above, acute, ramuli deflexed.

On shavings of hurdle makers. Near Bath. Mar.

Spores ($\cdot 00015$ in.) $\cdot 0035$ m.m. diam. When placed in alcohol they adhere in clusters, as if surrounded by a membrane or involved in mucus.—*B. & Br.*

Fusidium geranii. *West. Bull. d. Brux., 1851, p. 413.*

Spots brown, rounded, scattered, rather irregular, confluent and undeterminate, occupying the greater part of the leaf. Spores cylindrical-oval, with one or two nuclei or pseudo-septate.—*Cooke Fungi Britt., No. 685.*

On leaves of *Geranium*. King's Lynn (C. B. P.).

Mucor prinosus. *B. & Br. Ann. Nat. Hist., No. 1495.*

Small, snow-white, vesicles globose, reticulated, spores irregular.

Covering the soil of garden pots. Sibbertoft. Nov.

Spores ($\cdot 0007$ - $\cdot 0012$ in.) $\cdot 0175$ - $\cdot 03$ mm.

Thamnidium elegans. *Link. Obs. i., p. 45, t. ii. f. 45.*

Ascophora elegans. Corda Icon. iii., fig. 43. Cooke Handbook," No. 1881.

On fowls' dung.

Thamnidium Van Tieghemi. *B. & Br. Ann. N. H., No. 1496.*

Fertile threads bearing at the apex a single macrosporangium, lateral branches in the upper portion dichotomous, bearing microsporangia, externally rough, containing 1-4, or more, spores.

Thamnidium elegans, Van Tieghem, Ann. Sci. Nat., ser. 5, vol. xvii. p. 321 (not Corda).

On cabbage stalks.

Peziza diminuta. *Rob. Desm. Ann. Sci. Nat., 1847, viii., 185.*

Very small, scattered or crowded, shortly stipitate, externally whitish, tomentose, at first globose, then open, hemispherical; disc concave, yellowish, or orange ($\frac{1}{2}$ m.m.). Asci clavate-cylindrical, sporidia oblong. *Peziza apala, Fungi Britt. Exs., No. 287.*

On dry culms of *Juncus*.

The specimens published as *P. apala*, *B. & Br.*, in "Fungi Brit.," No. 287, are, as far as my own copy is concerned, this species, and *not* as named, the sporidia are very different. The figure 183 of this volume belongs to the present species. It may also be remarked here that *Pez. palearum*, *Desm.*, is quite different

from Rabenhorst's "Fungi Europæi," No. 519, as determined by an authentic specimen from Desmazieres, the sporidia are much smaller and not septate, as in "Grevillea" iii., fig. 193, the paraphyses are long and pointed.

Peziza (*Dasyascypha*) resinaria. *Cooke & Phillips.*

Gregarious, stipitate; cups at first turbinate, then open ($\frac{1}{2}$ -1 m.m.), clad externally, as well as the short stem with white villous down; margin inflexed. Disc pale orange yellow. Asci cylindrical (.05 m.m. long). Sporidia oval, minute (.005 \times .0025 m.m.). Paraphyses filiform.—*Phillips Elv. Britt. fasc. ii., ined.*

On resin of Spruce fir. Trefriw, N.W. May, 1874 (W. Phillips).

Mr. Phillips, adverting to the observations at p. 121, on *Peziza subtilissima*, C., and other species of *Peziza* closely allied, has forwarded specimens of the above, which are clearly distinct from any hitherto described. Externally it is more like a minute form of *Peziza bicolor* than *Peziza calycina*, but the fruit is different, the hairs much shorter, and the whole plant much smaller. It is only necessary to compare the sporidia with those of allied species to recognize its claim to rank as a distinct species; these are most like those of *Peziza Agassizii*, B. & C., a North American species, but the asci and sporidia are much smaller, the latter being .01 \times .005-.006 m.m. in *P. Agassizii*, and .005 \times .0025 m.m. in the above. Fortunately Mr. Phillips is in possession of sufficient specimens to include this in the forthcoming fasciculus of his "Elvellæci Britannici," together with the *Cenangium* hereafter described.

Ascobolus (*Ascozonus*. *Renny*) unicularius. *Renny in Journ.*

Bot., Dec., 1874, p. 355, t. 155, fig. 1-4.

Peziza unicularia Boud., *Ann. Sci. Nat. x.* 258. To this Mr. Renny refers *Ryparobius argenteus*, B. & Br. *Ann. Nat. Hist., xi., p. 347.*

Ascobolus (*Ascozonus*) Woolhopensis. *Renny in Journ. Bot., p. 356, t. 153.*

Ryparobius Woolhopensis, B. & Br. *Ann. N. H., xi., p. 347.*

On birds' dung. Hereford.

Ascobolus (*Ascozonus*) Leveillei. *Renny in Journ. Bot., t. 154, fig. 1-5 (not Crouan).*

On rabbits' dung. Hereford.

Ascobolus (*Ascozonus*) Crouani. *Renny. Journ. Bot., t. 154, f. 6-10.*

(Not *Ascobolus Crouani*, Cooke, which is a *Peziza* of the section *Humaria*.)

On rabbits' dung. Hereford.

Ascobolus (*Ascozonus*) parvisporus. *Renny Journ. Bot., t. 156, fig. 1-5.**

On rabbits' dung. Hereford.

Ascobolus (*Ascozonus*) subhirtus. *Renny Journ. Bot., t. 155, fig. 4-7.*

On rabbits' dung. Hereford.

Cenangium subnitidum. *Cooke and Phillips.*

Gregarious, erumpent, turbinate, becoming patellate, blackish brown; disc ($\frac{1}{2}$ -1 m.m.), marginate, depressed, then plane or convex, externally naked, opaque or somewhat shining. Asci clavate-cylindrical; sporidia narrowly elliptical, curved, binucleate, pale amber color ($\cdot 015 \times \cdot 005$ m.m.). Stylospores fusiform, curved, (hyaline $\cdot 015$ - $\cdot 02$ m.m. long).—*Phillips Elv. Britt. fasc., ii. ined.*

On branches of alder. Trefriw, N.W., 1874 (W. Phillips).

The sporidia are probably at length uniseptate.

Dermatea Ulicis. *Cooke.*

Cæs pitose or scattered, substipitate; cups at first turbinate, then open, externally reddish brown, furfuraceous (1-2 m.m. broad), disc darker, concave. Asci clavato-cylindrical; sporidia elliptical, uniseptate, brown ($\cdot 012 \times \cdot 005$ m.m.). Paraphyses subclavate and brownish at the tips.

On twigs of *Ulex*. Shere.

Externally of the color of ground coffee. Allied to such species as *Pez. fascicularis* and *Pez. furfuracea*, which are placed by Tulasne in *Dermatea*.

CARPOLOGY OF PEZIZA.

(Plates 43, 44.)

The figures are drawn to the same scale as previously, for which see plate 23.

- Fig. 199. *Pezizatectoria*, *Cooke*, *Fungi Britt., ii., ined.*
 " 200. *P. cornubiensis*, *B. & Br.*, ex. M. J. B.
 " 201. *P. leporum*, *Fckl.*, *Fungi Rhen.*, No. 1877.
 " 202. *P. salmonicolor*, *B. & Br.*, ex. M. J. B.
 " 203. *P. araneosa*, *Bull.*, *Fckl. Fungi Rhen.*, No. 2389.
 " 204. *P. macrospora*, *Wallr.*, *Fckl. Fungi Rhen.*, No. 1223.
 " 205. *P. umbilicata*, *Karst.*, *Fungi Fenn.* No. 729.
 " 206. *P. Gerardi*, *Cooke*, ex. *Herb. Gerard.*
 " 207. *P. Oocardii*, *Kalch.*, *Rabh. Fungi Eur.*, No. 521.
 " 208. *P. cochleata*, *Fckl.*, *Fungi Rben.*, No. 1230.
 " 209. *P. pulchra*, *Ger.*, fide W. R. Gerard.
 " 210. *P. arenicola* *Lev.*, ex. M. J. B.
 " 211. *P. pusio*, *B. & C.*, ex. M. J. B.
 " 212. *P. sepulta*, *Fr.*, ex. *Fries in Herb.*, M. J. B.
 " 213. *P. tomentosa*, *Schwz.*, ex. *Schweinitz*, in *Herb. M. J. B.*
 " 214. *P. stygia*, *B. & C.*, ex. M. J. B.
 " 215. *P. arenaria*, *Osborne*, ex. M. J. B.
 " 216. *P. asperior*, *Nyl.*, *Rehm. Ascomy.*, No. 3.
 " 217. *P. erinaceus*, *Schwz.*, ex. M. J. B.
 " 218. *P. scutellata*, *L.*, ex. M. J. B.
 " 219. *P. margaritacea*, *B.*, ex. M. J. B.
 " 220. *P. setosa*, *N.*, *Fckl. Fungi Rhen.*, No. 1866.
 " 221. *P. gregaria*, *Rehm. Ascomy.* No. 6. (= *P. brunnea*).
 " 222. *P. livida*, *Sch.*, ex. M. J. B.
 " 223. *P. geaster*, *B. & Br.*, ex. M. J. B.
 " 224. *P. diversicolor*, *Fr.*, ex. M. J. B.
 " 225. *P. semitosta*, *B. & Br.*, ex. M. J. B.
 " 225*. *P. alphitodes*, *B. & C.*, ex. M. J. B.
 " 226. *P. pubida*, *B. & C.*, ex. M. J. B.
 " 227. *P. institia*, *B.*, ex. M. J. B.

ATLAS DER DIATOMACEEN KUNDE.

Since our last notice of this work two more parts have appeared. In part II., a further instalment of the fastuosa group of *Surirella*; the 5th plate contains fifteen figures, ten of which are devoted to *Surirella fastuosa* and its varieties. The author promises to give very shortly a plate containing some splendid new varieties of this group.

In plate 6 we return to the *Naviculæ*. This plate contains 41 figures of *Navicula humerosa*, and the more or less allied forms. It is probable that several of these forms have been previously published under other specific names, e.g., *Navicula Fischeri* is *Stauroneis maculata*, Bailey's Microscopical Organisms, p. 40, pl. 2, fig. 32. Pritchard's Infusoria, 1864, page 915 = *N. Johnsoniana*, Greville. Transactions of Microscopical Society, vol. xi., p. 17, pl. 1, fig. 8. Plates 7 and 8 contain 116 figures of the elliptiform *Naviculæ*. *N. gemmata*, var. *spectabilis*, Grunow, seems to be identical with *N. gemmata*, var. *biseriata* of the same author, a figure of which was given in vol. i. of Grevillea (see Novara Diatoms, p. 91). This part contains 172 figures.

Part III. commences with the *Cymbellæ*, of which plate ix. contains 79 figures. This very puzzling genus is admirably represented. Its close alliance with the *Naviculæ* can be easily traced from the conspicuously lunate valve and eccentric median line as exemplified in *C. gastroides*, to the symmetrical sided *C. molleriana*, in which also the median line and nodule are perfectly central.

Plate 10 contains 69 figures of forms closely allied to the preceding genus, and which perhaps ought to be united with it, viz., *Cocconema* and *Encyonema*. Fig. 36 represents a very curious abnormal form of *C. mexicanum*, the median line becoming double on one side of the central nodule, the space between the double line being punctato striate, like the other part of the valve.

Figs. 42 to 69 represent species of the genus *Encyonema*.

Plates 11 and 12 give 105 figures of the panduriform *Naviculæ* (= *Diploneis*, Ehr.). We are scarcely prepared to admit that specific differences exist between *N. Pandura*, *N. separabilis* and *N. multicosata*, and careful comparison of figures 1 to 12 and 14 to 20, pl. 11, will show a gradual merging of these forms into each other; in fact, the author remarks in the explanation of this plate that *N. separabilis* stands between *N. Pandura* and *N. multicosata*, the former approaching the last very closely, and that Grunow makes it var. *intermedia* of his *N. multicosata*.

Plate 12 commences with 12 figures of *N. interrupta*, 5 of unnamed species, and 56 of various new and previously described forms. The figure of *Navicula giebelii* is much inferior to that in the specimen plate. This group will be continued in next number. The description of the plates in Part III. is much less convenient than that in Parts I. and II. ; instead of placing the generic and

specific names first, the habitats are previously given. In the description of figs. 3 &c., pl. xi., the arrangement stands thus:—“3, Pelew 3. (Grundl. 5, 6. Puerto Cabello, 7, 10. Camp. Bai (ob. auch. 11, Yokohama?). N. separabilis, A. S. steht in der Mitte zwischen, N. Pandura u N. multicostata sich näher an die erstere anschliessend, Grunow zieht sie als var intermedia zu seiner N. multicostata.” The specific names not being printed in italics renders it somewhat difficult to detect them.

F. KITTON, Norwich.

NOTE ON PEZIZA FUSCESCENS, PERS.

By W. PHILLIPS.

In consequence of a suggestion thrown out by the eminent authors (Messrs. Berkeley and Broome) of the “Notices of British Fungi” in the Ann. and Mag. of Natural History, January, 1875, page 38, that probably *Peziza brunneola*, Desm., is the same plant as that described by Persoon under the name of *P. fuscescens*, I am induced to offer a few remarks which may help to a settlement of the question. The very fragile nature of both these minute plants renders it very difficult to find them in published exsiccati and exchange specimens, but I have been fortunate enough to find both in this country, *P. brunneola*, Desm., in North Wales, and *P. fuscescens*, P. in South Wales, so that I have had ample opportunity of comparing fresh specimens.

Persoon first described his *P. fuscescens* in the “Synopsis Methodica Fungorum,” p. 654, in 1801, but with a very brief and imperfect diagnosis. Four years later Albertini and Schweinitz described it more fully in their “Conspectus Fungorum,” p. 325. Persoon in his “Mycologia Europæa,” p. 265, published 21 years after his synopsis, gave a more complete description as follows:—“Becoming fuscous, epiphyllous, minute, stipitate, totally brown, pilose, at first globose, then hemispherical. Occurring rarely on beech leaves (not seen by me in any quantity).” He then quotes from the Conspectus (A. and S.) “Cupula when dry globose, closed; when moist semipatulate, and clothed, especially round the margin, with dull-brown hairs (pilis badiis).” This description equally well applies to either species in question, except that Persoon’s plant is found on beech leaves while Desmazières’ plant is found on oak leaves. It now remains to inquire whether they differ in any other respect than in the matrix on which they grow. That such a careful observer as Desmazières, accustomed to the use of the microscope, should have established a species on insufficient grounds is very improbable, and that he was not unacquainted with Persoon’s plant is evident from his remark in speaking of his own

species "Ce joli petit champignon a des rapports avec le *P. fuscescens*, Pers." (Ann. des Sc. Nat. vol. xvii., 1842). Desmazières saw that the hymenium of the plant he found growing on oak leaves presented the unusual character of possessing paraphyses as broad, or nearly as broad, as the asci, and far exceeding them in length, tapering to a sharp point as represented in fig. 184, p. xli., and fig. 2, p. xlii. of this vol., whereas in *P. fuscescens*, Pers., this peculiarity is not to be seen.* A figure of the last named species is given on Pl. xl. (fig. 154) by the editor of "Grevillea" without such paraphyses. Fückel is entirely silent about them in his description of this species (Sym. Myc. p. 309), and after a careful examination of my South Wales specimens I find no indication of their existence. I conclude, therefore, that Desmazières considered the presence of these peculiar paraphyses in the hymenium of his oak-leaf plant a sufficient reason for distinguishing it as a new species under the name of *P. brunneola*.

PODISOMA ON JUNIPERUS PHÆNICIA.

In a communication on the species of *Podisoma*, published in the "Quekett Journal" (vol. ii., p. 255), we indicated that some doubts existed as to the species found at Naples by Gasparrini on *Juniperus phœnicia*, and figured by him under the name of *Podisoma fuscum*. Messrs. Tulasne, in their memoir on the *Tremellini*, alluded to this species in a note, remarking that if the figures were accurate this could not be the *Podisoma fuscum* of Corda, and was probably a new species. Recently we have received specimens of a *Podisoma* on *Juniperus phœnicia*, collected by M. Roux in the vicinity of Marseilles, the features of which differ somewhat from the *Podisoma Juniperi communis*, Fries. The stroma is ligulate, slender, and elongated, and there is scarcely any perceptible swelling of the matrix, but the principal difference exists in the pseudospores. In the form which is commonly found on *Juniperus communis* the pseudospores are more or less rounded at the apex, and scarcely, if at all, constricted at the commissure; in the form on *Juniperus phœnicia* both cells are, as nearly as possible, equal in size and form, both attenuated upwards, and both swollen at the base, so that the pseudospores are strongly constricted at the septum. This accords almost as little with Gasparrini's figures as the typical form of *Podisoma Juniperi communis*, and could scarcely be referred to his species more than the latter. The question naturally arises whether the form on *Juniperus phœnicia* can be regarded as distinct from that on

* Similar paraphyses are found in *P. Schweinitzii* (Rehm. exs. 156) *P. Sphærocephala*, Wallr., and *P. pælearum*, Desm.

Juniperus communis. If the form and constriction of the pseudospores can be assumed to have the same specific value as in *Puccinia*, there may be sufficient grounds for accepting this as distinct, but it must be borne in mind that there is some variability in the amount of rotundity of the upper cell in *Podisoma Juniperi-communis*, and also in the constriction, although it must be confessed that we have never met with such a pronounced constriction as in the form on *Juniperus phœnicia*. For the present it may be as well to regard this as a form of *P. Juniperi*, since we have no authentic specimens of Gasparrini's plant for comparison. In his figures the pseudospores are much broader for their length than in the Marseilles form. If there is any soundness in the view that each species of *Podisoma* has its corresponding *Ræstelia*, this form can be verified by sowing the secondary spores on the hawthorn, or those of *Ræstelia lacerata* on the *Juniperus phœnicia*, and recording the results. There is sufficient difference in the external habit, as well as the form of the pseudospores, to warrant a suspension of judgment until such an experiment is made; meanwhile we are not justified in regarding it as the *Podisoma fuscum* of Gasparrini, but rather as *Podisoma Juniperi* var. *phœnicia*.

Apropos of *Podisoma*, it may be remarked here that Mr. C. H. Peck has seen the pseudospores of *Gymnosporangium Juniperi* var. *clavipes* ("Quekett Journ," vol. ii. p. 258), germinating at the apex and not at the commissure. This would be sufficient to warrant the recognition of this form as a distinct species under the name of *Gymnosporangium clavipes*, C. & P., which Mr. Peck has assigned to it.

ON TWO NEW BRITISH SPECIES OF COLLEMACEI.

By the REV. J. M. CROMBIE, F.L.S.

Since my revision of the British *Collemacei*, in "Journ. Bot." for November, 1874, two additional and rather interesting species have been discovered and have been recorded by Nylander in the "Flora," 1875, pp. 102, 103. These are—

1. **Pyrenopsis phylliscella.** *Nyl.*—Thallus effuse, squamulose, dark-brown, the squamules subverruculoso-unequal, subadnate, aggregated, but not contiguous, rotundato-deformed; apothecia endocarpid, very minute, 5-15 in each thalline squamule; epithecium punctiform, concolorous, with thalline margin; spores 8-næ, oblongo-ellipsoid, .0,005-7 m.m. long, about .0,003 m.m. thick; paraphyses few, slender; hymenial gelatine, bluish, and the thecæ dark violet with iodine.

On quartzose boulders in subalpine streams. Very local, and rare on Ben-y-gloe, Blair Athole (Crombie, 1870).

In "Grevillea" i., p. 170, this species was erroneously referred by me to *P. fuscata*, which the thallus somewhat resembles. A better developed and fertile specimen, however, which, in consequence of having been accidentally put away with some mosses in a box, had till recently been overlooked, shows that the two plants are quite distinct. The present species, as observed by Nylander, l.c., has its nearest ally in *P. Tasmanica*.

2. **Collema granuliferum.** *Nyl.*—Thallus somewhat similar to that of *C. melænum*, but firmer, and partly sprinkled with isidiose globules, which are often crowded, the laciniae, in dry state on the under surface, often longitudinally and crowdedly, thinly rugulose-plicated; apothecia moderate, reddish, the thalline margin at length subrenated; spores 3-septate, sometimes with 1-2 connecting septules, .0,025-32 m.m. long, .0,008-12 m.m. thick.

On old walls and rocks (calcareous), rarely amongst mosses on the ground. Probably not uncommon in mountainous districts, as at Appin (Crombie), Cheddar Cliffs (Joshua), Leigh Woods and Kingsbridge (Holmes), Killarney (Hardy), but very sparingly fertile.

A larger and a smaller condition occurs, to the former of which is to be referred *C. flaccidum* var. *microlobum*, *Nyl.*, *olim* in *Cromb.*, "Enum.," p. 5. In the latter state the thallus is frequently met with, but poorly developed, and may readily be mistaken for *C. pulposum* f. *granulatum*, *Sw.* This also is one of the *Collemas* to which I referred in "Grevillea" ii., p. 80, as sometimes protruding itself through and obliterating the thallus of *Solorina saccata* var. *limbata*—a matter of pure observation, which does not depend upon any "stretch of imagination" whatever.*

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* I may here notice that in my observations l.c., I by no means meant to convey the idea that the thallus of var. *limbata* was simply these *Collemeine* growths, but only that they sometimes usurped the place of its normally granulose or isidiose thallus, which then appeared not continuous, but merely bordering the apothecia.

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Grevillea,

A QUARTERLY RECORD OF

CRYPTOGAMIC BOTANY

AND ITS LITERATURE.

EDITED BY M. C. COOKE, M.A.,

*Author of "Handbook of British Fungi," "Fungi, their uses," &c.,
"Rust, Smut, Mildew, and Mould," &c., &c.*

VOL. IV.

1875-6.

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I N D E X .

	PAGE.
Affinities of Pellicularia	134
Ascobolus, new species of	84
Atlas der Diatomaceen-Kunde	26, 131
Australian Fungi, Thumen's	70
Berkeley, M., Kashmir Fungi	137
Berkeley, N. American Fungi	1, 45, 93, 141
Blyttia Mörkii	76
Botanical Year Book	136
Braithwaite on Sphagnum	22
British Fungi... ..	33, 66, 109, 118, 165
British Lichens	83, 139, 180
Carpology of Peziza... ..	41, 132
Classification of Pyrenomycetes	30
Conidia of Fistulina... ..	173
Cooke, and Ellis, New Jersey Fungi	178
Cooke, M. C., British Fungi	33, 66, 109, 165
" Fungi Britannici	130
" Mycographia... ..	89, 93
" New Scotch Peziza	91
" Some Indian Fungi... ..	114
" On <i>Peziza brunnea</i>	125
" On <i>Peziza calycina</i>	169
" On Pellicularia	134
Coprinus radiatus, reproduction of... ..	53
Cornu, Max., on Spermata... ..	162
Crombie, J. M., New British Lichens	180
Cryptogamic Literature	43, 92, 139, 183
Cryptogamic Society of Scotland	79
Davies, G., on Blyttia Mörkii	76
Fairy Rings	138
Fistulina, conidia of... ..	173
Fries, E., on Gillet's Champignons... ..	181
Fungi, Australian	70
Fungi Britannici	130
Fungi, British	33, 66, 109, 118, 165
Fungi, Indian	114
Fungi, Kashmir	137
Fungi of North America	1, 45, 93, 141, 178
Hemileia vastatrix, germination of	136
Hepaticæ in Hibernia	85
Indian Fungi... ..	114, 137
Joshua, W., Collemei of Cirencester	42
Lactarius turpis, note on	77
Lecanora angulosa	128, 182
Leighton, Lichenological memorabilia	25, 78
Lichenological memorabilia	25, 78
Lichen pilularis. Dav.	126
Lichens, British	83, 139, 180
Lichens, Collemei	42

	PAGE.
Lichens, Irish	78
Lindberg, S. O., Irish Hepaticæ	85
Micrometric Tables	40
New and Rare British Fungi	118
New British Lichens	180
New Irish Lichens	78
New Jersey Fungi	178
North American Fungi	1, 45, 93, 141
Parasitism or Polymorphism	82
Peronospora infestans, resting spores of	17, 183
Peziza brunnea, A. & S., note on	125
Peziza calycina, observations on	169
Peziza, Carpology of	41, 132
Phillips, W. and Plowright, C. B., on British Fungi	118
Phillips, W., on Ascobolus	84
Phillips, W., Elvellacei Britannici	84
Phillips, W., Parasitism?	82
Plowright, C. B., on Rhytisma	28
Published Fascicula... ..	127
Rehm's Ascomyceten	65
Rehm on Peziza calycina	169
Resting Spores of Potato Disease... ..	17
Rhyncostegium, form of	129
Rhytisma maximum, fructification of	28
Rimularia limborina, note on	88, 128
Saccardo, nova Ascomycetum genera	21
Seynes, J. de, on Fistulina... ..	173
Smith, W. G., on Potato Disease	17, 183
Smith, W. G., reproduction in Coprinus	53
Spermatia of Ascomycetes... ..	162
Sphagnum laricinum, &c.	22
Stenogramme interrupta	129
Three Fungi from Kashmir... ..	137
Thumen, Flora Mycologica Australiæ	70
Triblidium	182
Woolhope Club Foray	81

Grevillea,

A QUARTERLY RECORD OF CRYPTOGAMIC BOTANY
AND ITS LITERATURE.

NOTICES OF NORTH AMERICAN FUNGI.

By the REV. M. J. BERKELEY, M.A., F.L.S.

(Continued from Vol. iii., page 160.)

- * **Helotium (Calycella) citrinum.** *Fr.*—On dead wood. New England, Oakes.
Sporidia .0004 long.
- * **Helotium (Calycella) pallescens.** *Fr.*—On dead wood. Rhode Island, Bennett. No. 1868.
- * **Helotium (Calycella) ferrugineum.** *Schwein.*—On dead wood. Boston, Murray. No. 6239.
751. **Helotium (Calycella) monticola.** *B.*—Congestum pallide fulvum obovatum; disco plano; sporidiis biserialibus subfusiformibus.
On dead wood. Mountains of Car. Sup. No. 470.
Crowded, pale tawny, obovate; disc plane; sporidia biseriate, subfusiform.
752. **Helotium (Calycella) aglæosporum.** *B.*—Corneum irregulare; hymenio pulvinate; ascis linearibus; sporidiis oblongis curvulis utrinque hyalinis.
On dead wood.
Horn-brown, irregular; hymenium pulvinate; asci linear; sporidia oblong, curved, hyaline at either end. Sporidia .0013-.0006 long.
- * **Helotium (Calycella) herbarum.** *Fr.*—On fallen branches in moist places. Santee River. No. 1579.
753. **Psilopezia nummularia.** *B.*—"Hook. Lond. Journ.," 1847, p. 325.
On rotting logs or on the ground. Car. Inf. No. 2959, 2989. Pennsylvania, Michener. No. 3580. Ohio, Lea.
Sporidia .0008 long, binucleate.
- * 754. **Psilopezia flavida.** *B. & C.*—Congesta flavida irregularis flexuosa; margine demum elevato; sporidiis oblongis.
On wood of *Quercus alba*. Alabama, Peters. No. 5233.

About $\frac{1}{4}$ inch across, dirty yellow, somewhat confluent, flexuous; asci linear; sporidia oblong, .0006 long, about half as much wide.

* **Rhizina undulata.** *Fr.*—On the ground, in pine woods, and on damp earth by the side of ditches. Car. Inf. No. 2962, 2963.

755. **Cordierites muscoides.** *B. & C.*—*Gregaria ramosa rufa* apice pallida obtusa; floccis adscendentibus brevibus ornata.

On damp boards. Pennsylvania, Michener. No. 4314.

About two lines high, slightly branched, rufous pale and obtuse above, clothed with short hair, all tending upwards. Much stouter than *C. coralloides*.

* **Patellaria applanata.** *B. & C.*—*Linn. Soc. Journ.* Car. Inf. No. 2499. On *Cornus suecica*. Penns., Michener. No. 4378. Connecticut, C. Wright. No. 5637.

* **Patellaria zhabarbarina.** *B.*—*Rav. Fasc. v.*, No. 46. On *Cornus suecica*. Alabama, Peters. No. 4000. On *Fagus sylvatica*. Car. Inf. Ravenel. No. 1734. On *Rubus*. Penns., Michener. No. 4361.

* **Patellaria discolor.** *Mont.*—*Car. Sup.* No. 164, 936. Car. Inf. No. 2658 bis., 2488, 2978. On *Polygonum Pennsylvanicum*. No. 1167.

* **Patellaria atrata.** *Fr.*—*Car. Inf.* Ravenel. No. 1640, 1445. Virginian Mountains. No. 3350. New England, Russell.

* **Patellaria olivaceo-virens.** *Schwein.*—*Car. Sup.* No. 444. On oak.

* **Patellaria carpineae.** *B.*—*Pez. carpineae*, P. Ohio, Lea; on *Carpinus Americana*. Penns., Michener.

* **Patellaria nigro-cinnabarina.** *Schw.*!—On *Liriodendron*. Car. Inf. No. 2257.

756. **Patellaria atro-fusca.** *B. & C.*—*Orbicularis* margine elevato atro-fusca; ascis clavatis; sporidiis oblongis triseptatis.

On small twigs of *Vitis vulpina*. Car. Inf. No. 3210.

Small, with the habit of *P. atrata*.

Orbicular, black-brown, with an elevated margin, springing from a black thin stratum which surrounds the twigs. Asci clavate; sporidia uniseriate oblong, triseptate. No. 5958 is apparently the same in a young state.

757. **Patellaria stygia.** *B. & C.*—*Atra* superficialis margine elevato; sporidiis uniseptatis.

On dead wood. New Jersey. No. 4590. Car. Inf. No. 3911. Boston, Sprague. No. 6234.

This also has the habit of *P. atrata*.

Black, superficial, orbicular, with a raised margin; sporidia oblong, slightly attenuated at either end, uniseptate, .0005 long.

758. **Sphinctrina microscopica.** *B. & C.*—*Curta* capitulo subglobose; ascis linearibus; sporidiis uniseriatis oblongis.

On dead twigs of *Morus multicaulis*. Car. Inf. No. 2712.

Very minute ; stem rather thick, nearly equal ; head subglobose ; asci linear, sporidia in a single row, oblong, 0003 long, about $\frac{1}{3}$ as much broad. Occasionally the stem is divided at the base.

759. **Sphinctrina gummæ.** *B. & Mont.*—Brevis turbinata ; stipite sursum incrassato ; ascis subclavatis ; sporis globosis ; paraphysibus linearibus granuliferis.

On gum of *Cerasus serotina*. Car. Inf. No. 2167.

Stem short, incrassated upwards ; head turbinate ; asci slightly clavate ; sporidia uniseriate globose ; paraphyses linear, granular within. In *Sphinctrina turbinata* the sporidia are elliptic and larger.

* **Tympanis frazzini.** *Schwein.*—Virginian Mountains. No. 3366, 3368.

* **Tympanis conspersa.** *Fr.*—On *Prunus*. New England, Sprague. No. 5815. Pennsylvania, Michener. No. 5143. On peach. Sartwell. No. 3071.

* **Tympanis fasciculata.** *Schwein.*—On *Viburnum dentatum*. Pennsylvania, Michener. No. 4344, 3557.

760. **Tympanis Ravenelii.** *B.*—Sparsa vel fasciculata ; cupulis breviter pedicellatis marginatis, disco cinereo ; sporidiis biconicis commissura medioque constrictis.

On branches of *Carpinus*. Car. Inf. No. 2018, 1816. Ravenel. No. 1676, 1816. On *Ilex prinoides*. Alabama, Peters. No. 3989.

Scattered or fasciculate, cups strongly marginate, shortly pedicellate, disc cinereous ; sporidia biconical, the divisions and commissure constricted, with occasionally a globular body at the commissure, 0013-0015 ; paraphyses crowned with narrow obovate conidia.

* **Tympanis turbinata.** *Schwein.*—On *Viburnum prunifolium*. Penns., Michener. Asci obtuse ; sporidia multitudinous.

761. **Tympanis gyrosa.** *B. & C.*—Fasciculata, cupulis arcte compressis gyrosis.

On fallen branches. Virginian Mountains. No. 3338.

On dead apple branches. New England, Russell. No. 5940.

Fasciculate ; cups closely compressed, forming a gyrose patch. The species is certainly distinct, but I have not seen any fruit.

762. **Tympanis rhabdospora.** *B. & C.*—Fasciculata, cupulis elevatis flexuosis, acute marginatis ; sporidiis filiformibus.

On *Acer*. New England, Sprague. No. 5831.

Fasciculate, cups crowded, elevated, flexuous, acutely margined ; sporidia filiform, nearly straight.

763. **Tympanis stictica.** *B. & C.*—Punctiformis, cupulis concavis margine elevato ; ascis clavatis ; sporidiis fusiformibus curvatis quadrinucleatis.

On *Salix Babylonica*.

Minute, punctiform, cup concave, with an elevated margin; asci clavate, sporidia fusiform, slightly curved, with four nuclei. No. 4318, 4325. On *Prunus verticillata*. Pennsylvania, Michener. May be the same, but I have seen no fruit, and the same may be said of No. 5837. Maine, Morse, sent out as *Tympanis Morsei*. No. 3514. On *Quercus tinctoria*. Pennsylvania, Michener, seems distinct, but there is no fruit. No. 5845, New England, Murray, and 5869, Russell, are the same; also No. 175, Car. Sup. on vine.

* **Cenangium craterium.** *Fr.*—On rotten sticks, or on the ground. Car. Sup. No. 228. Ohio, Lea. Kentucky. Arctic America, Drummond.

* **Cenangium cerasi.** *Fr.*—New England, Murray. No. 5443. Vermont, No. 5867. Pennsylvania, Michener. No. 4350, 4352, 5375.

* **Cenangium prunastri.** *Fr.*—Mountains of New York. No. 4508. Maine. No. 5688. Pennsylvania, Michener. No. 3560. No. 130 on cherry. 134 on *Prunus Americana*. No. 208 on peach. Car. Sup. the *Sphaeria rigida*, DC. form.

* **Cenangium ferruginosum.** *Fr.*—On *Pinus strobus*. New England, Sprague. On *Abies balsamifera*. Pennsylvania, Michener. No. 4390.

* **Cenangium pinastri.** *Fr.*—Canada, Poe. No. 6138. French, Broad. Car. Sup. Ravenel. No. 1523.

* **Cenangium cephalanthi,** *Schwein.*—On *Cephalanthus occidentalis*. Car. Inf. No. 5024. Alabama, Peters. No. 5201.

* **Cenangium triangulare,** *Schwein.*—Upper Canada. No. 330. Dr. MacLagan. Car. Inf. No. 448. Ravenel. No. 1581.

On *Quercus alba*. Pennsylvania, Michener. Sporidia filiform.

* **Cenangium turgidum.** *Fr.*—On oak limbs. Car. Inf. Ravenel. No. 1393. Car. Sup. No. 833.

Sporidia biseriata, fusiform, straight, with about four nuclei.

764. **Cenangium fulvo-tingens.** *B. & C.*—Fasciculatum, fulvo-tingens; cupulis tenuibus extus venosis subtiliter pulverulentis compressis; sporidiis oblongis curvulis.

On dry wood, which it stains of a bright tawny. Pennsylvania, Michener. No. 5127.

Fasciculated, cups thin externally brownish, minutely pulverulent, veined, crowded, compressed; sporidia oblong, slightly curved, almost sausage-shaped, .00025 inch long.

765. **Cenangium pithyum.** *B. & C.*—Erumpens, margine obtuso inflexo subtiliter pulverulento; sporidiis lineari-oblongis curvatis 4-septatis.

On *Abies*. New England, Sprague. No. 5827.

Erumpent; margin obtuse, strongly inflected, minutely pulverulent, brownish; sporidia linear-oblong, strongly curved with four septa, .002 long.

766. **Cenangium magnoliæ.** *B. & C.*—Cæspitosum apertum marginatum nigrum; ascis amplis, sporidiis magnis allantoideis.

On *Magnolia glauca*. Car. Inf. No. 2668. On *Laurus*. Alabama, Beaumont. No. 5108.

Cæspitose; disc open, marginate, black; asci ample, sporidia sausage-shaped, .00-0013 inch long, about half as much wide.

This was first sent out as *C. magnoliæ*, and I do not like to alter the name though it occurs on another genus.

767. **Cenangium concinnum.** *B. & C.*—Cupulis sessilibus subtiliter pulverulentis marginatis; disco plano nigro; sporidiis biserialibus oblongis triseptatis.

On *Quercus falcata*. Car. Inf. No. 3828, 6172. On *Laurus benzoin*. Car. Inf. No. 2295. On *Laurus sassafras*. Alabama, Peters. No. 5238.

Cups flat, with a strong brownish margin; disc black; sporidia biseriate; sporidia oblong, triseptate, .0006 long. No. 3828 has rather smaller sporidia, but is scarcely distinct.

* **Cenangium apertum.** *Schwein.*—On *Hydrangea*. Pennsylvania, Michener.

* **Cenangium andromedæ.** *Schwein.*—On *Andromeda arborea*. Car. Sup. No. 57,344.

Sporidia slender, fusiform or sigmoid, with many nuclei.

* **Cenangium spirææ.** *Schwein.*—On *Spiræa opulifolia*. Car. Sup. No. 446.

768. **Cenangium leptospermum.** *B. & C.*—Fasciculatum minutum nitidum subglobosum disco punctiformi; sporidiis elongato-fusiformibus arcuatis pluri-nucleatis.

On *Abies*. Alabama, Peters. No. 5190.

Fasciculate, minute, shining, subglobose; disc small, almost punctiform; sporidia slender, fusiform, arched, with many globose nuclei.

* **Cenangium pulveraceum.** *Fr.*—Car. Sup. No. 4418.

769. **Cenangium Juglandis.** *B. & C.*—Cæspitosum globosum pruinose apice nigrum serius omnino denudatum.

On *Juglans*. Mountains of Virginia. No. 3337.

Cæspitose, pruinose, naked above, globose, at length entirely black. Unfortunately without fruit.

770. **Cenangium fallax.** *B. & R.*—Subglobosum sparsum dense viridi-pulveraceum.

On *Taxodium distichum*. Santee Canal. Car. Inf. Ravenel. No. 1417.

Globose, scattered, densely covered with apple-green powder. A very pretty species, but I have seen no fruit.

* **Bulgaria sarcoides.** *Fr.*—On sticks and stumps. Pennsylvania, Michener. No. 3535, 3590.

* **Bulgaria inquinans.** *Fr.*—On oak. Car. Sup. No. 213,

426. Georgia, Cotoosa Springs, Ravenel. No. 1733. Massachusetts. No. 3393.

* **Bulgaria rufa.** *Schwein.*—On fallen branches, Pennsylvania, Michener. No. 3613. New England, Sprague. No. 5328.

Sporidia elliptic, in a single row.

771. **Bulgaria decolorans.** *B. & C.*—Alba demum cornei-color concava extus cum stipite venosa; ascis elongatis; sporidiis uniseriatis oblongo-cymbæformibus.

On decayed oak-wood. Alabama, Peters. No. 5222.

At first white, then horn-coloured, externally venose, together with the short stem; asci long; sporidia in a single row, oblongo-cymbæform, $\cdot 001\frac{3}{4}$ long, about 1-5 as much wide.

* **Ascobolus furfuraceus.** *P.*—On dung. Car. Inf. No. 3850.

772. **Ascobolus major.** *B. & C.*—Deplanatus margine eximio umbrino; sporidiis ellipticis lævibus.

On dung. Car. Inf. No. 3794.

Depressed, with a prominent umber border, sporidia elliptic, even, $\cdot 0011$ long.

* **Ascobolus trifolii.** *Bernh.*—New England, Sprague. No. 5767. Car. Inf. On *Medicago sativa*. No. 6360. Pennsylvania, Michener. No. 4037.

Sporidia shortly clavate, $\cdot 000\frac{3}{4}$ inch long.

Ascobolus conglomeratus. *Schwein.*—On dead wood. Car. Sup. No. 174. Car. Inf. Ravenel.

Sporidia oblong, narrow, uniseptate, $\cdot 000\frac{3}{4}$ - 0004 long.

* **Agyrium rufum.** *Fr.*—On dry fir wood. Alabama, T. M. Peters. No. 5193.

773. **Agyrium Tuckermanii.** *B. & R.*—Punctiforme convexum rufum; ascis brevibus clavatis sporidiis breviter subfusiformibus.

On bleached wood. White Mountains. New Hampshire, Tuckerman. Ravenel. No. 1759.

Minute, punctiform; rufous; asci short, sporidia shortly subfusiform, $000\frac{3}{4}$ long.

774. **Agyrium brunneolum.** *B. & C.*—Convexum brunneolum, ascis oblongis; sporidiis minoribus breviter fusiformibus.

On roots of pine. Alabama, Beaumont. No. 5161.

Much larger than the last, with narrower oblong asci, and smaller sporidia. The wood is not bleached.

* **Stictis radiata.** *P.*—On oak. Car. Inf. No. 2262, 1479, 1678. Car. Sup.

On *Andromeda arborea*. No. 346.

* **Stictis sesleriae.** *Libert.*—At the base of dead grasses. Santee River. No. 1640.

* **Stictis Hydrangeæ.** *Schwein.*—Virginian Mountains. No. 3352.

Scarcely different from *S. radiata*. Disc red, as in some British specimens.

* **Stictis pupula.** *Fr.*—On *Syringa*. Car. Inf. No. 1068.

On *Viburnum prunifolium* and *V. opulus*. No. 6005.

775. **Stictis glaucoma.** *B. & C.*—Liberata nigra, extus pruinosa ; disco plano demum elevato.

On *Rosa rubiginosa*. Car. Sup. No. 905. On *Viburnum opulus*, No. 2382. On *Kerria japonica*. No. 3800.

Bursting through the cuticle, but at length quite free, flat, black, externally pruinose.

776. **Stictis stereicola.** *B. & C.*—Rufa, minuta, margine radiato.

On *Stereum frustulosum*. Pennsylvania, Michener.

Minute, gregarious, parasitic on the frustules of the *Stereum* ; margin radiated. I regret that I can give no better character of this curious species.

* **Stictis hysterina.** *Fr.*—On wood of *Liriodendron*. Car. Sup. No. 159. Pennsylvania, Michener. No. 3974. Connecticut, C. Wright. No. 5634.

Sporidia in No. 3974 elliptic or oblong elliptic, quadrisepate, .0005 long.

* **Stictis parallela.** *Fr.*—On dead wood. Car. Inf. No. 2289.

* **Stictis versicolor.** *Fr.*—On oak. Car. Inf. No. 2253. Ravenel. No. 1266. Var. *rufa*. Massachusetts, Russell. No. 5442.

Sporidia sausage-shaped, exactly as figured by Corda under *Propolis versicolor*.

* **Stictis caulicola.** *Schwein.*—Sporidia fusiform, at length triseptate, .0008 inch long.

* **Lichenopsis sphaeroboloidea.** *Schwein.*—On *Carya*. Car. Sup. No. 745. Car. Inf. No. 2390. On *Syringa*. No. 2263. On oak. No. 2423. On peach. No. 2520.

Asci very long ; sporidia linear sigmoid, with 25 or more septa. There is apparently some species of *Ascomyces*, No. 5468, from St. Lawrence.

* **Tuber macrosporum.** *Vitt.*—Pennsylvania, Michener. No. 4333.

Sporidia .002 long, reticulated.

* **Phacidium pini.** *Schm.*—Pennsylvania, Michener. No. 5157. On *Pinus strobus*. New England, Sprague. No. 5411. New York, Sartwell. No. 2657.

* **Phacidium abietinum.** *Kze.*—On fir leaves. Car. Inf. Ravenel.

777. **Phacidium elegans.** *B. & C.*—Punctiforme radiato-apertum ; sporidiis clavatis fenestratis.

On bractes and sheaths of living pines. Car. Inf. No. 3678.

Minute, dot-like, black, opening by two or three lobes from the centre ; sporidia clavate, with several horizontal and vertical septa, .001 long. The sporidia in *P. pini* are filiform.

778. **Phacidium simulatum.** *B. & C.*—Hysteriiforme; ascis clavatis, sporidiis obovatis binucleatis.

On dead stems of *Clinopodium*, looking like an *Hysterium*, black; asci clavate; spores obovate, binucleate, .0004 long.

* **Phacidium exasperans.** *Schwein.*—On leaves of *Kalmia*. Pennsylvania, Michener. No. 4347.

779. **Phacidium elegantissimum.** *B. & C.*—In maculas orbiculares albas nigrocinctas situm punctiforme angulatum.

On leaves of holly. Alabama, Peters.

Seated on white orbicular black-margined spots, minute, angular. An extremely pretty species, but unfortunately I have found no fruit.

* **Phacidium dentatum.** *Kze.*—On leaves of *Quercus obtusifolia*. Car. Inf. Ravenel. No. 1629. On *Quercus nigra*. No. 4971. Texas, C. Wright. No. 3909.

Eustegia magnoliæ. Ravenel. No. 1356. Has no asci but long filiform stylospores.

* **Rhytisma acerinum.** *P.*—Car. Inf. Ravenel. No. 632. On *Acer rubrum*. Car. Inf. No. 2225.

* **Rhytisma solidaginis.** *Schwein.*—On *Solidago leptcephala*. Louisiana. No. 2571. On *Sol. cæsia*. New York, Sartwell, Miss Murray. On *Aster gracilis*. New Jersey. No. 2778. No. 3460.

* **Rhytisma punctatum.** *Fr.*—On *Acer spicatum*. New York, Sartwell. No. 3450. Ohio.

* **Rhytisma vitis.** *Schwein.*—Car. Sup. No. 688.

* **Rhytisma ilicincola.** *Schwein.*—On *Ilex prinoides*. Car. Inf. No. 2255. Santee Canal, Ravenel. No. 1626.

* **Rhytisma prini.** *Schwein.*—On leaves of *Prinus*. Car. Inf. No. 2254.

Scarcely differs from the last.

* **Rhytisma Ilicis-Canadensis.** *Schwein.*—Canada, Poe.

The same remark applies to this specimen.

* **Rhytisma Andromedæ.** *Fr.*—Canada, Poe. No. 6159.

* **Rhytisma vaccinii.** *Schwein.*—On *Vaccinium arboreum*. Car. Sup. No. 702. Ravenel. No. 493.

780. **Rhytisma Curtisii.** *B. & Rav.*—Crassum elevatum nitidum dentato-apertum disco aurantio; paraphysibus longis filiformibus sursum curvatis, sporidiis biseriatis clavatis.

On leaves of *Ilex opaca*. Car. Inf. 1054, 2045. Ravenel.

Rather thick, raised, shining, black, opening by triangular laciniae; disc orange; paraphyses long, slender, curved above; sporidia biseriate, clavate, much attenuated downwards, hyaline.

* **Rhytisma maximum.** *Fr.*—On *Cornus*. Alabama, Peters. No. 4571.

781. **Rhytisma tostum.** *B. & C.*—Tenue in maculam luteam situm, gyrosum hic illic tantum fertile.

On leaves of *Quercus lancifolia.* Alabama, Beaumont.

Seated on yellow spots, thin, gyrose, only here and there producing fruit-bearing perithecia, which soon shell off. Undoubtedly distinct, but the specimens are imperfect.

782. **Rhytisma monogramme.** *B. & C.*—In maculam bruneam nigro-marginatam situm; peritheciis hysteriiformibus solitariis.

On leaves of *Vitis æstivalis.* Seated on brown spots, which have a black border, hysteriiform, perithecia solitary. A very singular species, of which further information is desirable.

783. **Rhytisma erythrosporium.** *B. & C.*—Minutum dentato-apertum, sporidiis subfusiformibus utrinque apiculatis salmonicoloribus.

On leaves of *Quercus virens.* California. Proc. Am. Ac. iv., p. 128.

Minute, opening with two or three lacinæ; asci swollen; sporidia .0013 long, salmon-coloured, subfusiform, apiculate at either extremity.

784. **Asterina orbicularis.** *B. & C.*—In maculas orbiculares disposita; ascis obovatis; sporidiis oblongis obtusissimis curvatis uniseptatis.

On leaves of *Ilex opaca.* Car. Inf. No. 2046, 2373. On *Prinus coriacea.* Car. Sup. No. 3443. Ravenel. No. 231.

Forming orbicular black spots, in which the substratum is either quite continuous or interrupted; asci short, obovate; sporidia oblong, curved, very obtuse, uniseptate.

785. **Asterina decolorans.** *B. & C.*—Maculis orbicularibus undulatis ballatis; peritheciis punctiformibus; mycelio parco; ascis brevibus; sporidiis uniseptatis.

On some unknown leaf. New Jersey. No. 4684.

Spots orbicular, rufous, undulated and bullate; mycelium sparing, consisting of a few moniliform threads, and others which are inarticulate; asci short, oblong; sporidia uniseptate, .0004 long.

786. **Asterina conglobata.** *B. & C.*—Peritheciis globosis conglomeratis; ascis obovatis sporidiis breviter subfusiformibus uniseptatis.

On *Arbutus uva ursi.* No. 5865.

Globose, minute, conglobated, seated on a few slender threads; asci obovate; sporidia shortly subfusiform, uniseptate.

787. **Asterina diplodioides.** *B. & C.*—Maculis orbicularibus, mycelio interrupto; sporidiis oblongis obtusissimis uniseptatis fuscis.

On leaves of *Andromeda acuminata.* Alabama, Peters. No. 4511.

Forming orbicular interrupted spots; perithecia minute; sporidia .0003 long, shortly oblong, obtuse at either end, brown, resembling the spores of a *Diplodia.*

788. **Asterina melioloides.** *B. & C.*—Orbicularis parva; peritheciis depressis; sporidiis brevibus cymbæformibus uniseptatis.

On leaves of *Baccharis halimifolia*. *Car. Inf. Ravenel. No. 1355.*

Forming little orbicular spots; perithecia depressed, brown, rather rugulose; crowded; asci short, clavate; sporidia shortly cymbæform, uniseptate.

* **Asterina pelliculosa.** *B.*—On *Prinus coriacea*. *Car. Sup. No. 3443.*

789. **Asterina spurca.** *B. & C.*—Peritheciis sparsis punctiformibus, floccis brevibus duobus vel pluribus junctis articulatis radian-tibus ornatis.

On leaves and stems of *Hyptis radiata*. *Car. Inf. No. 1670. Ravenel, 1856. Alabama, Beaumont. No. 4657.*

Scattered, dot-like, surrounded by short articulated, submonili-form, radiating threads, which are joined together laterally in twos, sometimes forked at the apex.

790. **Asterina Wrightii.** *B. & C.*—Mycelio tenuissimo; peritheciis granulæformibus fuscis floccis cirrhatis circumdatis; ascis clavatis brevibus.

Apparently on some smooth *Cucurbit*. *Texas, C. Wright. No. 3880.*

Mycelium very thin; perithecia granular, crowded like little grains of gunpowder, surrounded by cirrhate threads; asci clavate, short.

791. **Asterina comata.** *B. & Rav.*—Sparsa major; mycelio obsoleto; floccis brunneis dense vestita.

On leaves of *Magnolia glauca*. *Alabama, Peters. No. 4562. Magnolia grandiflora. Santee Canal, Ravenel. No. 1819.*

Scattered, without any visible mycelium, large for the genus, about $\frac{1}{3}$ line broad, densely clothed with short brown hairs. The specimens in either case are young and without fruit, but the species is very distinct.

* **Lophium mytilinum.** *Fr.*—On bark of *Laurus Caroliniensis*. *Car. Inf. Ravenel. No. 1456.*

* **Glonium stellatum.** *Muhl.*—On pine trees near the ground. *Car. Inf. No. 1414. Car. Sup. Ohio.*

* **Labrella pomi.** *Mont.*—On apples. *Rhode Island, Olney. No. 2588.*

* **Hysterium pulicare.** *P.*—On dead wood and bark. Extremely common. β . *angustatum.* On *Platanus*. *Car. Inf. Rav. No. 1429. \gamma. lenticulare. Car. Sup. No. 285. 759.*

* **Hysterium elongatum.** *Wahl.*—On dead wood. *Car. Sup. No. 171, 184, 270, 442, 714, 882, 904.*

792. **Hysterium depressum.** *B. & C.*—Elongatum, granulato-ragosum depressum; rima angustissima; ascis clavatis; sporidiis cymbæformibus 5-septatis.

On dry exposed wood. Virginian Mountains. No. 3297.

Elongated, rough, with minute granules depressed; disc extremely narrow; asci clavate; sporidia cymbæform, with about five septa, sometimes abruptly bulging in the centre on the more convex side, .0016 long. Allied to the last, but the sporidia are very different.

* **Hysterium varium.** *Grev.*—On dead wood. Car. Inf. No. 2087. Approaching *Lophium*.

* **Hysterium lineare.** *Fr.*—On logs of *Taxodium*. Car. Inf. Ravenel. No. 1455. On dead wood. New England, Russell. No. 5391, with *Patellaria atrata*. Car. Sup. On oak. No. 851. On *Gleditschia*. No. 885.

I find in these specimens spindle-shaped sporidia, constricted strongly in the centre, multiseptate, .002-.0015 long.

* **Hysterium prælongum,** *Schwein.*—On dead wood. Texas, C. Wright. No. 3894, 3916.

Sporidia elliptic, probably resembling when mature those of *H. elongatum*.

793. **Hysterium fusiger.** *B. & C.*—Elongatum flexuosum; sporidiis fusiformibus quandoque curvatis multiseptatis.

On dead wood. New England, Sprague. No. 5830.

Elongated, flexuous, lying in various directions; sporidia fusiform, with about eight septa, sometimes strongly curved, .001 long. Resembling somewhat *H. tortile* and *graphicum*, but with different sporidia.

* **Hysterium rufulum.** *Spreng.*—On *Rhus radicans*. Car. Sup. No. 720, 912.

794. **Hysterium hiascens.** *B. & C.*—Superficiale ellipticum, labris involutis lævibus; disco aperto; sporidiis ellipticis fenestratis.

On dry bark of *Quercus bicolor*. No. 5883. Car. Inf. No. 3416. On *Celtis occidentalis*. Car. Sup. No. 287 (specimens in bad condition).

Allied to the last with the sporidia of *H. elongatum*.

* **Hysterium flexuosum.** *Schwein.*—On *Betula rubra*, *Acer rubrum*, *Vitis riparia*, *Cornus sericea*, *Andromeda arborea*, &c. Car. Sup. No. 1, 23, 63, 105, 109, 117, 316, 708, 796, 845. Car. Inf. No. 2343.

* **Hysterium Fraxini.** *P.*—On ash. Car. Sup. No. 727.

* **Hysterium Smilacis.** *Schwein.*—On twigs of *Smilax tamnoides*. Car. Sup. No. 93. 360.

795. **Hysterium Cyrillæ.** *B. & C.*—Elevatum, ellipticum opacum, læve; sporidiis biseriatis magnis oblongis endochromate bipartito.

On twigs of *Cyrilla*. Car. Inf. No. 2747.

Scattered, elevated, opaque, elliptic, even; sporidia biseriate, oblong, .004 long; endochrome divided into two portions, one of which is less than the other; epispore thick.

* **Hysterium petiolare.** *A. & S.*—On petioles of oak. Car. Sup. No. 272, 341, 349.

* **Hysterium Azaleæ.** *Schwein.*—On *Azalea nudiflora*. Pennsylvania, Michener.

* **Hysterium Rubi.** *P.*—On *Rubus*. Car. Inf. No. 2956.

* **Hysterium pinastri.** *Schrad.*—On pine leaves. Car. Sup. No. 140. New England, Sprague. No. 5298. Canada, Dr. Maclagan. No. 305.

* **Hysterium commune,** *Fr.*—Car. Sup. On *Sambucus canadensis*. No. 4507. On various herbaceous plants. On *Sedum Telephium*. Car. Inf. No. 176, 4498. On *Eupatorium purpureum*. Car. Inf. No. 2957. Pennsylvania, Michener. No. 3520.

* **Hysterium culmigenum.** *Fr.*—On stems of grass. Pennsylvania, Michener. No. 5126.

* **Hysterium Vaccinii.** *Carm.*—On *Vaccinium*. Car. Sup. No. 281. On *Andromeda arborea*. No. 288. On *Andromeda paniculata*. Pennsylvania, Michener. No. 4090. On *Lyonia ligustrina*. Car. Inf. Ravenel. No. 1691.

* **Hysterium maculare.** *Fr.*—On leaves of *Laurus Caroliniensis*. Car. Inf. Ravenel. No. 1774.

* **Hysterium foliicolum.** *Fr.*—On leaves of *Magnolia*. Alabama, Beaumont. No. 5097.

796. **Hysterium chlorinum.** *B. & C.*—Cito liberatum elevatum ellipticum primum chlorino-pruinose, demum denudatum; labris sulcatis; sporidiis biseriatis magnis oblongis hyalinis uniseptatis medio contractis.

On twigs of *Quercus aquatica*. Alabama, Beaumont. No. 4637.

Soon liberated from the cuticle, elevated from the bark, often narrowed at the base, elliptic, at first greenish from a fine powdery coat, which soon wears off; lips sulcate; disc greenish; sporidia in two rows, oblong, uniseptate, constricted in the middle, .003 long; the endochrome has frequently a little emargination.

797. **Hysterium variegatum.** *B. & C.*—Elongatum elevatum acutum; rima conspicua; sporidiis filiformibus.

On twigs of *Andromeda acuminata*. Car. Sup. No. 447. On *Andromeda arborea*. No. 288. On *Andromeda coriacea*. Car. Inf. No. 2449. On *Andromeda nitida*. No. 634.

I cannot distinguish Ravenel, No. 1743, on *Aralea spinosa*.

798. **Hysterium rufilabrum.** *B. & C.*—Ellipticum obtusum e macula pallida oriundum labiis rufis; ascis clavatis; sporidiis breviter fusiformibus hyalinis.

On twigs of *Acer striatum*. Car. Inf. No. 341.

Obtuse, elliptic, growing on a pallid spot, lip rufous; asci clavate; sporidia shortly fusiform, hyaline, .0006 long. Sporidia very different from those of neighbouring species.

799. **Hysterium Petersii.** *B. & C.*—Cuticula conditum ellipticum elongatumve flexuosum sporidiis filiformibus.

On cedar. Alabama, Peters. No. 4016.

Covered by the cuticle, elliptic, or elongated and flexuous; sporidia filiform. This does not grow on a pallid spot.

* **Cordiceps ophioglossoides.** *Fr.*—New England, Sprague. No. 5276.

* **Cordiceps capitata.** *Fr.*—On *Elaphomyces variegatus.* Car. Inf. No. 2460. New England, Sprague. No. 3273. Alabama, Peters. No. 4828.

* **Cordiceps entomorrhiza.** *Fr.*—Car. Inf. No. 2613. Ravenel.

* **Cordiceps militaris.** *Fr.*—Car. Sup. No. 451. Alabama, Peters. No. 5245. A small variety.

* **Cordiceps Ravenelii.** *B. & C. Journ. Linn. Soc. i. p. 159, tab. 1. fig. 4.*

On larvæ of *Ancylonycha.* Car. Inf. No. 3080. Ravenel. No. 1272. Texas, C. Wright. No. 3155.

* **Cordiceps acicularis.** *Rav., l. c. p. 158., tab. 1. fig. 2.*—On larvæ. Car. Inf. Ravenel. No. 1276.

* **Cordiceps stylophora.** *B. & Br., l. c. p. 158, tab. 1. fig. 3.*—On larvæ in rotten logs. Car. Inf. No. 1325.

* **Cordiceps palustris.** *B. & Br., l. c. p. 159, tab. 1, fig. 5.*—On larvæ in moist putrid logs. Northampton Swamp, Ravenel. No. 718.

* **Cordiceps armeniaca.** *B. & C., l. c. p. 158, tab. 1, fig. 1.*—On birds' dung, probably on remains of insects. Car. Inf. No. 3774.

* **Claviceps purpurea.** *Tul.*—On *Glyceria fluitans.* Montreal, Dr. MacLagan. No. 543. *Spermodia Paspali,* Car. Sup. No. 465; and Ergot on *Tripsacum dactylodes,* No. 455. Has been observed in the barren state only.

* **Epichloe typhina.** *Tul.*—On living grasses. Santee River. No. 1630.

800. **Hypocrea Petersii.** *B. & C.*—Agariciformis; stipite rugoso; peritheciis periphericis; ascis linearibus; sporidiis globosis.

Alabama, Peters. No. 5251.

At first sight this looks like an Agaric infested with some *Hypomyces*, but the fructification is exactly that of an *Hypocrea*. Stem irregular, dilated upwards, about an inch high; head orbicular, irregular, rufous; perithecia both on the under and upper sides; sporidia globose in linear asci.

801. **Hypocrea tuberiformis.** *B. & Rav.*—Magna tuberiformis mycelio radiato albo affixa.

On stems of *Arundinaria.* Car. Inf. Ravenel. No. 1220.

Forming either a large mass $\frac{3}{4}$ of an inch across, or two or three distinct subglobose individuals, fixed to the stem by a radiating white rugose mycelium; at first yellowish, then black.

* **Hypocrea rufa.** *Fr.*—On moist decayed wood. Car. Inf. No.

2953. On *Polyporus*. No. 2722. On Oak. Santee Canal, Ravenel. No. 1935. Conidiiferous state. Car Inf. 1014, 1902, 2486. Car. Sup. 1780.

802. **Hypocrea Richardsoni.** *B. & Mont.*—Orbicularis rubra, plana vel corrugata sparsa vel congesta; sporidiis ellipticis. *Tubercularia pezizoidea*, Schwein.

On poplar. Maine, Blake. New England, Russell. No. 5870. No. 4506, Mountains of New York, is a small variety.

Bright rufous-red, orbicular, scattered, plane, or crowded and corrugated; asci clavate; sporidia elliptic. First gathered in one of the Arctic Expeditions by Sir J. Richardson.

* **Hypocrea gelatinosa.** *Fr.*—Car. Inf. No. 1136, 1641. Ravenel. No. 1299. On *Carya*. No. 4242.

803. **Hypocrea viridi-rufa.** *B. & Rav.*—Major subglobosa congesta viridi-rufa; ostiolis impressis; ascis linearibus; sporidiis oblongis truncleatis.

On *Alnus serrulata*. Santee Canal. Car. Inf. Ravenel. No. 1846.

Subglobose, congested, or confluent, greenish-rufous; asci linear; sporidia oblong with two nuclei.

804. **Hypocrea Ravenelii.** *B.*—Pulvinata rugosa rubra; ascis clavatis; sporidiis biseriatis fusiformibus demum triseptatis.

On *Ostrya Virginica*, *Acer rubrum*. Car. Inf. No. 1575.

Small, pulvinate, at first even, then rugose, bright rufous-red; asci clavate; sporidia biseriate, fusiform, at length triseptate, .0015-.0016 inch long. Allied to *H. Richardsoni*.

* **Hypocrea contorta.** *B. & C. Sphaeria contorta*, Schwein.—Car. Sup. No. 230, 364. On Cherry. No. 367. On Oak. No. 445. On *Liquidambar*. Ravenel. Car. Inf. No. 1366.

* **Hypocrea lenta.** *Fr.*—On *Nyssa*. No. 2190. On willow. Car. Inf. Ravenel. No. 970. On pine. No. 1375.

* **Hypocrea stereorum.** *B. & C. Sphaeria Stereorum*, Schwein.—On *Polyporus Curtisii*, B. Car. Inf. No. 1079.

805. **Hypocrea chlorospora.** *B. & C.*—Parva atra viridi-pruinosa; ostiolis prominulis; ascis linearibus; sporidiis globosis viridibus.

Mountains of New York. No. 4466.

Small, pulvinate, black, with a greenish bloom; asci linear; sporidia globose, .00018 inch in diameter, green.

806. **Hypocrea solenostoma.** *B. & Rav.*—Subglobose pallide rufa ostiolis elongatis cylindricis; sporidiis globosis.

On decaying *Pachyma Cocos*. Car. Inf. No. 1319. Santee Canal, Ravenel.

Subglobose, pale rufous, rather irregular; ostiola cylindrical; spores globose, .00016 inch in diameter.

807. **Hypocrea ochroleuca.** *B. & Rav.*—Effusa ochroleuca in mycelio pallido sparsa.

On *Myrica cerifera*. Car. Inf. No. 1635. Ravenel. No. 1382.

Effused, thin, ochro-leucous, seated on a pale mycelium, with a barren border, often cracked when old.

* **Hypocrea citrina.** Fr.—Car. Inf. No. 1448. On *Cyrilla*. No. 2661. Varying in intensity of colour.

808. **Hypocrea polyporoidea.** BC.—Peritheciis tomentosus liberis in crustam pallidam insidentibus.

On beech. Alabama, Peters. No. 6110.

Fawn-coloured; perithecia free, tomentose, with a naked ostium seated on a pale crust, here and there elevated, which is thin towards the margin. A very curious species.

809. **Hypocrea armeniaca.** B. & C.—Effusa armeniaca tomentosa; peritheciis superficialibus saturatoribus.

New England, Sprague. No. 6269.

Forming a thin tomentose apricot-coloured striatum, which when barren looks like *Corticium ochroleucum*, at length fertile, perithecia scattered, of a deeper tint. There is a form of this species which occurs on the naked soil. New England, Murray. No. 5714.

810. **Hypocrea parasitans.** B. & C.—Minuta subelliptica pruinosa pallida; sporis majoribus globosis.

On *Hydnum erinaceum*. No. 6190.

Minute, pallid, subelliptic, sometimes winding round the teeth; spores globose, rather large.

811. **Hypocrea subviridis.** B. & C.—Effusa pallide viridis tomentosa in mycelium niveum insidens.

On dead grass leaves. Car. Inf. No. 4955.

Effused; perithecia pale dull green, tomentose, crowded, seated on a white mycelium. A curious species.

* **Hypocrea atramentosa.** B. & C.—Journ. Linn. Soc., x., p. 377.

On leaves of *Andropogon*. Alabama, Beaumont. No. 4018.

* **Hypomyces aurantius.** P.—Grev. tab. 78.

On *Stereum*. Car. Inf. No. 3286.

On the underside of oak logs. Ravenel. No. 1457.

* **Hypomyces asterophorus.** Tul. Carp. iii., p. 54.—On *Nyctalis*. Ravenel.

* **Hypomyces luteo-virens.** Fr.—On *Agaricus alutaceus*. Car. Inf. Ravenel. No. 1105. Pennsylvania, Michener. No. 3971. Var. *viridis*. New England, Sprague.

* **Hypomyces lateritius.** Tul., l. c. p. 62.—New England, Murray. No. 5366. Sprague, No. 5776. On *Lactarius Indigo*. Car. Sup. No. 6415.

* **Hypomyces tomentosus.** Fr.—On some *Agaric*. No. 6189.

812. **Hypomyces tegillum.** B. & C.—Mycelio pergamentaceo; peritheciis ovatis rufis.

On pine. Car. Inf. No. 2606.

Perithecia brown, scattered over a continuous white mycelium like thin parchment.

* **Hypomyces ochraceus.** Tul., l. c. p. 41.—On decayed *Agarics*. Pennsylvania, Michener. No. 3606.

* **Hypomyces rosellus.** A. & S.—Pennsylvania, Michener. No. 4383.

* **Hypomyces asterophorus.** Tul., Carp. iii., p. 54.—Car. Inf. Ravenel. No. 1497.

* **Nectria episphæria.** Fr.—On *Ustulina*. Car. Inf. No. 2952.

* **Nectria Peziza.** Fr.—Car. Inf. No. 1907, 2508, 2711, 3855. Boston, Murray. No. 6236.

* **Nectria muscivora.** B.—“Cooke Handb.,” p. 786. Car. Inf. No. 1003.

* **Nectria ochroleuca.** Schwein.—On *Morus multicaulis*. Car. Sup. No. 144.

* **Nectria dematiosa.** Schwein. On *Morus rubra*. Car. Sup. No. 289, 838.

Sporidia oblong, slightly curved, uniseptate, .00085-.00057 inch long, from an authentic specimen.

* **Nectria cucurbitula.** Fr.—Car. Inf. On *Melia*. No. 1400. On *Prunus*. No. 1418. Ravenel. On *Ficas*. No. 1810. On *Acer*. New England, Sprague. No. 5836.

Sporidia sausage-shaped, innumerable, .000125 inch long.

In No. 4688 I find the minute sporidia within several long linear bodies, and endowed with molecular motion. This is the only specimen in which I have observed such a structure; in all the others the sporidia are free.

* **Nectria sanguinea.** Fr.—Car. Inf. No. 2445. Ravenel. No. 1570. Virginian Mountains, on *Juglans*. No. 3321.

Ravenel's specimens are accompanied by *Atractium flammeum*.

* **Nectria coccinea.** Fr.—Car. Inf. No. 840. On *Morus multicaulis*. No. 1085. On *Melia*. No. 1879. On *Prunus*. No. 1416. On *Magnolia glauca*. No. 2691. Ravenel. On *Acer* and *Quercus*. No. 1557, 1393. Car. Sup. On *Liriodendron*. No. 889. *B. parasitica*. No. 843. New England, Sprague. No. 5816.

813. **Nectria peponum.** B. & C.—Minima sparsa coccinea; sporidiis oblongis uniseptatis.

On dead gourds. Car. Inf. No. 2230, 2384. On tomato. No. 2124. Santee Canal. Ravenel. No. 1786.

Very small, scarlet, scattered; sporidia oblong, uniseptate. It looks at first sight as if it were seated on a smooth white mycelium, but it is only the external coat of the gourd.

Var. **aurelia.** Sporidia simple. Car. Inf. No. 1393. It is possible that this may be merely the same thing in a younger state.

THE RESTING-SPORES OF THE POTATO DISEASE.

By W. G. SMITH, F.L.S.

The potato disease in this country is rarely seen before the month of July, but this year I received some infected leaves for examination from the editors of the "Journal of Horticulture" at the beginning of June, and my reply to the correspondent was printed on June 10. The leaves were badly diseased, and I detected the *Peronospora* in very small quantities here and there, emerging from the breathing pores. This was a week or ten days before Mr. Berkeley brought the matter before the Scientific Committee of the Royal Horticultural Society, and when I heard Mr. Berkeley's remarks about the *Protomyces*, I immediately accused myself of great carelessness in possibly overlooking it; but I was equally certain of the presence of the *Peronospora* in the specimens I examined.

On receiving authentic specimens of diseased plants from Mr. Barron, of Chiswick, the brown spots on the potato leaves at once reminded me of the figures of some species of *Protomyces*, and the dimensions agreed tolerably well with some described plants of that genus, but the spots, when seen under a high power, appeared very unlike any fungus, and they were very sparingly mixed with other bodies much smaller in diameter, and with a greater external resemblance to true fungus spores. These latter spore-like bodies were of two sizes—one transparent and of exactly the same size as the cells of the leaf (and therefore very easily overlooked), and the other dark, reticulated, and much smaller. A few mycelial threads might be seen winding amongst the cellular tissue, and these threads led me to the conclusion that the thickened and discoloured spots were caused by the corrosive action of the mycelium, in the same way as Peach, Almond, Walnut, and other leaves are thickened, blistered, and discoloured by the spawn of the *Ascomyces*, as illustrated at the last meeting of the Society.

My opinion, therefore, was soon formed that the "new" potato disease (as it has been called) was no other than the old enemy in disguise, or, in other words, that it was the old *Peronospora infestans* in an unusual and excited condition. That climatic conditions had thrown the growth of this fungus forward and out of season was probable; but the idea that the pest would not at length attack all and every sort of potato was to me most unreasonable, though the more tender sorts might be the first to suffer.

Suspecting the two-sized small bodies before mentioned to be of the nature of spores, and remembering my experiments during last autumn with ketchup, in which I observed that the spores of the common mushroom might be boiled several times, and for lengthened periods, without their collapsing or bursting, I thought I would try to set free the presumed spores of the potato leaves by macerating the foliage, stems, and tubers in cold water. This maceration

was necessary because the tissue of the diseased leaves was so opaque and corroded, and the cell-walls were so thickened that it was difficult to distinguish the threads and suspected spores from the cellular tissue. I did not treat the leaves with boiling water, because I wished to keep the threads and spores alive.

From day to day I kept the diseased leaves and stems and tubers wet between pieces of very wet calico, in plates under glass, and I immediately noticed that the continued moisture greatly excited the growth of the mycelial threads; this to me was quite unexpected, as I had merely wished to set the spore-like bodies free. So rapid was now the growth of this mycelium that after a week had elapsed some decayed parts of the lamina of the leaf were traversed in every direction by the spawn. Thinking the close observation of this mycelium in the now thoroughly rotten and decomposed leaves might end in some addition to our knowledge of *Peronospora infestans*, to which fungus I had no doubt from the beginning that the threads belonged, I kept it under close observation, and in about ten days the mycelium produced a tolerably abundant crop, especially in the abortive tubers of the two-sized bodies I had previously seen, and measured in the fresh leaves. The reason why these objects, which undoubtedly occur in and about the spots, are so extremely few in number in those positions is, I imagine, because they require a different set of conditions for their normal growth, and these conditions are found in abundant and continued moisture.

The larger of these bodies I am disposed to consider the "oospore" of the potato fungus, and the smaller bodies I look upon as the "antheridia" of the same fungus, which are often terminal in position. The filaments of the latter are commonly much articulated, and sometimes more or less moniliform or necklace-like. Both oospore and antheridium are very similar in nature and size to those described as belonging to *Peronospora alsinearum* and *P. umbelliferum*, and this is another reason (beyond my seeing undoubted *P. infestans* on potato leaves at the beginning of June) why I am disposed to look upon these bodies as the oospore and antheridium of the potato fungus.

The larger bodies are at first transparent, thin, pale brown, furnished with a thick dark outer wall, and filled with granules; at length a number (usually three) of vacuities or nuclei appear. The smaller bodies are darker in colour, and the external coat is marked with a few reticulations, possibly owing to the collapsing of the outer wall. At present, I have been unable to detect any fecundating tube (described as belonging to the antheridium of other species of *Peronospora*), but I have observed the two bodies in contact in several instances. After fertilisation has taken place, the outer coat of the oospore enlarges, and appears to be cast off. Both antheridium and resting spore are so slightly articulated to the threads on which they are borne that they are detached by the slightest touch, but with a little care it is not really difficult to see

both bodies *in situ*; and my observations lead me to think that conjugation frequently takes place after both organs are quite free. The antheridia and oospores are best seen in the wettest and most thoroughly decomposed portions of the tissue of the decomposing tuber, but they occur also in both the stem and leaf. I consider Mr. Alexander Dean's remark, as reported in "Gardeners' Chronicle" for June 19 last, p. 795, to have a distinct bearing on this point, where he says:—"In all cases where the seed tubers were cut they were quite rotten."

Before I referred to De Bary's measurements of similar organs in other species of *Peronospora*, I was disappointed with the results of my observations, and felt disposed to refer the bodies and threads in the potato leaves to *Saprolegnia*, but a glance at the figures which I shall shortly publish, and the similar figures copied from De Bary to the same scale, will show that if the bodies observed by me are *Saprolegnia*-like, the oospores and antheridia figured by De Bary show an exactly similar alliance. Still, as the *Saprolegniæ* are at present defined, I am by no means inclined to describe the bodies observed by me as really belonging to that tribe of plants.

The *Saprolegniæ* have the habit of moulds and the fructification of *Algæ*, and they live on organic matter, animal and vegetable, in a state of putrefaction in water. One of the best known of these plants is *Botrytis Bassiana*, the parasite which causes the disease of silkworms. Now the genus *Botrytis* amongst fungi is almost or quite the same with *Peronospora*, to which the Potato disease belongs; and I consider it a strong argument in favour of my *Saprolegnia*-like bodies being the oospores and antheridia of the *Peronospora* when such an authority as Mr. Berkeley ("Micrographic Dictionary," p. 6) considers one of the *Saprolegniæ* (*Achlya*) "may be an aquatic form of *Botrytis Bassiana*"—the silkworm disease.

The common fungus which attacks flies (so frequently seen on our window-panes in autumn), *Sporendonema muscæ*, Fr., is said to be a terrestrial condition of *Saprolegnia ferox*, Kutz., which latter only grows in water; and if a fly infected with the fungus be submerged the growth of the *Saprolegnia* is the result. It would now seem to be somewhat the same with the potato when diseased, in the fact that when submerged a second form of fruit is produced.

Between the two moulds, *Botrytis* and *Peronospora*, there is little or no difference; the characters of Corda, founded upon the continuous or articulate filaments, cannot be relied upon, and even De Bary himself figures *P. infestans* with articulate filaments, like a true *Botrytis*. The intimate connection, however, between the *Saprolegniæ* and some moulds cannot be denied, as the instances above cited clearly show; and I am therefore disposed to think that the fungus which produces the potato disease is aquatic in one stage of its existence, and in that stage the resting spores are formed.

Reference should here be made to the bodies found germinating in the intercellular passages of spent potatoes by Dr. Montagne (*Artotrogus*), and referred by Mr. Berkeley to the *Sepedonie*. Ever since Mr. Berkeley first saw these bodies he has had an unswerving faith in the probability of their being the secondary form of fruit of *Peronospora infestans*, but unfortunately, as far as I know, no one has ever found a specimen of *Artotrogus* since Montagne.

The question may, therefore, be naturally asked, in conclusion—How does *Artotrogus* agree with the presumed resting spores here figured and described? And has Mr. Berkeley been right or wrong in clinging so tenaciously to his first idea? Fortunately for the investigation of the potato disease (which can never be cured till it is understood), Mr. Berkeley has given in the “*Journal of the Royal Horticultural Society*” the number of diameters his figures are magnified to, and I have here further enlarged those figures so as to correspond in scale with my own drawings, which latter are sketched with a camera lucida. It will be seen that they are the same with each other both in size and habit, with the exception of the processes on the mature spore of *Artotrogus*—which processes may possibly be mere mycelial threads, or due to the collapsing of the inflated epispore. The reason these resting-spores have evaded previous search is that no one has thought of finding them amongst leaves which had been macerated for a long period in waert. There is, however, nothing unreasonable in fruit being perfected in water or very damp places, as it is common in the *Saprolegniæ* and amongst *Algæ* in general. To sum up, there are four reasons why the bodies here described belong to the old potato disease:—

1. Because they are found associated with the *Peronospora* and upon the potato plant itself.
2. Because they agree in size and character with the known resting-spores of other species of *Peronospora*.
3. Because some other moulds are aquatic in one stage of their existence.
4. Because they agree in size with *Artotrogus*.

I will only say in conclusion that it affords me great pleasure to lay these additional notes on the potato disease before the Society which thirty years ago published Mr. Berkeley's original and excellent memoir on the same subject.—*Gardener's Chronicle*, July 10, 1875.

N.B.—Mr. W. G. Smith has also published in the succeeding numbers of the same *Journal*, July 17th and July 24th, further particulars and details of this subject with illustrations, to which we must refer our readers, as confirming and extending the observations above recorded.—*Ed. Grev*.

NOVA ASCOMYCETUM GENERA.

By P. A. SACCARDO.

I. **Fracchiæa**. Sacc. Myc. Ven. 115, tab. xii. f. 3—7.

Perithecia carbonacea, aggregata, raro subsparsa, erumpentia, v. cortice delapso, superficialia, macula stromatica nigricante insidentia, orstolo brevissimo denique umbilicato. Asci polyspori, paraphysibus nullis. Sporidia valsea, i.e., cylindracea utrinque rotundata, curvula, hyalina. Spermata, in peritheciis ascophoris juvenilibus, minima, cylindracea, curvula, hyalina.

Species: *Fracchiæa heterogenea*, Sacc., l. c. et Mycoth. Ven. I., No. 88.

Obs. Genus peraffine *Coelosphariæ*, Sacc. (= *Nitschkiæ* Otth.), a quo inprimis ascis polysporis recedit.

II. **Thyridaria**. Sacc. Mycoth. Ven. II., No. 170.

Perithecia carbonacea, aggregata, raro subsparsa, crusta stromatica nigricante subcorticali insidentia et cum ea in acervulos subvalseos connexa, tecta, dein saepe erumpenti-liberata. Asci octospori paraphysibus copiosis obvallati. Sporidia oblongata, plurilocularia (non muriformia) fuliginea. Status pyenicus et micropycnidicus cogniti.

Species: *Thyridaria incrustans*, Sacc. l. c. *Cucurbitaria Broussonetii*, Sacc. Myc. Ven. 118, t. xii., f. 12-17.

Obs. Genus stromate manifestissimo instructum, *Thyridio* affine, a quo præcipue sporidiis non muriformibus dignoscitur.

III. **Thyronectria**. Sacc.

Perithecia ceraceo-membranacea, contextu rubescente, subdiaphano nectriacea, in cortice nidulantia ibique in acervulos valseos aggregata, tecta v. tandem erumpentia, ostiolis papillatis, brevibus. Asci octospori, paraphysati. Sporidia oblonga, v. ovoidea, initio transverse et longitudinaliter pluriguttulata dein tenuiter muriformia, hyalina.

Species: *Thyronectria Patavina*, Sacc. (edenda).

Obs. Genus ob contextum perithecis et sporidia diaphana ad *Nectriam* v. *Calonectriam* vergens, ob stromata immersa, valsea et ob sporidia muriformia ad *Thyridium* accedens, inter utrumque medium.

IV. **Passerinula**. Sacc.

Perithecia membranaceo-mollia, pallida, in stromate v. in peritheciis pyrenomycetum majorum (ex. gr. *Thyridii* et *Valsariæ*) omnino immersa, nunc inordinate aggregata, nunc discreta, globosa, minuta; nucleo farcto candido; ostiolis cylindraceutis, plus minus alte exsertis, incurvis, albidis. Asci octospori, paraphysati. Sporidia oblonga v. ovoidea, 1-septata et ob guttas duas septo utrinque appositas simulate 3-septata, dilute fuliginea.

Species: *Passerinula candida*, Sacc. (edenda).

Obs. Genus, Nectriaceis subaffine, egregio mycologo T. Passerini in Parmensi Universitate Botanices Professori dicatum; quod

Passerinia vocare non oportet ex eo quod jam extat nimium affine nomen Passerina.

V. **Phomatospora.** Sacc.

Perithecia membranacea, discreta, minuta, tecta, v. erumpentia, ostiolo papillato, brevi. Asci cylindræco-filiformes, aparaphysati, octospori. Sporidia phomatoidea, p. e. oblonga, continua, 2-gattulata, hyalina. Status spermogonicus *Phomam* referens.

Species: 1. *Phomatospora Berkeleyi*, Sacc., *Sphæria phomatospora B. et Br.*, "Cooke Brit. Fung.," 884.

2. *Phomatospora ovalis* (Pass.) Sacc. *Sphæria ovalis*, Pass., in "Erb. Critt. Ital.," ser. ii., No. 642.

VI. **Patinella.** Sacc.

Cupulæ sessiles, patellatæ, marginatæ, totæ atræ, ceraceo-lentæ, duriusculæ; excipulo minute prosenchymatico, fuligineo; disco concaviusculo, v. subplano. Asci octospori, paraphysati. Sporidia ovoidea, continua, minuta, hyalina. Paraphyses filiformes apice conidia spherioidea, fusca, mox secedentia gerentes.

Species: *Patinella hyalophæa*, Sacc. (edenda).

Obs. Genus inter Discomycetes paraphysibus conidia fusca gerentibus sporidisque minutis hyalinis insigue, nec ulli mihi noto affine.

SPHAGNUM LARICINUM, &c.

Dr. Braithwaite, in continuation of his valuable papers on "Bog Mosses" in the "Monthly Microscopical Journal," has detailed the varieties of *Sphagnum laricinum* as follows:—

Var. β **teretiunculum.** Lindb.

Branches crowded, terete, usually incurved or more or less circinate. Stem leaves large, oblong, obtuse, the apex somewhat fringed or toothed. Branch leaves short, very broad, concave.

Marshy places in woods.

Sweden, Lapland, Finland, Dovrefjeld Mountains Norway, New Jersey.

Var. γ **platyphyllum.** Lindb.

Branches short, rather obtuse, with imbricated leaves. Stem leaves lingulate, with distinct auricles composed of projecting hyaline cells. Branch leaves rounded-ovate, pointed, very broad and concave.

Marshy places in woods in subalpine districts.

Sweden, Lapland, Finland, Norway, Estland, North Wales, New Jersey.

Var. δ **cyclophyllum.** Lindb. (*Sph. obtusifolium* var. β *turgidum*. Hook & Wils.)

Stems short, turgid, 1-3in. long, quite simple or with one or more short solitary branches. Stem leaves very large, orbicular, deeply concave and cucullate, pale greenish white.

Moist peaty places in mountain districts.

Aland Islands, Shore of Loch Katrine, New Orleans, Alabama, New Jersey.

Dr. Braithwaite then intimates his intention to add descriptions of three natives of North America which have not yet been found in Europe, and commences with—

Sphagnum Pylaiei. Bridel. (*Sullivant Icon. Musc.*, p. 12, t. 6.)

Dioicous? olive green, fuscous, or blackish; stem erect, undivided, slender, 2-4in. high with a single layer of small cortical cells, and a narrow reddish brown woody layer; branches all solitary or in pairs at the lower part of the stem, short, terete, obtuse, arcuato-decurved, the cortical cells small, retort cells few, narrowly cylindrical, not recurved at apex.

Stem leaves numerous, laxly imbricated, erect, ovate-oblong, concave, rounded and minutely erose at apex, the hyaline cells fibrillose. Branch leaves laxly imbricated, very small, ovate, obtuse, the margin incurved in the upper third, entire at apex; hyaline cells with strong annular fibres, and without pores, in section circular, separated both in front and back by the chlorophyll cells, which are very thick and obtusely trigonous.

Peat bogs.

Newfoundland, Table Rock, S. Carolina, New Hampshire, New York, New Jersey.

Var. β **sedoides.** Lindb. (*Sph. sedoides* Bridel, *Bry. Un. i.*, p. 750.

Stem procumbent at base 3-5in. high, simple or with a few short, scattered branches, fragile, flaccid, dull pale green, the upper part vinous red. Leaves large, very densely imbricated, oblong-ovate, concave, obtuse, entire, or eroso-denticulate, with a border of two rows of extremely narrow cells; hyaline cells elongated, with annular fibres, and very few minute pores. Branch leaves similar but smaller.

Peat bogs.

Newfoundland, S. Carolina, New York.

Sphagnum Pylaiei and its variety have been regarded by most authors as doubtful species, partly because they have never been found in fruit; the structure of the leaves and stem is, however, so distinct that there can be no hesitation in maintaining the right of *S. Pylaiei*, as the most highly developed form to the title of specific rank.—*Monthly Micro. Journ.*, June, 1875.

Sphagnum Portoricense. Hampe (*Linn.* 1852, p. 359.)

Dioicous? in large soft tufts, pale fuscous below, pale glaucous green above. Stems 8-14 in. high, stout, simple or bipartite, firm, pale brown; cortical cells in 2-3 layers, containing spiral fibres, but few pores. Stem leaves auricled, erect or deflexed, subquadrate-ovate, fringed round the entire margin, upper cells rhomboidal, lower elongated, all without fibres or pores.

Ramuli 4-5 in a fascicle, 2-3 divergent, arcuate-patent, sub-

clavate-fusiform, attenuated at base, the leaves julaceously imbricated; pendent branches more slender, lax. Cuticular cells spirally fibrillose with few pores, the transverse walls geniculate downwards into the adjacent cell, usually having a pore at the apex of the bend.

Leaves of the divergent branches small below and widely cordate or semicircular, becoming larger above, narrower at base, the median orbiculate-ovate, squamoso-scabrous at back of the strongly cucullate apex, very narrowly margined, all minutely fimbriate throughout, the fibrils of the fringe formed of the commissural walls of destroyed hyaline cells; lower hyaline cells elongatorhomboidal, upper rhombic, with numerous strong papillæ internally on the wall combined with the chlorophyll cells, all fibrillose, with several large pores at the margin; chlorophyll cells triangular in section, interposed between the hyaline on the concave surface of leaf. Fruit unknown.

Swamps in mountain districts.

Porto Rico. New Jersey.

Sphagnum macrophyllum, *Bernh. (Brid. Bry. Univ. i. p. 10).*

Dioicous, pale olive green, fuscous below, when dry glossy and shining. Stems 6-10 in. high, rather rigid, very fragile, fuscous, simple or dichotomous by innovation, with 2-3 layers of cortical cells. Branches crowded in a spinose capitulum 3-4 in a fascicle, uniform and similar, divergent, dependent, straight, subflabellate; lax leaved, the cortical cells short, uniform, with few pores. Stem leaves minute, very broad at base, ovate-oblong, obtuse, entire, the hyaline cells rhomboid, without fibres, but with 1-3 central pores. Branch leaves rather rigid, subdistichous, small at base of branch, soon becoming elongated, narrowly lanceolate, and lanceolate-subulate, involute-concave, bordered by 1-2 rows of extremely narrow cells, apex somewhat truncate, with 7-8 teeth. Hyaline cells elongate, flexuose-fusiform, with 6-10 pores in a longitudinal median line; free from fibres. Chlorophyll cells circular in section, separating the hyaline both in front and back.

Fruit in the upper fascicles or in the coma, divergent; perichæatial bracts 6-9 lax, oblong-ovate, uppermost convolute, truncate, and toothed at apex, the areolation resembling that of the branch leaves. Capsule small on a shortish slender peduncle; spores sulphur coloured. Male plant and prothallium unknown.

North America (near Philadelphia, in Louisiana, Alabama, Mississippi, New Jersey). *Braithwaite, in Monthly Micro. Journ., Aug., 1875.*

MYCOGRAPHIA.—An announcement is made on the cover of this Journal of the speedy issue of the first part of a new work containing coloured figures of Fungi, to be continued at intervals of about six months.

LICHENOLOGICAL MEMORABILIA, No. 8.

By the REV. W. A. LEIGHTON, B.A. Camb., F.L.S., F.B.S. Ed.

On Lecidea trochodes, (Tayl.), Leight.

The aim and object of every student of natural productions in his researches and investigations ought to be the eliciting and establishment of truth. Nevertheless, notwithstanding the utmost care and careful observation, errors will inadvertently occur. The detection of such errors, from whatever cause arising, only makes the truth shine more clearly and distinctly. The pointing out of such errors ought not to be considered an invidious task; only let it be done in a courteous and gentlemanly manner. To do so in a sneering and acrimonious spirit and way is derogatory from the dignity of science, and unworthy of a true son of science, since it can only rebound unfavourably against himself.

Dr. Th. M. Fries, in his "Lichenographia Scandinavica," part 2, p. 531, under *Lecidea trochodes*, (TAYL.), LEIGHT., quotes as synonymous and identical the four following lichens, viz. :—

Rimularia limborina, Nyl. Flora, 1868, p. 346. Leight. Lich. Fl., p. 406.

Lecidea inferior f. *subgyrosa*, Nyl. Not. Sällsk., p. F. et Fl. F. Förh., xiii. p. 339.

Lecidea inconcinna, Nyl. Flora, 1872, p. 357.

Lecidea subgyratula, Nyl. Flora, 1873, p. 296.

with this observation :—"Insignis facillimeque determinata species, quam qui semel vidit, dein mox agnoscat. Vix igitur intelligitur, cur cel. Nylander ultimis annis hanc saltem quatuor üsdemque diversissimis nominibus designaverit. Expressis igitur verbis declaratum volumus, omnia supra allata synonyma examine niti speciminum authenticorum."

Dr. Fries further states that the peculiar structure of the apothecium upon which Dr. Nylander founds his genus *Rimularia* arises from the circumstance that the paraphyses becoming dead, subcarbonaceous, and fuscous-black, especially at their apices, form a continuous or partial carbonaceous stratum over the epithecium or disk. But that the apothecia are really lecideine and similar to those observed in several species of the genera *Gyrophora* and *Lecidea*, the result of a similar deformation, and that an entire perithecium involving the hymenium is purely imaginary.

What *Lecidea inferior* f. *subgyrosa*, NYL., and *Lecidea inconcinna*, NYL., may prove to be, I have no means of ascertaining, as I have never seen authentic specimens of those lichens. But I possess a fragment of the original specimen which Dr. Taylor collected on Carig Mountain, county Kerry (preserved in Herb. Borrer. at Kew), and which he published in his "Flora Hibernica," p. 259, as *Opegrapha saxigena* var. *trochodes*. This I showed in

my "British Graphideæ" (1854), p. 13, t. 5, f. 8, to be actually a *Lecidea*, which now bears the name of *L. trochodes*, and I have been informed on good authority that Dr. Nylander only knows the plant from this figure in my Monograph.

By the kindness of Mr. Crombie I have been permitted the microscopic examination of the unique specimen of *Rimularia limborina*, NYL., which he gathered on Craig Guie, Braemar, and which bears this name in Dr. Nylander's own handwriting. This examination shows that *Lecidea trochodes* and *Rimularia limborina* are perfectly identical both in external characters and internal structure and formation, except that the spores, in other respects identical are in the latter plant slightly larger, but still only so in a degree observable in most lichens, and not sufficiently dissimilar to separate the plants. As figures convey more distinct and adequate ideas than mere descriptions, I here add figures of the structure of the two plants and their spores (see plate 52, figures 1 and 2). From this it will be evident that *Rimularia limborina*, NYL., must be erased from our British Lichen-Flora, and merged in *Lecidea trochodes*, (TAYL.).

Mr. Crombie has also supplied me with an authentic specimen of *Lecidea subgyratula*, NYL. This possesses umbonate apothecia, resulting most probably from the same deformation as stated by Dr. Fries with regard to *L. trochodes*. But in *L. subgyratula*, NYL., the spores are colourless, and only half the size of those of *L. trochodes* (see fig. 3); consequently this must be considered a good and distinct species, and that Dr. Fries is in error in regarding it as synonymous and identical with *L. trochodes*.

EXPLANATION OF PLATE 52.

- L. trochodes.* (e) Section of apothecium. (g) Apothecium as seen from above.
 (f) Spores magn. 1200.
Rimularia limborina. (c) Section of apothecium. (d) Spores magn. 1200.
L. subgyratula. (a) Section of apothecium. (b) Spores magn. 1200.
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"ATLAS DER DIATOMACEENKUNDE."

The fourth and fifth parts of this work are now issued. Plate 13 contains a continuation of the *Panduriform navicula* (*Diploneis* group), viz., *N. didyma*, *N. gemma*, and its varieties, *egena*, and *densestriata*; *N. prominula*, *N. futilis*, *N. gemmatula*, *N. Kützingii*, *N. diplosticta*, *N. splendida*, *N. bomboides*, *N. muscæformis*, *N. entomon*; besides these are several "critical forms" given for comparison; these seem to unite several of the so-called species. Forty-nine figures are given; making in all 154 figures of this group.

Plates 14 to 18 inclusive are devoted to the genus *Campylo-discus*, and contain 118 figures. About one-half of these are

given as distinct species (many of them new), the remainder represent "critical forms" and varieties.

Plates 19 and 20 contain the following forms of *Surirella*, viz., five varieties of *S. fastuosa*, *S. recedens*, *S. intercedens*, *S. Collare*, *S. sentis*—a very fine and remarkable form the ridges of the canaliculi are distinctly spinous. *S. fausta* (the sp. name of *australis*, Pl. iv., fig. 20, to be deleted); this species is probably only a variety of *S. lata*. *S. deflexa*, distinguished by the sigmoid outline of the median space; *S. lepida* resembles *S. striatula*, *S. anfractuosa*, *S. arabica*, *S. Baldjiki*. The above forms belong to the *fastuosa* type. *S. Gründleri*—this, the author thinks may be only a variety of *S. pulchra*, *S. Febigerii*, *S. inducta*, and *S. Kurzii*.

In the five parts now issued we find 64 figures of *Surirella*; 19 of these represent forms of *S. fastuosa*. I am inclined to think that all forms with a striated border to the median space should be considered as merely variations (not varieties) of *S. fastuosa*. It is, perhaps, open to doubt whether it is desirable to figure so many forms exhibiting only the minutest differences. If this plan is carried out, this work will contain at least 30,000 figures. The following is a list of the genera already published, with the number of figures illustrating them:—

Actinoptychus	-	-	26
Campylodiscus	-	-	123 (not completed).
Cocconema	-	-	35
Cymbella	-	-	79
Encyonema	-	-	34
Navicula	-	-	382 (not completed).
Surirella	-	-	64 (not completed).

Professor H. L. Smith's list of genera contains about 400 names; allowing for synonyms, &c., we may fairly estimate the number at 300. As the twelve monthly parts represent one-sixth of the entire work, and as the number of figures in the six parts will probably not exceed 1000, the "Atlas," when complete, will contain more than 6,000 figures. It must, however, be remembered that the author states in his Prospectus that only those forms which are subject to great variation will be treated in this exhaustive manner. All the figures in the parts just published are remarkably accurate representations of the actual forms.

Part 5 contains a circular from the author, in which he alludes to the corrected explanatory tables which are to take the place of those now given. To enable him to do this with the accuracy he desires he most respectfully requests all who can afford him assistance in the form of well-founded criticisms, or the correction of any errors in nomenclature, will have the kindness to do so. In conclusion, he remarks, "I venture to say that I make this

request in the names also of those who hope and expect that the publication of my 'Atlas' will greatly advance the knowledge of the Diatomaceæ, and their number is, I am happy to say, no small one."

F. KITTON, Norwich.

ON THE FRUCTIFICATION OF RHYTISMA MAXIMUM, *Fries.*

The polymorphism of fungi is one of the most interesting and important subjects the mycologist has to study, bearing as it does, not only upon the reproduction, but also, now-a-days, upon the classification of these organisms. Personally, we are inclined to think too much use is made by some mycologists of the secondary forms of fructification, in their endeavours to find characters for the differentiation of genera, but this is far too extensive a subject for discussion here.

The following observations upon the fructification of *Rhytisma maximum*, *Fr.*, may be interesting, as the plant itself does not seem to be one of very common occurrence in this country; they have been made upon specimens, gathered at various seasons, which grew parasitically on some young willows in a clay pit near King's Lynn.

We believe that Sowerby's *Sphaeria aurea*, t. 356, and Greville's *Cryptomyces wauchii*, t. 206, represent this plant, the former depicting it in its earlier conditions, the latter representing the ascigerous state, for according to our observations the golden yellow border, though not always absent, is far less marked in the ascigerous than in the non-ascigerous plant.

Usually, however, the first manifestation of the parasite consists in a yellow discoloration of the outer bark of some of the younger branches. Frequently these discolorations are elongated in form, but whether so or not, in their centre are soon observable one or more black spots or patches, varying in size from a line or less to several inches in length. Repeated examinations of the fungus in this stage have failed to reveal any fructification whatever, and indeed very little structure at all. One of two things now happen, either the whole fungus, and more particularly the black central portions, increase in extent and thickness, without however manifesting any particular microscopic structure, remain for a longer or shorter period in a state of quiescence, and then develop asci and sporidia: presently more particularly to be described. Or, as not unfrequently happens, the blackened patches become distended by a semi-turbid fluid, forming so many distinct blisters. The fluid which they contain owes its turbidity to a host of minute hyaline more or less oval spermatia, averaging about .0001 in. across, t. 63, fig. 6. We have never seen these bodies borne upon sterigmata as figured by Tulasne t. xvi., fig. 4. In this stage the plant is not

erumpent, the blackened patches and the cuticle being incorporate. Modifications in structure now take place which result in the development of asci beneath the blackened cuticle, in the vacuity which originally contained the spermatia; when this is the case the blackened cuticle becomes adherent to, and forms an outer covering for, the ascigerous layer, giving the plant a black, shining, smooth surface. As the plant develops, the surface becomes more or less cracked in various directions, and the asci thus exposed.

Sometimes, however, the plant is truly erumpent, and from the first* of subcutaneous origin. It can readily be recognised as a thickening of the bark before the cuticle ruptures; in this state the yellow circumference is usually absent. In whatever manner it arises the ascigerous stratum is always of a whitish colour, consisting of an assemblage of cylindrical octosporous asci t. 53, f. 3 and 4, containing ovate, very pale yellow sporidia, each of which when young is enveloped in a thin gelatinous vestment, and filled by a granular endochrome, with one or more large nuclei. They measure some $\cdot 0013 \times \cdot 0003$ in. upon an average. The paraphyses are abundant, filiform in outline, very slightly incrassated above, also containing granules, but we have never been able to see any distinctly articulate bodies, such as Tulasne, t. xvi, f. 6, represents. As the plant matures, it separates at the edges from the matrix, becomes revolute, and finally falls off, leaving a smooth cicatrix, formed by the exposure of the inner bark.

We also meet with reproductive bodies of two other kinds, namely a *Fusarium*, which oozes out upon the surface of the *Rhytisma* in little roseate masses. These consist of curved spores, obscurely triseptate when mature, which were originally borne upon little threads, t. 53, fig. 8 and 9.

The other bodies are spores having some resemblance to those belonging to the genus *Hendersonia*, dark brown in colour, from $\cdot 0007$ in. to $\cdot 0009$ in. long, usually triseptate, but occasionally with four transverse, and one longitudinal septa. They are developed from the interior of a somewhat indistinct perithecium, imbedded in the *Rhytisma*, and originate as simple hyaline oblong spores, which acquire first one septum, then the other two, and at last the coloured endochrome (t. 53, f. 5.) The perithecia have a minute shining black ostiolium, which is visible on the surface of the *Rhytisma*. We have only found the ascigerous fungus in spring and early summer, but the *Rhytisma* is to be met with at all seasons. Hence we conclude season has a good deal to do with the determining the exact mode of reproduction. Frequently we have examined plants, and have found the white stroma, but no trace of spermatia or asci; it is under these conditions that the *Fusarium* spore are most likely to be met with, and later on the *Hendersonia* spores. This species of *Rhytisma* differs from its

* See Grev. t. 206, fig. 1, where a small branch is depicted distinctly representing this.

allies *R. salicinum*, and *acerinum* in not maturing its asci during the winter as they do: but the stroma is developed in spring, and bears asci in early summer.

King's Lynn.

CHARLES B. PLOWRIGHT.

PLATE 53.—Fig. 1. *Rhytisma*, nat. size. 2. Section of ditto 3. Ascus and sporidia $\times 500$. 4. Sporidia $\times 500$. 5. Pycnidia resembling *Hendersonia*. 6. Free conidia. 7. Conidia on sterigmata from Tulasne. 8. Fusiform stylospores. 9. The same when free.

CLASSIFICATION OF PYRENOMYCETES.*

Several advances have been made by Continental Mycologists of late years, towards a carpological classification of the Ascomycetes. Some objections have but recently been stated by the writer in the "Popular Science Review;"† and the last volume of "Transactions of the Woolhope Club," includes some observations by Mr. C. E. Broome on the same subject. Professor Saccardo's recently published scheme affords an opportunity for a further consideration of the basis of the classification proposed. Whatever may be the merits of Professor Saccardo's scheme, these must be subsidiary to the main question whether the basis is a sound one, and on this point we have already expressed a very decided opinion. The system adopted by Fries, with some minor modifications which experience has suggested, is based mainly on the vegetative system. External features, which can be determined often by the unaided eye, usually by means of a pocket lens, and only very rarely, and in peculiar instances, by resort to the low powers of a microscope, must commend itself, other conditions being equal, to the mycologist. It surely must be preferable to adopt a system by means of which an individual plant can, with little doubt or hesitation, be at once referred to its correct genus, leaving to microscopical examination its specific features, than to invert the order, and make microscopical examination essential to the determination of the genus, whilst external features are ignored. No one can doubt for a moment how much the determination of a collection of new plants is facilitated by the ability to group them at once in their proper genera. This is impossible with a carpological scheme, such as that proposed by Saccardo. Experience has proved that *Xylaria* is a natural and irreproachable genus, based on external features, on the clavate or branched stroma, and without any regard whatever to the character of the fruit. Because the sporidia are simple and coloured, it may be in all known species, no attempt has been made to alter or split up the genus, but its principal feature is not carpological.

* *Conspectus Gezerum Pyrenomycetum Italicorum, systemate carpologico*, dispositorum, auctore. P. A. SACCARDO.

† *Pop. Sci. Rev.*, July, 1875, on "The Tendencies of Systematic Botany."

Hereafter it may be that a species with septate sporidia would have to be excluded if artificial are to give way to natural affinities, and secondary features to be promoted to the exclusion of primary. In like manner, *Dothidea* has always been regarded as a very natural though less perfectly characterized genus, but unfortunately the sporidia are more variable, and hence eight genera in three groups, represent the hyaline simple spored, the hyaline uniseptate, and the coloured septate spored. If the proposed scheme is to be fully carried out, it must be considerably augmented, and there is no reason why, if pressed to its logical conclusions, nearly every species should not have a claim to be regarded as the type of a new genus. In Professor Saccardo's scheme there are seven typical groups—

- | | |
|------------------|------------------|
| 1. Allantosporæ. | 5. Phragmosporæ. |
| 2. Hyalosporæ. | 6. Scolicosporæ. |
| 3. Phæosporæ. | 7. Dietyosporæ. |
| 4. Didymosporæ. | |

It is presumed that the same terms represent the same things in all cases, but that is not practically the case, for in *Perisporiaceæ* we find that *Hyalosporæ* are simple (page 1), in *Sphæriaceæ* they become 1-3 septate (page 5), in *Perisporiaceæ* globose, ovoid, or oblong; in *Sphæriaceæ* ovoid, fusiform, or oblong; in *Hypocreaceæ* ovoid-cylindrical, and spheroid in *Hysteriaceæ*. From the scheme it would appear that the above groups represent—

1. Sporidia sausage-shaped, almost colourless.
2. Sporidia hyaline, simple, or 1-3 septate.
3. Sporidia simple, coloured.
4. Sporidia bilocular.
5. Sporidia coloured, septate.
6. Sporidia filiform.
7. Sporidia muriform.

These characters are not definitely stated as applicable to all the families, but under some a diagnosis is given which is not identical with that in others. (Compare pp. 1 and 5; 3 and 9; 2 and 7.) It is not so much with this grouping of genera that we are concerned, although that is clearly open to criticism, as with the primary features of the genera themselves, and here we cannot imagine that any practical mycologist could possibly place together as nearest allies, *Capnodium elongatum*, *Sphæria herbarum*, *Sphæria obducens*, *Cucurbitaria Berberidis*, *Valsa fenestrata*, and *Valsa vestita*, and yet these are the types of six consecutive genera, composing one group. All sense of affinity or relationship must be wholly obscured by infatuation for the one idea of conformity in shape, colour, and septation of the sporidia. One seems prepared to encounter almost anything after such a notion of botanical affinities, and even *Microthyrium microscopicum*, with *Sphæria punctiformis* and *Sphæria epicymatia* in juxta-position is only accepted as additional evidence of the fact, so often exemplified in the world,

that when men, however highly educated, suffer themselves to be caught in a stream, they are rapidly overwhelmed, and how devotion to a single idea may warp the judgment and confiscate all other considerations.

The question which should be determined satisfactorily is, especially with regard to the Ascomycetes, what are the safest, soundest, and most natural groups in which, as genera, the species should be classed for purposes of study? Should the vegetative system be adopted as the basis, or should the reproductive, or should both be combined as much as possible? We do not hesitate to express our conviction that the vegetative system should be adopted in conjunction with the reproductive, but that the latter should be subsidiary to the former. Our strongest objection to the modern carpological arrangements is that they adopt the reproductive almost absolutely, and ignore the vegetative, except when it harmonizes with the mathematical idea. If it were not so we should never see *Sphæria phomatospora* placed next to *Sphæria fimbriata*, or *Diatrype stigma* close to *Sphæria millepunctata*. It cannot claim to be even a satisfactory carpological system, which recognizes as nearest allies *Sphæria putaminum* and *Sporormia intermedia*. Surely such affinities (?) must have been inserted as a satire on a carpological classification, for whoever has seen the magnificent sporidia of Schweinitz's American *S. putaminum* and knows the diminutive quadrilocular dissilient sporidia of the dung *Sphæria* called *Sporormia minima*, and *Sporormia intermedia*, must confess that if such indication of affinities is all that we are to expect from a "Carpological disposition," it is a most decided and indubitable failure.

Professor Saccardo has expended considerable labour in the production of his "System," which was foreshadowed by Notaris in 1844, and since applied by Fuckel, Winter, Nitschke and others in Germany. All have had some share in unsettling the old method, without ensuring unanimity in the new, for each has his own method, the only point of agreement being a Carpological basis, other coincidences following accidentally. We could have wished that so much industry, energy, and persistency had been expended in a better direction, and it is with regret that we feel compelled to oppose our esteemed friends both in Italy and Germany. Far be it from us to depreciate the labours of Continental mycologists, who, without a single exception, have always been ready to afford us every assistance in their power, most promptly and courteously, whenever we have had occasion to appeal to them. Nevertheless we recognize it as a duty, albeit not a pleasant one, to protest against the introduction and extension of a false basis of classification.

BRITISH FUNGI.

By M. C. COOKE.

(Continued from Vol. iii., page 186.)

Agaricus (Lepiota) cinnabarinus. *Fr. Epicr. ed. ii., p. 36.*

Pileus fleshy, soon flattened, obtuse, granulose-mealy, persistently vermilion; stem stuffed, somewhat bulbous, squamose below the ring; gills free, lanceolate, white.—*Ag. granulosis* v. *cinnabarinus*, Alb. & Sch., 147. *Fl. Dan. t. 1795* (gills incorrect). *Berk. & Br. Ann. N.H., No. 1402.*

In pine woods. New Pitsligo.

Pileus 2-3 inches broad, flesh pallid, taste mild.

Agaricus (Armillaria) subcavus. *Schum. Fr. Epicr., ed. ii., p. 46.*

Pileus submembranaceous, convex, somewhat plane, viscid, striate to the middle, disc rather fleshy, umbonate; stem fistulose upwards, equal, punctulate, even above the torn ring; gills plane, decurrent, white.—*Schum. in Flor. Dan. t., 1843.* *Berk. & Br. Ann. N.H., No. 1403.*

On the ground. Cirencester. Nov.

Slender, wholly white, except the umber umbo.

Agaricus (Tricholoma) panæolus. *Fr. Ic. t. 36, f. 2.*

Pileus between spongy and compact, convexo-plane, variegated with pruinose grey spots; margin inflexed, repand; stem solid, short, fibroso-striate, gills arcuate, adnate, somewhat crowded, grey or dirty rufous.—*Fr. Epicr. ii., 73.* *Berk. & Br. Ann. N.H., No. 1404.*

On the ground. Street (J. A. Clark).

Agaricus (Tricholoma) pædidus. *Fr. Ic. t. 46, f. 1.*

Pileus somewhat fleshy, tough, convex, then flattened, depressed about the conical umbo, fibrillose, becoming smooth, moist; margin involute, naked; stem stuffed, short, somewhat striate; gills sinuate-decurrent, crowded, narrow, white, then grey.—*Berk. & Br. Ann. N.H., No. 1405.*

In fields. Abergavenny (J. Renny). Wollaston (Miss Hume).

Agaricus (Clitocybe) diatretus. *Fr. Epic. ii., p. 104.*

Inodorous; pileus somewhat fleshy, convex, then plane, depressed, even, smooth, hygrophanous; stem stuffed, then hollow, elastic, even, straight, smooth and naked above; gills decurrent, with an acute tooth, crowded, narrow, white.—*Berk. & Br. Ann. N.H., No. 1406.*

In pine woods. Coed Coch.

Gathered at the same time with *A. fragrans*, from which it was at once distinguished by the total absence of the particular odour of that species.

Agaricus (Clitocybe) angustissimus. *Fr. Ic. t. 59, f. 2.*

Hygrophanous, inodorous; pileus rather fleshy, thin, convex, then plane or depressed, even, smooth, whitish; stem stuffed, then

fistulose, thin, naked, flexuous; gills adnate, narrow, very much crowded, white.—*Berk. & Br. Ann. N.H., No. 1407.*

In woods. Ascot.

Agaricus (Collybia) muscigenus. *Schum. Saell, p. 307.*

White; pileus submembranaceous, convex or plane, obtuse, even; stem stuffed, setaceous, flaccid, flexuose, equal, smooth; gills adnate, somewhat crowded, linear.—*Flor. Dan. t. 2023, fig. 1. Mich. t. 73, fig. 1. Berk. & Br. Ann. N.H., No. 1408.*

Amongst moss. Coed Coch.

Stem 1 inch, pileus 1-2 inches broad.

Agaricus (Collybia) ambustus. *Fr. Ic. t. 70, f. 2.*

Pileus submembranaceous, convexo-plane, papillate, striatulate, hygrophanous; stem somewhat stuffed, tough, short, livid; gills adnate, crowded, lanceolate, white, then tawny.—*Berk. & Br. Ann. N.H., No. 1409.*

On burnt earth. Kew.

Agaricus (Collybia) Stevensoni. *B. & Br. Ann. N. H., No. 1497.*

Pileus semi-ovate, obtuse, viscid, pallid, yellow, here and there spotted; stem thin, fibrillose, pulverulent above, externally and internally rufous, rooting; gills broad adnate with a decurrent tooth, distant, white.

Glamis (Rev. J. Stevenson). Aug.

Pileus $\frac{1}{2}$ inch across and high; stem $1\frac{1}{2}$ inch high, scarcely a line thick, composed of fibres.

Allied to *Agaricus ventricosus*, but differing in its slender almost solid stem, viscid, semi-ovate pileus, and very broad, adnate, somewhat ventricose, plane gills.—*B. & Br.*

Agaricus (Mycena) galericulatus var. **Calopus.** *Fr. Ic. t. 80, f. 2.—Berk. & Br. Ann. N.H., No. 1410.*

On blocks of wood in a fernery. Coed Coch.

Agaricus (Mycena) ætites. *Fr. Ic. t. 81, f. 5.*

Fragile; pileus membranaceous, campanulate, then convex, smooth, sulcate, hygrophanous, with a broad obtuse prominent umbo; stem unequal, somewhat compressed, smooth, shining; gills uncinat, subarcuate, thin, connected by veins, whitish.—*Fr. Epicr. ii., 143. Berk. & Br. Ann. N.H., No. 1411.*

Amongst mosses. Ascot.

Agaricus (Omphalia) philonotis. *Lasch. Fr. Ic. t. 76, f. 1.*

Fragile, cinereous, dingy; pileus membranaceous, hygrophanous, floccose when dry; margin erect; stem fistulose, smooth; gills very decurrent, rather distant, narrow, white, then smoky.—*Fr. Epicr. ii., 158. Berk. & Br. Ann. N.H., No. 1412.*

On *Sphagnum*. Glamis (Rev. J. Stevenson).

Agaricus (Omphalia) umbelliferus. *Fr. var. Abiegnus.—Berk. & Br. Ann. N.H., No. 1413.*

On decayed fir stump. Coed Coch.

Pale yellow.

Agaricus (Entoloma) resutus. *Fr. Epicr. ii.*, 193.

Pileus somewhat fleshy, convex, obtuse, adpressedly squamulose or fibrillose, becoming brownish, centre darker; stem somewhat stuffed, equal, soft, smooth; gills slightly adnexed, ventricose, rather thick, grey.—*Berk. & Br. Ann. N.H.*, No. 1414.

Pastures. Glamis (Rev. J. Stevenson).

Stem $1\frac{1}{2}$ -2 in. long, pileus 1 in. broad. Inodorous.

Agaricus (Nolanea) icterinus. *Fr. Epicr. ii.*, 209.

Pileus somewhat membranaceous, campanulate then convex, striatulate, papillate, greenish becoming yellowish, hygrophaneous; stem somewhat stuffed, short, rigid, clad with flocculose meal; gills affixed or free, distant, ventricose, pallid.—*Berk. & Br. Ann. N.H.*, No. 1415.

In gardens and woods. Edensor (J. Renny).

Agaricus (Nolena) cœlestinus. *Fr. Epicr. ii.*, 210.

Pileus membranaceous, campanulate, obtuse, striate, smooth, light-blue, disc darker, slightly scabrous, stem fistulose, even, smooth, dark steel-blue, pruinose above; gills adnate, very broad, somewhat crowded, whitish.—*Berk. & Br. Ann. N.H.*, No. 1416.

On old oak trunks. Oct.

Agaricus (Eccilia) foscus. *Smith Journ. Bot.* 1875, p. 97, t. 161, f. 49.

Pileus sub-membranaceous, pruinose-crystalline, deeply umbilicate somewhat irregular, black-brown, becoming white with age; stem, pruinose or innato-fibrillose, cartilaginous with a fleshy pith, attenuated downwards; gills decurrent, somewhat waved, thick, pink; spores nodulose.

On the ground at the foot of and upon the stems of tree ferns (*Dicksonia antarctica*) at Messrs. Veitch's Nursery, Chelsea, June, 1870. Allied to the next, but a very different plant, the dark-brown trama and external pruinose-crystalline stratum are characteristic.

This species doubtless is not truly British, nor can the next be scarcely regarded as such.

Agaricus (Eccilia) acus. *Smith. Journ. Bot.* 1875, p. 97, t. 161 f. 14-20.

2. **Agaricus (Eccilia) acus**, *nov. sp.* Pileus submembranaceous, deeply umbilicate, densely pruinose, white; margin striate and incurved; gills thick, distant, deeply decurrent, pink; stem cartilaginous, smooth; odour strong, fungoid; spores nodulose.

Amongst germinating coffee-seeds in cocoa-nut fibre; Royal Gardens, Kew. Gathered by the Rev. M. J. Berkeley, in August, 1873. It differs in its snow-white pruinose pileus, and in other characters from all other described species. Its nearest ally is *A. carneo-griseus*, B. & Br.

Agaricus (Eccilia) atropunctus. *Pers. Syn. p.* 353.

Pileus somewhat fleshy, soft, hemispherical, pale-cinereous; stem somewhat tough, pallid, smooth, clothed with black punctiform squamulae; gills decurrent, arcuate, distant, alternate, cinereous-

flesh-coloured.—*Fr. Epic.*, p. 159. *ii*, p. 212. *Smith in Journ. Bot.* 1875, p. 98, t. 161, f. 10-13.

Amongst moss in an oak wood. Near Hereford. Oct. (Dr. Bull).

Gregarious, small, pileus $\frac{1}{2}$ - $\frac{3}{4}$ in. across. Taste disagreeable, whole plant brittle, and the pileus inclined to be somewhat irregular.—*W. G. S.*

Agaricus (Hebeloma) Bongardii. *Weinm. Fl. Russ.*, p. 190.

Pileus rather fleshy, campanulate, obtuse, disc squamose, torn and fibrillose about the margin, stem solid, rigid, pallid rufous, silky below, pulverulent and whitish above, gills adnate, ventricose, pale-reddish then cinnamon.—*Fr. Epic.* *ii*, 229. *Kalch. Ic. t.* 20. f. 2. *Berk. & Br. Ann. N.H.*, No. 1417.

On Culbin sand hills, near the Findhorn-mouth (G. Norman).

Stem 2-3 inches. Pileus 1-1 $\frac{1}{2}$ in.

Agaricus (Hypholoma) storea. *Fr. Epic.* *ii*, 293.

Pileus fleshy, convexo-plano, umbonate, dry, fibrillose, stem solid, elongated, equal, even, subfibrillose, pallid, gills adnate, dry, livid, becoming brownish, margin serrulate and white.—*Berk. & Br. Ann. N.H.*, No. 1418.

At the base of trees. Ascot. Coed Coch.

Stem 4-5 in. long 4 lin. thick; pileus 3 in. broad.

Agaricus (Hypholoma) elæodes. *Fr. Epic.* *ii*, 291.

Pileus fleshy, somewhat plane, subumbonate, dry, smooth, flesh yellow, stem stuffed, then hollow, equal, fibrillose, becoming ferruginous, gills adnate, crowded, thin, greenish then olive.—*Páulet t.* 108. *Bull. t.* 30, *Larbr. t.* 16, f. 2. *Berk. & Br. Ann. N.H.*, No. 1119.

On trunks, &c. Slough (M. Terry).

Agaricus (Hypholoma) silaceus. *Pers. Syn.* p. 421.

Pileus fleshy, convex, viscid, orange-red, silky about the margin, whitish, stem stuffed, then hollow, bulbous, shining, fibrilloso-striate, gills adnate, crowded, grey, then olive.—*Batt. t.* 22 *E.* *Berk. & Br. Ann. N.H.*, No. 1498.

Glamis. (Rev. J. Stevenson.)

Pileus viscid, bright orange rufous; stem 4in. high, at length hollow, solid and slightly swollen at the base; smell resembling that of meal. Spores pale purple-brown.

Cortinarius (Inoloma) traganus. *Fr.*

Var. **finitimus** *Weinm.* p. 155. *B. & Br. Ann. N.H.*, No. 1499.

Smell not at all that of the typical form, but pleasant though peculiar, resembling that of gum just beginning to ferment. Pileus silky, at length smooth, lilac, as is the stem, which is yellowish and mottled within, but not saffron-coloured nor brown.—*B. & Br.*

Hygrophorus fornicatus. *Fr. Epic.* *ii*, 414.

Whitish, pileus fleshy, thin, campanulate, then expanded, even, smooth, viscid; stem firm, equal, tough, smooth, gills sinuate,

adnexed, ventricose, thick, distant, white.—*Krombh. t. 25. fig. 4. 5.*
Berk. & Br. Ann. N.H. No. 1420.

In pastures. Holm Lacy. Batheaston.

Cantharellus albidus. *Fr. Fl. Dan. t. 1293, fig. 1.*

Pileus rather fleshy, infundibuliform, repand, smooth, pallid, stem solid, nearly equal, smooth, gills dichotomous, divergent, white.—*Fr. Epic. ii., 457. Berk. & Br. Ann. N.H., No. 1421.*

Amongst moss. Coed Coch. Sept. Oct.

Cantharellus Stevensoni. *B. & Br. Ann. N.H., No. 1422.*

Pileus orbicular, umbilicate, pallid, smooth, margin inflexed; stem cylindrical, delicately pulverulent, white, then darker; gills decurrent, pallid, brownish behind.

On rotten wood amongst moss. Glamis. March.

Pileus about 2 lines across, stem $\frac{1}{4}$ in. high, $\frac{1}{2}$ line thick, with a little white mycelium at the base. Very near to *C. cupulatus*, but that is very strongly umbonate when young, and the umbo is always visible at the bottom of the umbilicus, the habitat moreover is different.—*B. & Br.*

Leutinus scoticus. *B. & Br. Ann. N.H., No. 1423.*

Inodorous. Pileus smooth, hygrophanous, extremely variable, pallid, at length brownish, either quite stemless and reniform, or variously stipitate, solitary or cæspitose, sometimes deeply umbilicate, lobed at the margin, and sinuate or plicate, gills rather distant, strongly toothed, decurrent when the stem is developed.—*Fr. Ep. ed. ii., p. 485.*

On decayed *Ulex* and rotten wood. Glamis.

Pileus $\frac{1}{2}$ - $1\frac{1}{2}$ in. broad, stem when present varying from 2 lines to as many inches. Its nearest ally is *L. omphalodes*.

Boletus sulfureus. *Fr. Epicr. ii., p. 501.*

Pileus compact, convex, then plane, silky-tomentose, with innate flocci, sulphur-coloured; stem firm, ventricose, even, smooth, of the same colour as the pileus; tubes adnato-decurrent, short, minute, compound, sulphur-coloured, at length greenish.—*Berk. & Br. Ann. N. H. No. 1424. Smith in Journ. Bot. 1875, p. 98, t. 162, fig. 1-3.*

On sawdust. Forres (Rev. J. Keith).

From a wide-spreading fleecy, golden-coloured mycelium it springs in dense clusters, after the fashion of *Agaricus spectabilis*. Stem compact, 1-2 in. long, an inch thick, self-coloured, but at length acquiring a dirty ferruginous tint. Pilei at first hemispherical, then by mutual pressure twisted and concrescent; margin acute, involute when young. Flesh yellow, turning more or less blue when broken, but when exposed for some time to the air golden, under the tubes occasionally reddish. Tubes 1-2 lines long, adhering more closely than usual, changing colour when touched, at length spotted with ferruginous stains. Spores yellow, then olivaceous, unusually small. Tasteless.—*W. G. S.*

Boletus æreus. *Bull. Champ. p. 321.*

Pileus pulvinate, smooth, sub-pelliculose, olivaceous brown, becoming somewhat blackish. Stem stout, somewhat reticulated, yellowish, brownish at the base, tubes minute, nearly free, sulphury.—*Krombh. t. 36 f. 1-7. Quéll t. 16, f. 2. Rostk. t. 15. Berk. & Br. Ann. N.H., No. 1425.*

In woods. Surrey (M. Terry).

Spores oblong, oblique at the base, $\cdot 0004\text{-}\cdot 0005$ in. \times $\cdot 0002$ in.

Boletus carnosus. *Rostk. t. 14.*

Compact. Pileus pulvinate, smooth, brown; stem short, firm, substriate, rufescent yellow; tubes adnate, yellow, pores rather large, angular, of the same colour.—*Fri. Epicr. ii., 520. Berk. & Br. Ann. N.H., No. 1426.*

In beech woods. Stoke Pogis (M. Terry).

Polyporus floccopus. *Rostk. Sturm. Fl., No. 28, t. 13.*

Pileus coriaceous, mouse-coloured, floccose, stem floccose, pores hexagonal-oblong, white, crenate.—*Berk. & Br. Ann. N. H., No. 1427.*

On dead wood. Glamis (Rev. J. Stevenson).

Polyporus trabeus. *Fr. Epicr. ii., 547.*

White. Pileus fleshy, fibrous, then firm, effuso-reflexed, transversely elongated, without zones, pallid, pores short, minute, roundish or elongated, toothed, white.—*Rostk. t. 28. Berk. & Br. Ann. N.H., No. 1428.*

On pine wood. Glamis. Menmuir.

Polyporus borealis. *Fr. Epicr. ii., 552.*

White, then yellowish, pileus spongy, then suberous, compact, subpulvinate, hairy, internally parallel-fibrous, margin patent, unequal, sinuate, flexuous or torn, white.—*Rostk. 4. t., 40. Schæff. t. 314? Berk. & Br. Ann. N.H., No. 1429.*

On fir trunks. Slough (M. Terry).

Polyporus (Anodermei) Keithii. *B. & Br. Ann. N.H., No. 1430.*

Conchiform, stemless, decurrent behind, bright red-brown, rough with rigid processes, hymenium pallid; dissepiments lacerated.

On dead wood. Forres (Rev. J. Keith).

About $\frac{1}{2}$ in. across.

Polyporus callosus. *Fr. Epicr. ii., 577.*

Effused, equal, tough, entire, like soft leather, separable, white, pores firm, rounded, equal, quite entire, obtuse.—*Berk. & Br. Ann. N.H., No. 1431.*

On dead wood. Glamis (Rev. J. Stevenson).

Polyporus (Resupinati) collabefactus. *B. & Br. Ann. N.H., No. 1432.*

Stratum quite smooth, resembling a *Corticium*; pores seem first to arise from the mere collapsing of the substance, always shallow, margin obtuse.

On dead wood. Glamis (Rev. J. Stevenson).

Polyporus (Resupinati) Rennyi. *B. & Br. Ann. N.H., No. 1433.*

Forming a thick, at first somewhat frothy, then pulverulent mass,

white, turning to lemon-coloured when dry, pores sparingly produced, white, elongated.

On wood and on to the ground. Hereford. Nov. (J. Renny). Glamis (Rev. J. Stevenson).

Polyporus (Resupinati) blepharistoma. *B. & Br. Ann. N.H., No. 1434.*

Wholly resupinate, snowy-white, mycelium arachnoid, sub-farinose, pores small, dissepiments thin, margin ciliato dentate.

On dead wood. Glamis.

Very thin and delicate, the ciliato-dentate margin of the pores is very elegant.

Polyporus penetralis. *Smith in Journ. Bot. 1875, p. 99, t. 162, figs. 4-8.*

On imported tree-fern stems, cannot be included as British. The same remark applies also to

Laschia coccinea, Smith, in "Journ. Bot.," 1875, p. 99, t. 162, figs 9-13—on trunk of *Encephalartus* in Bull's Nursery.

Hydnum squamosum. *Schæff. Fr. Epic., ed. ii., p. 598.*

Pileus fleshy, irregular, glabrous, broken into irregular rufous-brown scales; stem short, whitish, attenuated downwards; spines grey-brown, with a white apex.—*Berk. & Br. Ann. N.H., No. 1435.* Smith "Journ. Bot.," 1875, pp. 99, t. 161, fig. 1-3.

In pine woods. Street, Somerset.

Small, inflexible, flesh thick, white.

It is closely allied to *H. imbricatum*, but is distinguished by its smaller size, white flesh, and other characters. It also possesses an abominably fetid odour, which is not the case with its allies.—*W. G. S.*

Hydnum melleum. *B. & Br. Ann. N.H., No. 1436.*

Honey-coloured, effused, thin, margin delicately byssoid, teeth acute at the tips, sometimes divided, pulverulent below, naked in the middle.

On broken rails lying on the ground. Coed Coch.

Hydnum Stevensoni. *B. & Br. Ann. N.H., No. 1437.*

White, effused, farinaceous beneath, here and there byssoid; spines cylindrical, obtuse or truncate, sometimes compressed; apices pulverulent.

Glamis. March.

Hydnum anomalum. *B. & Br. Ann. N.H., No. 1438, t. 1, f. 1.*

Pallid yellow, stratum thin, gelatinous, teeth at first granuliform, then stipitate, obtuse, divided above.

Inside rotten ash tree. Langridge. March.

Substance of teeth tough, with large ovate or globose vesicles immersed in it; spores globose, shortly pedicellate. Near to Fries's genus *Mucronella*.

Radulum tomentosum. *Fr. Ep. ed. ii., p. 624.*

Effused, innate, rather thick, white then pallid, swollen at the margin, erect, tomentose; tubercles short, crowded, angular, obtuse, smooth, confluent—*Berk. & Br. Ann. N.H., No. 1439.*

On *Pyrus aucuparia*. Menmuir.

MICROMETRIC TABLES.

I. Parts of a Millimètre to parts of an Inch.		II. Parts of an Inch to parts of a Millimètre.	
M. Mètres.	Inch.	Parts of an Inch.	M. Mètres.
10	·3937	1·0	25·399
9	·3543	·9	22·859
8	·3149	·8	20·321
7	·2755	·7	17·779
6	·2362	·6	15·239
5	·1968	·5	12·700
4	·1574	·4	10·160
3	·1181	·3	7·620
2	·0787	·2	5·080
1·0	·0393	·10	2·539
·9	·0354	·09	2·285
·8	·0314	·08	2·032
·7	·0275	·07	1·777
·6	·0236	·06	1·523
·5	·0196	·05	1·270
·4	·0157	·04	1·016
·3	·0118	·03	·762
·2	·0078	·02	·508
·10	·0039	·010	·253
·09	·0035	·009	·228
·08	·0031	·008	·203
·07	·0027	·007	·177
·06	·0023	·006	·152
·05	·0019	·005	·127
·04	·0015	·004	·101
·03	·0011	·003	·076
·02	·0007	·002	·050
·010	·00039	·0010	·0253
·009	·00035	·0009	·0228
·008	·00031	·0008	·0203
·007	·00027	·0007	·0177
·006	·00023	·0006	·0152
·005	·00019	·0005	·0127
·004	·00015	·0004	·0101
·003	·00011	·0003	·0076
·002	·00007	·0002	·0050
·001	·00003	·0001	·0025

A millimètre = ·03937 inch.

CARPOLOGY OF PEZIZA.

[Plates 50 and 51.]

ALEURIA.

- Fig. 228. *P. hinnulea*, *B. & Br.*, ex. herb. M. J. B.
 ,, 229. *P. exidiiformis*, *B. & Br.*, ex. herb. M. J. B.
 ,, 230. *P. Thumeni*, *Karst.*, Thumen Myc. Un., No. 126.
 ,, 231. *P. limnicola*, *Hazs.*, ex. herb. Hazslinszky.
 ,, 232. *P. echinosperma*, *Pk.*, ex. herb. C. H. Peck.
 ,, 233. *P. miltina*, *Berk.*, ex. herb. M. J. B.
 ,, 234. *P. carbonigena*, *Berk.*, ex. herb. M. J. B.
 ,, 235. *P. calyx*, *Sacc.*, ex. herb. Saccardo.
 ,, 236. *P. aggregata*, *B. & Br.*, ex. herb. M. J. B.
 ,, 237. *P. quisquiliarum*, *B.*, ex. herb. M. J. B.
 ,, 238. *P. Mulleri*, *Berk.*, ex. herb. M. J. B.
 ,, 239. *P. astroidea*, *Hazs.*, ex. herb. Hazslinszky.
 ,, 240. *P. convexella*, *Karst.*, ex. herb. Karsten.

LACHNEA.

- ,, 241. *P. alpina*, *Fckl.*, Fckl. Fungi Rhen., 2637.
 ,, 242. *P. miniata*, *Fckl.*, Fckl. Fungi Rhen., 2683.
 ,, 243. *P. mutabilis*, *B. & Br.*, ex. herb. Bloxam.
 ,, 244. *P. Torulæ*, *Fckl.*, Fckl. Fungi Rhen., 1596.
 ,, 245. *P. sanguinea*, *P.*, Rabh., F. E., 226.
 ,, 246. *P. fusca*, *P.*, ex. herb. M. C. C.
 ,, 247. *P. maculans*, *Rehm.*, Rehm. Ascomy., 155.
 ,, 248. *P. herpotricha*, *Berk.*, ex. herb. M. J. B. α , mycelium.
 ,, 249. *P. aurea*, *Fckl.*, Fckl. Fungi Rhen., 2476.
 ,, 250. *P. cæsia*, *P.*, Fungi Britt. i., 562.
 ,, 251. *P. chavetiæ*, *Lib.*, Libert. Exs., 26.
 ,, 252. *P. aurata*, *Fckl.*, Fckl. Fungi Rhen., 2480.
 ,, 253. *P. Rosæ*, *P.*, ex. herb. M. C. C.
 ,, 254. *P. prunicola*, *Fckl.*, Fckl. Fungi Rhen., 1191.
 ,, 255. *P. aurelia* *P.*, Phillips Elv. Britt., 29.
 ,, 256. *P. retincola*, *Rabh.*, Rabh. F. E., 225.
 ,, 257. *P. virens*, *A. & S.*, ex. herb. Klotsch (immature).
 ,, 258. *P. spicarum*, *Rehm.*, Rehm. Ascomy, No. 153.
 ,, 259. *P. Rhododendri*, *Ces.*, Erb. Critt. Ital., 536.
 ,, 260. *P. pomicolor*, *B.*, ex. herb. Ravenel (not mature).
 ,, 261. *P. bolaris*, *Batsch*, Libert Exs.
 ,, 262. *P. cedrina*, *Ger.*, ex. herb. W. R. Gerard.
 ,, 263. *P. strobilina*, *Fr.*, Rabh. Fungi Eur., 624.
 ,, 264. *P. controversa*, *C.* (*P. litorea*, *Rehm.*), Rehm. Ascomy., No. 114.
 ,, 265. *P. apala*, *B. & Br.*, Phil. Elv. Britt., 27. = *P. juncicola*, Fckl. Sym. p. 305. Rabh. F. E., 517.
 ,, 266. *P. luzulina*, *Ph.*, ex. herb. W. Phillips.
 ,, 267. *P. cephaloidea*, *Fckl.*, Fckl. Fungi Rhen., 1872.
 ,, 268. *P. patula*, *P.*, Libert Exs., 225.
 ,, 269. *P. nivea*, *Fr.*, ex. herb. M. C. C.
 ,, 270. *P. subgibbosa*, *Ellis*, ex. herb. J. B. Ellis.
 ,, 271. *P. sulphurella*, *Pass.*, ex. herb. Passerini.
 ,, 272. *P. virginea*, *Batsch*, ex. herb. M. C. C.
 ,, 273. *P. Tiliæ*, *Pk.*, ex. herb. C. H. Peck.
 ,, 274. *P. Cookei*, *Pass.*, ex. herb. Passerini.

NOTE.—Fig. 193 is *Peziza vexata*, Not., and different from *P. palearum*, Desm.

Fig. 190 is an error, now inexplicable; the *Peziza patula*, published by Libert, is different (see fig. 268).

Fig. 183, under *P. apala* is apparently *P. diminuta*, as the true *P. apala*, B. & Br., is figured at fig. 265.

Fig. 168, *P. chrysophthalma*, does not appear to differ from *P. suecica*, Fckl.

All the above figures are drawn to the same scale as in the previous plates.

ON THE COLLEMEI OF THE CIRENCESTER OR
COTTESWOLD DISTRICT.

By W. JOSHUA.

It may not be uninteresting to your readers to record what has been done in this very interesting section of Lichenology in the, till recently, unexplored Cotteswold district in the West of England.

By way of introduction, it may be desirable to state the meteorological influences which tend to call these fragile plants into existence, and keep them supplied with the necessary nutriment.

The district under notice is situated on the Great Oolitic formation, near one of the sources of the river Thames, about the centre of the Cotteswold range; consisting of a long tract of high ground in the eastern part of Gloucestershire, extending from the hills of Stinchcombe and Nibley in the south, to Bredon in the north, and attaining an altitude of from 500 to 1000 feet.

The soil is various, consisting of open stone-brash, loam, and Bradford and Forest marble clay, alumine and lime predominating, with 20 to 30 per cent. of siliceous sand. The air is decidedly sharp, but the temperature not unequal. The average annual rainfall does not exceed 29 inches, which is below that of many other counties.

The porous nature of the Oolite affords a firm resting-place for the larger Collemei, which flourish principally on the stone walls so common in the district; here they have the advantage of catching every falling drop of moisture to stimulate their growth, while the smaller forms choose the fresh mortar of the surface, or the sides of damp shady banks, in lanes not wholly obscured from the sun. It is a curious fact that, although containing in a moist growing state, as has been lately ascertained by Professor Church, from 75 to 95 per cent. of water in their composition, they resist, equally with other lichens, the greatest extremes of heat and cold.

The *Collema nigrescens*, L., I believe to be the only representative of the *Corticulous* species, but I have recently discovered on leaves of the Portugal laurel, associated with *Strigula Babingtonii*, Berk., a collemoid growth. The *C. epiphyllum* of Leight., which has proved to be *Atichia Mosigii*, Flot., the true place of which, in the entire absence of all fructification, is somewhat uncertain. The species belonging to this tribe, which have come under my own notice in the district, are as follow:—

- | | |
|--|---|
| Collemopsis Schæereri, Mass. | Abundant in old quarries. Cowcombe Wood, near Chalford |
| „ Arnoldiana, Hepp. | A new British addition, but scarcely differing from <i>C. Flotoviana</i> . On the Oolite in the former locality. |
| Collema myriococcum, Ach. | On walls; not very common. Barnsley Park. near Cirencester. |
| C. auriculatum, Hffm.
farvum, Ach.
dormatinum.
tunæforme. | } Different conditions of the same species, and occur abundantly on walls, frequently well fruited throughout the district. |

- Collema pulposum*, *Bernh.*
 β. *Compactum*, *Ach.*
ceranoides, *Borr.*
pulposulum, *Nyl.*
 Common on banks and walls.
 Not common. Near Cirencester.
 The true plant of Borrer. On ground. Minch-
 inhampton Common. Rare in fruit.
 A good subspecies, on canal walls, near Ciren-
 cester.
- C. limosum*, *Ach.*
C. crispum, *Huds.*
C. cristatum, *Nyl.*
C. chirleum, *Ach.*
 On clayey soil, near Wooton-under-Edge.
 Banks and walls.
 A diminutive form of *C. crispum*. Common.
 The typical form, common on wall tops in damp
 situations.
- β. *monocarpon*, *Duf.*
malænum, *Ach.*
 A good subspecies. On mortar.
 In large circular patches on walls in damp situa-
 tions.
 On slates. Shipton.
 Walls. Barnsley Park.
- a. marginale*, *Huds.*
 ? *cristatum*, *Schrad.*
C. polycarpon, *Schw.*
C. stygium, *Del.*
C. multipartitum, *Sm.*
C. nigrescens, *Huds.*
Leptogium amphinæum, *Ach.*
 On limestone, near Oaksey.
 Canal wall, near Cirencester.
 Very rare. Among mosses. Barnsley Park.
 On ash. Kemble. Generally infertile.
 On ground. Near Stroud. Probably a form of
L. subtile.
- L. tenuissimum*, *Dcks.*
L. cretaceum, *Sm.*
 On banks near Stonehouse.
 Old quarries on the Oolite, near Cirencester.
 Rare.
- L. pusillum*, *Nyl.*
 Abundant on fresh mortar, near Cirencester ;
 probably identical with *Collema biatorinum*,
Nyl.
- L. lacerum*, *Sw.*
a. fimbriatum, *Hffm.*
pulvinatum, *Hffm.*
intermedium, *Arn.*
 Common everywhere.
 Cowcombe Wood.
 Common. Well-fruited. On walls.
 On ground, among mosses. Near Chalford.
 There is also a very dark form of *L. laurum*,
 very minute, always barren, occurring on the
 mortar of walls.
- L. subtile*, *Schrad.*
 This occurs on clay banks, near Wooton-under-
 Edge. Thallus well developed ; also in the
 crustaceous form. Near Chalford.
- flatiusculum*, *Nyl.*
 On banks near Stonehouse. Rare, and hitherto
 new to our flora.
- L. sinuatum*, *Huds.*
L. plicatile, *Ach.*
 Common on walls ; fruit abundant.
 On walls, near church, Aston Keynes. Though
 common, it is rarely to be met with in a fertile
 state ; it was formerly classed as *Collema*.
- L. turgidum*.
L. schraderi, *Bernh.*
L. microscopicum, *Nyl.*
 Walls. Sevenhampton. Generally fertile.
 On bridge, near canal, Cirencester. Well fruited.
 Old quarries, Cowcombe Wood, near Chalford.
 Very sparingly fruited, accompanied with
 apothecia of *Byrenocarpoid* growth, which,
 if not referable to *Obrysum*, will probably
 prove to be fungoid.

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A QUARTERLY RECORD OF CRYPTOGAMIC BOTANY
AND ITS LITERATURE.

NOTICES OF NORTH AMERICAN FUNGI.

By the REV. M. J. BERKELEY, M.A., F.L.S.

(Continued from Vol. III., Page 16.)

814. **Nectria aglæothele.** *B. & C.*—Pallida; ostiolo papillæformi demum collabente; ascis linearibus; sporidiis ellipticis uniseptatis.

On alder. Apparently growing on the remains of some *Coccus*. New England, Sprague. No. 5378.

Pale; ostiolum distinct, papillæform darker, then deeply sunk by collapsion; asci linear; sporidia elliptic, uniseriate, slightly attenuated at either end, .00057 inch long. *Nectria crustulina*, *B. & Rav.* Santee Canal. No. 1865, with cæspitose neat tan-coloured perithecia is a stylosporous form, with obovate uniseptate spores, .0006-.0004 inch long.

815. **Nectria Russellii.** *B. & C.*—Cæspitosa, rubra, ostiolo papillæformi dein collabente; sporidiis cymbæformibus uniseptatis.

On elm. New England, Russell. No. 5447.

Cæspitose, red, inclining to brown, ostiolum papillæform, at length sunk from collapsion, sporidia cymbiform, uniseptate, .0006-.0008 inch long. No. 2154, on *Morus*, *Car. Inf.*, scarcely differs.

816. **Nectria viticola.** *B. & C.*—Parva, nitide coccinea, mollis lateraliter collabens e strato albo tenui oriunda; sporidiis uniseri- alibus ellipticis uniseptatis.

On branches of vine. Alabama, Peters. No. 5225.

Scattered, bright crimson, soft, collapsing laterally, seated on a thin white mycelium; sporidia uniseriate, elliptic, uniseptate.

817. **Nectria offuscata.** *B. & C.*—Cæspitosa brunneo-rubra, subtiliter granulata ostiolo collabente; ascis clavatis; sporidiis biserialibus oblongis angustis hyalinis.

On *Hibiscus syriacus*. *Car. Inf.* No. 2865.

Cæspitose, dingy dark brown-red; minutely granulated; ostiolum depressed; asci clavate; sporidia biseriate, oblong, about $\frac{1}{4}$ th as broad as long; externally resembling *N. Russellii*.

* **Nectria cinnabarina.** *Fr.*—*Car. Sup.* No. 138. *Car. Inf.* No. 1399. On *Morus*. Mountains of New York. On *Acer*. No. 4430. On gooseberry. No. 4433.

818. **Nectria diploa.** *B. & C.*—"Journ. Linn. Soc.," x., p. 378. Var. **diminuta.**

Minuta parasitica coccinea; ascis lanceolatis; sporidiis breviter fusiformibus, 2-4 nucleatis.

On some *Sphæria*. On alder. *Car. Inf.* No. 4029.

Very minute, parasitic, scarlet; asci lanceolate but obtuse; sporidia sometimes larger, binucleate, at length uniseptate, in one row or smaller quadrinucleate, biseriata, .001-.00114 inch long.

819. **Nectria Curtisii.** *B.*—Minuta, erumpens sparsa; ascis lanceolatis, sporidiis oblongis curvis, quadrinucleatis.

On *Zea*. *Car. Inf.* No. 3795.

Minute, erumpent, scattered; asci lanceolate, sporidia oblong, curved, with four nuclei, .0005 inch long, about $\frac{1}{6}$ th as broad as long.

* **Nectria polythalama.** *B.*—*Fl. New Zeal.*, II., p. 203. Tab. cv., fig. 15.

On *Liquidambar*. Alabama, Peters. No. 6082. On *Fraxinus*. *Car. Inf.* Ravenel. No. 1549.

Sporidia curved, pluriseptate, .001-.0008 inch long.

820. **Nectria auriger.** *B. & R.*—*Cæspitosa aureo-pulverulenta ostiolo collapso fusco, sporidiis breviter cymbæformibus utrinque attenuatis pluriseptatis.*

On *Fraxinus*. *Car. Inf.* Ravenel. No. 1830.

Perithecia clothed with yellow powder, ostiolum dark, depressed; sporidia cymbæform, slightly attenuated at either end, with about seven septa, .001 inch long.

Var. **flavitecta**, *B. & C.* Sporidiis majoribus 4-septatis.

On *Kerria Japonica*. *Car. Inf.* No. 4025.

Sporidia quadriseptate, sometimes with a gelatinous coat, .0015 inch long. Possibly a distinct species, but the specimen is not in good condition.

* **Sphærostilbe pseudotrichia.** *Schwein.* (Sub *Sphæria*.) *Nectria. B. & C.*—"Journ. Ac. Nat. Sc. Phil.," ii., 1853, p. 289, tab. 25, fig. 9, "Journ. Linn. Soc.," xiv., p. 114. Canada, Poe. No. 6140.

* **Sphærostilbe cinnabarina.** *Tul.*—*Carp.* iii., p. 103. Louisiana, Dr. Hale. No. 3674. On hickory. *Car. Inf.* Ravenel. 1339. There are two specimens from Ravenel. On *Morus*. No. 1432. On *Rhus radicans*. No. 1639, and *Car. Inf.* No. 3049, in which the Stilbum (*S. lateritium*, *B.*) is more transparent. This may possibly indicate another species.

* **Sphærostilbe gracilipes.** *Tul.*—*Carp.* iii., p. 102. *Car. Inf.* On *Hibiscus syriacus*. No. 2637. On *Carya*. No. 2410. On *Melia*. Ravenel. No. 1439. On *Platanus*. No. 1820. Alabama, Peters. On *Carya*. No. 5247.

Sphærostilbe coccophila. *Tul.* l. c. p. 105.—On *Alnus serrulata*. Pennsylvania, Michener. No. 4316.

It is not quite certain that this is Tulasne's species. The conidia are those of an *Atractium*, .002 long.

* **Sphærostilbe flammea.** *Tul.* l. c. p. 104.—On *Acer rubrum*. Car. Inf. Ravenel. No. 1843.

There is a very distinct species on *Magnolia glauca*. Car. Inf. No. 5005 (*Atractium pallidum*) B. & C., with short fusiform spores, .0005 inch long, with the endochrome retracted to either end; also Ravenel, No. 976 and 1433. On *Parmelia* and *Frullania Virginnica*, which may possibly be the conidiiferous form of *Nectria muscivora*.

* **Cucurbitaria elongata.** *Grer.*—On *Robinia*. Mountains of Virginia. No. 3307, 3323. New York, Sartwell. No. 3624. On *Gleditschia*. No. 5974. Car. Sup. No. 841.

* **Cucurbitaria Gleditschiæ.** *Schwein.*—Car. Sup. No. 841, 942. Sporidia ovate, uniseptate.

* **Cucurbitaria Berberidis.** *Tul.*—New England, Russell. No. 5961, 5980.

* **Cucurbitaria tumorum.** *Schwein.*—Canada, Poe. No. 6141.

821. **Cucurbitaria callista.** *B. & C.*—Effusa, peritheciis in crustam fuscam insidentibus primum globosis dein collapsis; sporidiis minutis allantoideis.

On Hornbeam. No. 342.

Forming a continuous effused patch; perithecia seated on a brown crust, at first globose, then collapsed; sporidia minute, sausage-shaped.

822. **Cucurbitaria brevibarbata.** *B. & C.*—Cæspitosa globosa nec collapsa minutissime tomentosa; ascis clavatis faretis; sporidiis allantoideis.

823. **Xylaria Titan.** *B. & C.*—Gigantea allantoidea dura extus albida; ostiolis nigris prominentibus.

Texas, Lindheimer, No. 2676.

Five inches long, 2 inches wide, sausage-shaped, convex on one side, hollow on the other; hard, solid, dirty-white, stained with the sporidia and dotted with the prominent ostiola.

824. **Xylaria cudonia.** *B. & C.*—Sublaccata; stipite curto sursum dilatato; capitulo hemispherico e peritheciis papillato; ostiolis minimis.

On a dead tree. Car. Inf. Santee Canal, No. 3220.

Slightly lacate, shining; stem $\frac{5}{12}$ inch long, nearly 2 lines thick above; head semiglobose, $\frac{5}{12}$ inch across, slightly papillose from the projection of the perithecia; ostiola very small.

825. **Xylaria clavulus.** *B. & C.*—Parva seriata; stipite brevi crassiusculo penetrante; capitulo convexo.

On the dead stem of some grass. Texas, C. Wright, No. 3150.

Gregarious, seriate. A miniature of the last. Stem with the head about 1 line high, not laccate, rather thick for the size of the plant, penetrating the convex papillate head. A very curious little species.

* **Xylaria digitata.** *Fr.*—Car. Sup. No. 417. Texas, Lindheimer, No. 3627.

* **Xylaria polymorpha.** *Fr.*—Car. Sup. No. 450, 739. Pennsylvania, Michener. No. 3782.

* **Xylaria Cornu-Damæ.** *Schwein.*—On dead wood. Car. Inf. Ravenel.

* **Xylaria corniformis.** *Fr.*—Car. Inf. No. 1124. Car. Sup. No. 733.

On *Rhus copallina*. Car. Inf. Ravenel. No. 1803. On *Populus dilatata*. No. 914. On *Acer rubrum*. Ravenel. No. 1558, and *Myrica cerifera*.

Cæspitose globose, not collapsed, clothed with very minute black pubescence; asci clavate, stuffed with multitudes of minute sausage-shaped sporidia.

* **Xylaria flabelliformis.**—*Schwein.*—Car. Inf. No. 1213, 2609.

* **Xylaria pedunculata.** *Fr.*—St. Louis, Missouri, Dr. G. Engelmaan. No. 6429.

* **Xylaria hypoxylon.** *Fr.*—Car. Inf. No. 57. 116. 737. 600. 1824. Ravenel, No. 1277. Pennsylvania, Michener. No. 3924.

* **Xylaria persicaria.** *Schwein.*—On peach stones. Car. Inf. No. 3218.

* **Xylaria carpophila.** *Fr.*—On nuts of *Liquidambar*. Car. Inf. No. 1175. Ravenel. No. 1279. 1277.

* **Xylaria filiformis.** *Fr.*—On dead leaves. Car. Inf. Ravenel

* **Xylaria rhopaloides.** *Mont.*—Var. **acicularis**, *B.* More slender and delicate. Car. Sup. Ravenel. No. 1301. Car. Inf. No. 68. 248. 433. Texas, C. Wright. No. 3904.

826. **Xylaria tentaculata.** *B. & Br.*—Stipite elongato glabro fusco; capitulo brevi cylindrico processibus longis tentaculiformibus coronato.

In shaded swamps among mosses and rotting wood. Car. Inf. Ravenel. No. 1300. On the fruit of some *Leguminosa*. Cordova. Sallé. No. 92.

Stem 1 inch high, not a line thick; head cylindrical, 1-2 lines long, ostiola prominent, tending upwards, crowned by several tentacular processes, about $\frac{1}{2}$ an inch long. Allied to *Xylaria comosa*, *Mont.*

* **Pozonia Œdipus.** *Mont.*—On dung. Alabama, Peters. No. 4019. Texas, C. Wright. No. 3778.

* **Hypoxylon concentricum.** *Grev.*—Car. Sup. No. 70.

* **Hypoxyylon Petersii.** *B. & C.*—Journ. Linn. Soc. x., p. 384.

On rotting oak. Alabama, Peters. No. 4903. Cuba, C. Wright. Sporidia 0003 long.

827. **Hypoxyylon malleolus.** *B. & Rav.*—Globosum confluens, ostiolis annulo depresso circumdati, stromate nigerrimo.

On oak trees. Car. Inf. Ravenel. No. 1646.

Globose, $\frac{3}{4}$ inch wide, but often laterally confluent, ostiola papiliform, sunk in an annular depression as in *H. marginatum*; stroma jet black.

828. **Hypoxyylon glomiforme.** *B. & C.*—Hemisphericum ferrugineo-pulveraceum, demum denudatum nitidum læve; peritheciis conditis; stromate atro-fusco.

On bark of *Quercus nigra*. Connecticut, C. Wright. No. 5632. 6368.

Gregarious, hemispherical, nearly $\frac{1}{4}$ inch wide, at first clothed with ferruginous powder, then black and shining, even, perithecia hidden without any external trace of ostiola; stroma dark brown.

829. **Hypoxyylon Murraini.** *B. & C.*—Subglobosum extus intusque nigrum, ostiolis dense papillosum.

On dead bark. Boston, Murray.

Gregarious, subglobose, a line or more broad, black without and within, densely papillose with the minute ostiola. The specimens are unfortunately without fruit. It resembles externally *H. bomba*, Mont., except the densely papillose surface.

* **Hypoxyylon fragiforme.** *Grev.*—Car. Inf. No. 1420. Cotoosa Springs, Ravenel. No. 1740. Rhode Island. Olney. No. 1855. Amherstburgh, Dr. Maclagan. No. 372. Sartwell. No. 2736.

* **Hypoxyylon argillaceum.** (*P.*)—Canada, Dr. Maclagan. No. 291.

* **Hypoxyylon fuscum.** (*P.*)—On *Betula rubra*, *Laurus benzoin*, *Ilex opaca*, *Cerasus avium*. Car. Sup. No. 16, 106, 197, 312. Pennsylvania, Michener. No. 4121. Car. Inf. Ravenel. No. 1751.

* **Hypoxyylon cohærens.** (*P.*)—On oak, beech, *Nyssa*, *Acer Pennsylvanicum*. Car. Sup. No. 69, 842. Car. Inf. No. 2206. Mountains of New York. No. 4437, 4503. Cotoosa Springs. Ravenel, No. 1741. Sporidia 0003 inch long.

* **Hypoxyylon marginatum.** (*Schwein.*)—On oak. Car. Sup. No. 58, 104, 129, 240, 376. Car. Inf. No. 1482, 1546, 1571. Ravenel, No. 531, 1753. Cotoosa Springs. No. 1739. var. EFFUSUM. Alabama, Beaumont. No. 4855. On *Myrica cerifera*. Car. Inf. Ravenel. No. 1578, 1823. Dr. Maclagan. No. 367. Amherstburgh.

* **Hypoxyylon multiforme.** *Fr.*—On oak. Car. Inf. No. 1538, 2370, 2525.

830. **Hypoxyylon crocopeplum.** *B. & C.*—Irregulare depressum pulvere crocino tectum; peritheciis prominulis, ostiolo minuto.

On decayed bark. Car. Inf. No. 1906. Nearly $\frac{1}{2}$ inch broad, irregular, depressed, clothed with a dense coat of red ferruginous (peroxyd) powder; perithecia rather prominent, with a minute ostiolum, sporidia dark, shortly cymbæforme.

* **Hypoxylon rubricosum.** *Mont.*—On ash. Car. Inf. No. 6007. Ravenel. No. 1835. On *Melia azederach.* No. 1795. Sporidia .0004 inch long.

831. **Hypoxylon gemmatum.** *B. & Rav.*—Parvum, pulvinatum, rubiginosum, ostiolis prominulis nigris centro perforatis gemmatis. On *Liquidambar.* Car. Inf. Ravenel. No. 1385.

Small, scarcely a line broad, pulvinate but flat, rubiginous, sometimes transverse, studded with the black prominent ostiola, which are perforated in the centre.

* **Hypoxylon perforatum.** (*Schwein.*)—On *Arundinaria macrosperma.* Car. Inf. No. 1010. Ravenel. No. 97. On *Cornus florida.* No. 1767. 1812.

832. **Hypoxylon jecorinum.** *B. & Rav.*—Effusum pulvere fulvo primum tectum demum jecorinum; ostiolis prominulis punctatum. On logs of *Acer rubrum.* Car. Inf. Ravenel. No. 1560.

Effused, an inch or more long and broad; at first tawny, dotted with dark ostiola, then liver-coloured. No. 1828. On *Platanus,* differs only in having the perithecia more prominent.

833. **Hypoxylon florideum.** *B. & C.*—Effusum undulatum vinosum pulverulentum, peritheciis abditis; sporidiis cymbæformibus uninucleatis.

Car. Inf. No. 1911. On *Acer rubrum.* Ravenel. No. 1579.

Effused for many inches, undulated, clothed with a vinous powder, asci linear, sporidia cymbæform, .0036 long, uninucleate.

* **Hypoxylon decorticatum.** (*Schwein.*)—Car. Inf. No. 2845.

834. **Hypoxylon myriangioides.** *B. & Rav.*—Orbiculare pulvinatum, ferruginum rugosum, peritheciis prominulis collabentibus, ascis lineari-lanceolatis; sporidiis fusiformibus curvatis triseptatis.

On bark of Hornbeam. Car. Inf. Ravenel. No. 1363.

Orbicular, pulvinate, flat, rugose, ferruginous; perithecia prominent, collapsing; asci linear-lanceolate, sporidia biseriata, fusiform, curved, triseptate.

835. **Hypoxylon notatum.** *B. & C.*—Peritheciis paucis majoribus in pulvinulos congestis, rubiginosis, ostiolo demum truncato perforato.

On *Celtis.* Car. Inf. No. 1910. On oak. Car. Inf. No. 2205. On *Viburnum dentatum.* Pennsylvania, Michener, No. 4206.

Perithecia few, rather large, crowded into a little pulvinate mass clothed with rubiginous powder, ostiola at length prominent, truncate, with a central perforation. The sporidia, which are shortly cymbæform, vary a little in size.

836. **Hypoxyylon glomus.** *B. & C.*—Erumpens pulvinatum subangulare nigrum; peritheciis paucis; ostioliis hic illic erumpentibus perforatis.

New England, Murray. No. 5698. Sprague. No. 6273.

Erumpent, pulvinate, somewhat angular, black, with a little red about the apex; perithecia large, about five in each pustule. This is clearly a very distinct species, but the specimens are unfortunately old and without fruit.

837. **Hypoxyylon leucocreas.** *B. & Rav.*—Parvum pulvinatum e peritheciis prominulis papillatum nitidum, intus niveum; sporidiis parvis ellipticis.

On limbs of oak. Car. Inf. Ravenel. No. 1706.

Small, about $\frac{1}{2}$ a line across, black, papillate from the projection of the perithecia; stroma snow-white; asci linear; sporidia in a single row, minute, elliptic, brown.

838. **Hypoxyylon bicolor.** *B. & C.*—Irregulare undulatum placentaeforme granulatum, intus niveum.

Vermont. No. 5909.

Irregular, strongly undulated, an inch or more across, finely granulated, white within. This again is without fruit, but is a very distinct species.

* **Hypoxyylon enteromelum.** *Schwein.*—On beech. Pennsylvania, Michener. No. 4354. Nova Scotia, Rev. J. D. Russell. No. 5901.

839. **Hypoxyylon xanthocreas.** *B. & C.*—Pulvinatum nigrum demum confluens e peritheciis prominulis papillosum; stromate flavo; ascis linearibus; sporidiis uniseriatis ellipticis.

New England, Sprague. No. 5374.

At first distinct, pulvinate, then by confluence forming a mass half an inch broad, black, papillate from the projection of the minute perithecia; asci linear; sporidia uniseriate, elliptic, 0003 long. Differs from Montagne's *H. endoxanthum*.

840. **Hypoxyylon epirhodium.** *B. & Rav.*—Effusum tenue parvum nigrum ex ostioliis prominulis papillosum; ascis linearibus; sporidiis elliptic uniseriatis.

Car. Inf. No. 3253. On branches of rose. Car. Inf. Ravenel.

Effused, thin, forming small black patches, about two lines across, papillose from the slightly prominent ostiola; asci linear; sporidia uniseriate, elliptic.

* **Hypoxyylon turbinulatum.** *Schwein.*—On beech. Pennsylvania, Michener. No. 4216.

* **Hypoxyylon callostroma.** *Schwein.*—On *Benzoin odoriferum*. Pennsylvania, Michener. No. 3959. No. 4346, on *Prinus verticellatus*. Alabama, Beaumont. No. 4619.

Sporidia oblong, .0004 long.

841. **Hypoxyylon Morsei.** *B. & C.*—Erumpens; peritheciis magnis

congestis rubiginosis; ostiolo papillæformi; ascis linearibus; sporidiis oblongis.

On alder. New England, Russell. No. 5936. Maine, Morse. No. 6277.

Erumpent; perithecia large, crowded, covered with rubiginous meal; ostiola papillæform; asci linear; sporidia uniseriate, oblong, with one or two nuclei, .001 or more long, about $\frac{1}{3}$ as much wide.

842. **Hypoxylon Blakeii.** *B. & C.*—Erumpens; peritheciis minoribus congestis ferrugineis; ostiolo papillæformi; ascis linearibus; sporidiis oblongis.

On willow. Maine. No. 6303.

Erumpent; perithecia ferruginous, much smaller than in the last, crowded; ostiola prominent; asci linear; sporidia uniseriate, oblong, with one or two nuclei, .0008 long. In many respects resembling the last, but with smaller perithecia and sporidia.

* **Hypoxylon sassafras.** *Schwein.*—*Car. Inf.* No. 1889. Ravenel. Sporidia oblong, .0008 long.

843. **Hypoxylon epiphæum.** *B. & C.*—Peritheciis paucis conatis e maculâ rubiginosa oriundis; ostiolo papillæform; sporidiis breviter cymbæformibus.

On *Magnolia glauca.* *Car. Inf.* No. 2437.

Perithecia few, crowded in the centre of a rubiginous spot; ostiolum papillæform; asci linear; sporidia uniseriate, brown, shortly cymbæform.

* **Hypoxylon rubiginosum.** *Fr.*—*Car. Sup.* No. 878. Texas, C. Wright. No. 3893.

* **Hypoxylon subiculosum.** *Schwein.*—*Car. Sup.* No. 86, 176, 278, 309, 319, 321, 357, 384, 395, 423. *Car. Inf.* No. 4920. Ravenel. No. 1707.

Sporidia shortly cymbiform, binucleate, .0005 long.

* **Hypoxylon gregale.** *Schwein.*—*Car. Inf.* Ravenel. No. 1329.

Perithecia ovate, rather acute, pulverulent; ostiolum papillæform; sporidia oblong, narrow, uniseptate, .0005 long.

* **Hypoxylon mammæforme.** *Fr.*—*Car. Inf.* On *Cyrilla.* No. 952.

844. **Hypoxylon nucitena.** *B. & C.*—Peritheciis minutis nigris confluentibus tingentibus; sporidiis cymbæformibus biseptatis, medio fuscis.

On nuts of *Carya.* Pennsylvania, Michener. No. 4151.

Perithecia minute, crowded, forming an even stratum, pulverulent; ostiolum papillæform; sporidia cymbæform, biseptate, the middle articulate, brown, or with a brown nucleus, .0006-.00057 long.

* **Hypoxylon investiens.** *Schwein.*—Texas, C. Wright. No. 3913.

REPRODUCTION IN *COPRINUS RADIATUS*.

By WORTHINGTON G. SMITH, F.L.S.

Plates 54 to 61.*

For the purpose of minute research into the vital phenomena of the Mushroom tribe, *Coprinus radiatus*, Fr., possesses many advantages over the other species of the large order to which it belongs. The first great advantage peculiar to *C. radiatus* is that it grows readily and abundantly on dung heaps from April to December, and it comes up equally well in town and country. The second point in its favour is that it is so small and transparent that every part can be quickly examined, and an entire plant kept under the covering glass of the microscope. The third advantage found in *C. radiatus* rests in the fact of its whole life being so exceedingly short that its entire vital functions are performed in a few days. Having these points in view, I have, during the whole of the present summer and autumn kept up a large bed of fresh horse-dung in my garden, and from this bed I have narrowly watched the growth of many generations of the plant I am about to describe.

A complaint is often made by persons unused to the microscope, and to the appearances of objects as seen by its aid, that it is impossible to see the real objects as they are represented in drawings. To a certain extent this is borne out by facts, for a drawing is never meant to represent what may be accidentally seen at one sitting, but is designed as a summing-up of all that has been seen during many hundreds of sittings. Any one looking for the first time through a good telescope at Jupiter's moons, Saturn's rings, or the planet Mars, might be a little disappointed in the apparent smallness and lack of strongly marked outlines in the objects seen; but this does not detract from the correctness of astronomical diagrams, which are only matured after many patient observations. No one expects to see the solar system as shown in a model, or the country as seen on a map.

It may reasonably be premised that the facts observed in connection with the life history of *Coprinus radiatus* will more or less apply to all the other species belonging to the Mushroom tribe; but it would be impossible to make the observations here recorded on the more fleshy species, because, instead of days, these latter plants take months to mature. In *C. radiatus* generation after generation keeps springing up in almost daily succession, but in the more fleshy species, exclusive of *Coprinus* and *Bolbitius*, I am convinced there is, as a rule, but one generation in the year. The *Agarics* of the autumn spring up from the mycelium formed during the fall of the previous year, and this

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mycelium has rested in the ground for twelve months. In digging up old pasture ground, or the dead leaves of an autumn which has passed, mycelium in a resting state is invariably found. There is no such long rest with the mycelium of *Coprinus radiatus*, for so long as the weather is not too dry, too wet, or too cold, the fungus goes on perfecting itself day after day without ceasing. During hot, very wet, or frosty weather the spawn lies buried, and it rests in the warm, moist dung for short periods of time only.

Coprinus radiatus, Fr., is one of the dung-borne Agarics with a cap which measures from an eighth to one quarter of an inch in diameter, and this filmy pileus is supported on a stem, which on an average measures from a quarter to three-eighths of an inch or more in height (Pl. 54A and 55A). The whole cap is a mere transparent film, and the fragile stem is like an atom of gossamer thread. A breath will totally break down and collapse every part of the plant, whilst a heavy dew or slight shower of rain will destroy a whole colony. These minute Agarics can only be gathered with the aid of small forceps, for if they are taken in the fingers they at once collapse, become liquid, and vanish. So little moisture does a single specimen contain that it is lost in the moment or two consumed in taking it for examination from the garden to the house. The young plants may generally be seen dotted over the dung, like in size to so many pins' heads (Pl. 55B), and from this, the infant state, to maturity, the growth of the fungus is very rapid. At seven or eight in the evening nothing but immature plants can be seen (Pl. 54c, d, enlarged 20 diameters); about eleven or twelve a rapid growth commences, and by two or three o'clock in the morning perfect maturity is reached. If the morning is moist the plants will remain in perfection till nine or ten o'clock, but if it is dry they will not last after five or six. On shady roadsides or in dark places the time required for growth may probably be a little more or less, but the present observations apply to the plants as found growing on dung in a light and open place.

To get a good view of *C. radiatus* it is necessary to magnify it at least from 50 to 100 diameters; the nature of the stem and gills can then be made out, and all the individual component cells be clearly seen.

Mature plants are figured at E, F (Pl. 54), enlarged 10 and 20 diameters, the first showing the nature of the outer surface of pileus, with its furrows, and the other the lower or fruiting surface, with the nature of the gills, and the collar formed by them near the insertion of the stem. At G is shown the relative number of the basidia or privileged cells, which carry the naked spores, and at H the relative number and position of other privileged cells, termed cystidia. To these latter bodies I shall presently refer more fully, and they are merely adverted to here that some idea may be formed of their great number. At I is shown a transverse section

through the cap of the fungus, a short time before expansion (when the umbrella-like top is down), to show that the hair-like stem is hollow, and that the plant in infancy is enveloped in a complete veil or bag, the presence of which is shown by the ring of cells and hairs which forms the circumference of the diagram.

For a proper comprehension, however, of this minute fungus much more than a superficial examination is necessary, and the first thing to be done in the way of dissection is to secure a good longitudinal section of the fungus from top to bottom, as shown in Pl. 55 (J)—this enlarged 35 diameters, at once shows the immense number of cells which go to make up one of the fugitive little plants belonging to *Coprinus radiatus*. By reference to the figure it will be seen that the stratum of flesh which forms the pileus is only six or seven cells in thickness, and the external surface is covered with a few hairs of different sizes (the remnants of the universal veil or wrapper) some of the smaller hairs being tipped with a gland. Another good vertical segmental section across the cap and gills will show the appearance of the plicato-radiate outer surface of the pileus to be caused by a series of cracks which are brought about by the necessarily sudden expansion of the cap, which act of expansion tears (in these positions) the component cells of the pileus apart, Pl. 54E, and Pl. 55K. A transverse section through the fungus when in an infant state shows the commencement of these fissures, as at Pl. 54, I, and Pl. 55, L. The gills have no trace of a trama—the so-called trama being the cells which form the substance between the hymenium in the gills; if present this substance would be at M M., Pl. 55, but one of the characters of the genus *Coprinus* is that the gills have no distinct intermediate substance in the gills. In the plant under examination the lamellæ or gills are free from, and form a collar round the stem (Pl. 55, N), and are only about seven cells in thickness.

Good sections down and across this stem when young will show it (gossamer like as it is) to be piped or hollow from top to bottom (Pl. 55 O), and the hairs seen at the base (P P) are the torn remains of the veil or wrapper which once held the edge of the pileus (Q) down to the base of the stem. In this figure several spores may be seen at the base, carried up amongst the cells of the stem. On looking at an entire plant of *C. radiatus* in this way under a low power of the microscope it appears to be formed of a few thousands of cells only, but if these cells are now measured and counted, which is by no means a difficult matter, it will be found that instead of thousands it really requires millions of individual cells to build up one of these minute plants which a breath destroys. The smallness and lightness of one fungus is such that it requires 150 specimens to weigh a grain, or 72,000 to weigh an ounce troy. In the type specimen of *C. radiatus* now figured there were 22,560,000 cells in its structure irrespective of the spores, which numbered about 3,200,000 more. If all these cells

and spores are only equivalent to the hundred-and-fiftieth part of a grain, it follows that in an ounce of fungus cells there must be no less than one billion six hundred and twenty-four thousand millions of these bodies, exclusive of the spores. In a large Mushroom the cells would number hundreds of billions. Still more wonderful is the fact that each individual cell is furnished with a spark of life, contains water, protoplasm, and other material, and is capable of growth and assimilation.

The purpose of this essay is to demonstrate something of the life history of the minute but truly wonderful fungus now before us; and with this object in view it is not only necessary to use the higher powers of the microscope, but to patiently watch the fungus and its changes at every hour (almost minute) of the night and day and for several days in succession.

In the vertical section of one of the minute gills, as shown in Pl. 56, magnified 150 diameters, the whole fruiting and reproductive surface of the fungus is seen at a glance. The nature of the furrows in the pileus (R) is now perfectly clear, every cell being seen in position, and the remnants of the universal veil or wrapper are seen on the surface of pileus at s. Studded amongst the cells of the upper stratum of cap may be seen various brilliant crystals which belong to the ammonio-phosphate of magnesia, and which crystals are taken up by the fungus from the manure on which it grows. Many dung-borne Agarics are covered with so-called micaceous particles, which, in many instances, doubtlessly arise from the manure which supports the fungus. It is a matter of considerable difficulty to get a section like this, for if attempted clumsily no result will follow beyond a slight discoloration of the edge of the lancet; it is necessary to take the slice at the exact moment of maturity, and even then it requires the perfection of dexterity to cut the fungus properly, as the plant is sticky in all its parts. A fragment of the fruiting surface of a gill is shown at T.

To understand the vital phenomena of *C. radiatus* it is necessary to comprehend the meaning of the bodies seen in Pls. 56 and 57. The whole fungus is built up of cells, which run parallel with each other (and at maturity are very long) in the stem (Pl. 55), and which spread laterally, and then become more or less spherical in the pileus. When these cells reach the gills or fruit-bearing surface (hymenium, $\sigma \sigma$), a certain differentiation takes place in their functions. The majority of the cells remain simple, but certain other cells which are spread over the gills with the greatest regularity assume a different nature, and produce spores. These cells are called basidia (meaning small pedestals, $v v$, Pl. 56 and 57), and the spores, or analogues of ovules or seeds, basidio-spores, because they are carried on these little pedestals. The minute threads between the spores and their pedestals are termed spicules or sterigmata (literally progs). Certain other

privileged cells (w w, Pl. 56) are termed cystidia (bladders), and around these latter organs and their meaning the principal interest of the subject in hand will now centre. But let it be borne in mind as a preliminary fact of the utmost importance that at first the fungus is composed wholly of simple cells which show no differentiation; no differentiation in the cells is seen in infancy when the gills are first formed, but the privileged cells, known as basidia and cystidia, come only into existence and that simultaneously as the plants reach maturity. This differentiation I consider to be sexual the basidia being female, and the cystidia the male organs. When the contents of the basidia and cystidia are interchanged, the result is a return to another series of cells, which go to form a new plant. I am perfectly aware of the opinions which have been expressed by other botanists (and to which I shall return), but it is not so much my aim to make my observations accord with what others have said, as to record what I have seen myself, and to give my own interpretations of the phenomena seen, irrespective of what has been said or done before.

The first sign of differentiation in the simple cells of the gills, when the basidia and cystidia are about to be produced, is in the privileged cells becoming glossy, crystalline, and translucent; they both appear to secrete a material which makes them conspicuously brilliant. Each basidium then throws out four slender branches, the tips of which gradually swell and form spores. The cystidia (w) are more sparingly produced (for their number in this species see Pl. 54, n. and Pl. 55, q), and at first cannot be distinguished from the basidia, though they are frequently larger in size; they are commonly granular within, and are in many species, as in the one before us, crowned with granules, w (Pl. 57, x), but sometimes they bear four spicules, and this latter condition has led some botanists to consider the cystidia to be barren basidia, but that they are really cystidia with spicules is proved by the following fact, which I believe to be somewhat new. In moisture, as supplied by the expressed juice of horse dung (or even distilled water) these spicule-bearing cystidia germinate at the four points of the spicules, and produce long threads, which bear at their tips the granules so frequent in typical cystidia (Pl. 57, y). The cystidia are moreover furnished with spicules in the subgenus *Pleuteus*. The germinating cystidia are seen in several places at w, Pls. 56 and 57, and the granules at x, y. On the top of Pl. 57 is seen a section of a gill with all the bodies in position enlarged 350 diameters, whilst on the lower part of the cut may be seen various germinating cystidia to the same scale as seen on the surface of a gill. The granules at y, which are at first not capable of movement, are really spermatozooids possessed of a fecundative power, but to see this power brought into operation considerable care and patience and the higher powers of the microscope are requisite. In certain other of the Agaricini, the protoplasmic contents of the

cystidia are at times discharged from one mouth only, and that at the apex of the cystidium.

Before quitting Pls. 56 and 57, I may say that when a slice, as represented in fig. 56, is placed under a covering glass in a drop of water, all the cells totally collapse and perish, so that in three or four hours not a vestige remains, but the same drop of water which destroys the old cells instils life into the granules or spermatozoids, which after the lapse of a couple of hours begin to revolve, and ultimately swim about with great rapidity. These spermatozoids attach themselves to the spores, pierce the coat, and discharge their contents into the substance of the spore. From twenty-four to forty-eight hours after this the spore discharges a cell which soon becomes free, and this is the first cell of the pileus of a new plant which rapidly produces others of a like nature (z, Pl. 56). Now the same water which had the effect of immediately collapsing and destroying the old cells, has quite a different effect on the new cells as discharged from the fecundated spore, for the whole development of the new plant depends upon the constant presence of moisture, expressed juice of horse-dung being perhaps best. A spore unpierced by the spermatozoids is shown producing a mycelium peculiar to itself, at a, Pl. 56.

A spore is commonly considered to have some analogy with a seed, but according to my views its analogy is rather with an unfecundated naked ovule without an embryo, unless the nucleus within the spore may in some way represent the rudimentary fungus; when the spores are formed within sacs or asci, the ascus bears some analogy with the ovary. The cystidium, on the other hand, represents with its granules the anther and its pollen.

The six spores represented on the top of Pl. 58 are magnified 1,000 diameters, and each viscid spore, which is furnished with a nucleus lighter in colour, but with a dark outline, has been pierced and fertilised by one or more spermatozoids, whilst the unfertilised spore at a has burst at both ends, and produced a mycelium of its own. At b may be seen three spermatozoids which have burst after twelve hours in expressed juice of horse-dung, and which have also produced branching threads peculiar to themselves, reminding one of a pollen tube. It is quite possible that these latter threads may help to produce a new plant if they come in contact with the spores. The large figure at c is similar in nature to the group at z, Pl. 56, and represents three fertilised spores which have burst and produced the first minute knot or groups of cells of the cap of a new fungus. These eighteen cells took four days for their production, and the crystals belong to the expressed juice of the horse-dung in which they grew. The spermatozoids as here shown begin gradually to revolve after being kept in liquid for two hours, and the movements last for at least four days. At first these bodies are perfectly spherical, as at d, when they merely oscillate, then they revolve slowly, and as time

goes on, a single turn of a spiral makes itself visible, and the bodies whirl round with great rapidity. At intervals the motion entirely ceases, and then, after a short lapse of time, the gyration is again continued.

Judging from the presence of the eddy round these bodies whilst whirling (E E, Pl. 58) they are possibly provided with cilia, but from the extreme minuteness of the bodies themselves I have not been able to satisfactorily demonstrate their presence. The whirling of the spermatozoids is sometimes so strong that when they attach themselves to the spores they twist them round after the manner of the revolving oosphere in *Fucus*.

When the cells of the old parent fungus collapse and disappear in the water, their place is in less than two hours occupied by innumerable quantities of bacteria, vibriones and monads, which belong to the infusoria. In these two hours every cell of the pileus has generally vanished. Where these infusoria come from, or how they so speedily come into being, is difficult to say. They may possibly be present in a latent state in the juices of the fungus, but I have invariably found, when a single specimen of *C. radiatus* has been placed on a slide under a covering glass with a drop of water, and this, again, under a propagating glass, that as the millions of fungus cells quickly disappear, so millions of simple infusoria just as quickly come into being. It seems almost reasonable to believe that the fungus cells themselves become suddenly transformed, and reappear as simple infusoria; the change would not be quicker or more remarkable than the rapid production of the purple black spores from the crystalline and colourless basidia.

Be this as it may I have here engraved the abundant infusoria to the same scale as the cells. The tailless monads at F have a rocking Brownian movement, whilst those with tails, G, propel themselves rapidly about after the manner of minute tadpoles. These monads are liable (without care) to be mistaken for the bodies I refer to spermatozoids, from which they are, however, very different. The bacteria are represented at H H, with their various movements (indicated by dotted lines), either straight, zig-zag, or rapidly revolving on a central axis; when they so revolve they cause a miniature vortex amongst the monads and atoms. I have commonly seen one segment move from side to side, as at J, whilst the other segment remained quiescent. I have also seen them bud from the centre, and occasionally they occur with three limbs instead of two, radiating from the central axis. The vibriones are like vegetable screws, and are shown at K. The spores and infusoria neither collapse nor burst in boiling. As for the monads, vibriones, and bacteria, it can hardly be admitted that they are generated spontaneously from inorganic materials; my experiments rather point in the direction that they are only differentiated forms of already living cells. However this may be, my boiling has not

destroyed either vitality or form, and those interested in the subject of spontaneous generation, may possibly read the result of the following experiment with interest. A dozen semi-decayed specimens of *C. radiatus*, swarming with minute infusoria, were boiled in a test tube for five minutes and then hermetically sealed at the highest point of ebullition. At the end of a month the tube was opened and a drop of its liquid contents at once placed under a cover glass of the microscope for examination. Spores, cells, monads, bacteria, and vibriones were all there, but the latter motionless and apparently dead. In fifteen minutes, however, they showed signs of life, and began to slightly move about, in thirty minutes the movements were decided in nearly every specimen seen, whilst in sixty minutes the infusoria darted about with almost the same energy as they did before they were boiled. For a better appreciation of the exact form and gyrations of the spermatozoids they are shown again at the bottom of Pl. 58, enlarged 3,000 diameters. At first it requires long and patient observation to make out the form of these bodies satisfactorily, but when the peculiar shape is once comprehended, there is little difficulty in correctly seeing their characteristic form. The difficulty is something like that experienced by beginners in separating very small and close double stars with a telescope; at first, and sometimes for a long period, only one star can be seen, till quite suddenly the two are made out, and they are seen as two ever afterwards.

It is not uncommon to find the spores of other dung-borne fungi sticking to the specimens of *C. radiatus*, and it is quite frequent to find not only the spores but the perfect asci of certain species of *Ascobolus* sticking to the under surface, to which position they have been projected from the plants of *Ascobolus* growing on the dung. I have also seen the eggs of various mites, nematoid worms, &c., carried up amongst the cells, which quite accounts for larvæ being found within the substance of apparently sound fungi.

In the works I am acquainted with there is no mention of the cystidia falling bodily out of the hymenium on to the ground, yet this is the case in several Agarics I have examined, and is so with *C. radiatus*. The spores naturally fall to the earth, and with them the cystidia, and it is upon the moist earth that fertilisation is generally carried out. All botanists will remember Hoffmann's observations, where he has indicated the passage of basidia into cystidia, and his remarks on the upper surface of the ring which grows round the middle of the stem in *Agaricus muscarius*. In this latter position Hoffmann found a quantity of gelatinous knots, from which projected one or more oscillating threads, terminated frequently with a little head, which occasionally becomes detached. My interpretation of these observations is, that Hoffmann lighted upon the fallen cystidia on the upper surface of the ring, where

they were throwing out threads. Hedwig made somewhat similar observations on the ring in *Agaricus*.

From the condition of the infant plant, as figured on the hymenium, Pl. 56, z, and Pl. 58, c, it is easy to trace the young fungus through the various stages of its growth, as seen at Pl. 59, where the figures are all enlarged 500 diameters, the lower group of cells shows a plant of seven days' growth in the expressed juice of horse-dung. In all these figures it will be seen that crystals and spores are carried up by the cells, and the lower figure conclusively shows that the first cells of the new plant are the large ones which belong to the pileus; indeed, the hairs of the pileus, as here shown, are amongst the earliest cells produced, these hairs and the threads of the mycelium (which is always highly granular near the plant) are almost one and the same in character. In Pl. 59 and in Pl. 60 the infant fungus resembles a Puff-ball, to which it indeed bears a certain natural relationship. The whole plant in infancy is enveloped in a wrapper of cells, the fructification being entirely concealed within. In the lower figure on Pl. 59 may be seen two spermatozoids which have burst, and κ κ κ shows the cells of straw.

When the fungus has made about the number of cells represented on the bottom of Pl. 59, the growth cannot be carried any further beneath a covering glass. Pl. 60 represents on one side the elevation, and on the other the section of the very smallest infant plant it is possible to see with a lens on the dung. The fungus represented is magnified 200 diameters, and the original was about half the size of a pin's head (see A A A sketch in margin). The nature of the hairy coating, which forms the veil, and the cells which are to form the future gills, are here clearly seen. This figure shows the fungus in its Puff-ball condition at the time when the cells are being actively produced. It contains only a small proportion of the actual cells which go to make up a perfect fungus, and represents probably a full week's growth from the spores. How it is the cells have an inherent property of building themselves up into a particular design, no one knows any more than it is known how the fine spark of life is kept up in these cells from one generation to another.

The mycelium now grows in a radiate manner from the base of the young plant, just as a germinating seed throws up a plumule and throws down a radicle. This mycelium being the produce of fertilisation is now capable, under certain conditions, of producing new plants on certain spots on the threads. Spores are now unnecessary, in the same way as fresh seeds are unnecessary where the creeping root-stock of Couch-grass is present. Or the mycelium may go to rest in the form of cords or thick threads, when it is termed *Rhizomorpha*, or in the form of knots or bulblets, when it is called *Sclerotia*. A similar state of things is common in many perennial flowering plants, as *Convolvulus sepium* and *Sagittaria*

sagittifolia, and they both at first arise from a seed in the same way as a Mushroom arises from a spore. In Mushroom spawn the grower gets a material similar in nature to the root-stock in Couch-grass.

Pl. 61 and last, represents, enlarged 120 diameters, *C. radiatus* a few moments before expansion, when nearly all the cells are present. Most of the cells here shown are, however, only about one-half the size they reach at maturity, and they are not all and every one produced till the exact moment of complete expansion, as I have ascertained by counting the cells of many specimens. This is not to be wondered at, for if the 22,500,000 cells which go to make up one of these minute plants require 14 days for their production, it follows as a necessity that the cells go on multiplying all the fortnight, night and day, at the rate of 1,114 to the minute. It takes about five hours for the spores to be gradually produced all over the hymenium—say from 5 to 10 o'clock in the morning—and as there are upwards of 3,000,000 spores to each plant, they, as a consequence, gradually appear upon the basidia or spore-bearing spicules at the rate of 100,000 every minute.

No sooner has the plant arrived at perfection than that very moment it begins to perish. I have demonstrated that the cells of the pileus and the hairs which form the veil are the first to appear, and so they are the first to disappear. The fine matted hairs which form the veil in Pl. 61, B B B, are all torn asunder during the few moments consumed in the expansion of the cap, and at the moment of maturity the hairs vanish and the pileus is naked, which nakedness is the first sign of its decay. When the fragile little fungus has at length produced its fruit, and is prostrate and dying upon the matrix from which it sprang, then, as can be seen with patience under the microscope, the cystidia produce spermatozoids which are at first passive and then active; these pierce the spores and cause the discharge of the first living cell of the pileus of a new plant. It will be seen from these observations that *C. radiatus*, though one of the most minute and fugitive of all the Mushroom tribe, is yet as completely perfect in all its parts as any of the larger and higher species of *Agaricus*. It must not be supposed that these observations can be followed without close attention and the utmost patience. All the 3,000,000 spores of the fungus do not grow and make new plants, or the world would soon be covered with *C. radiatus*. For every spore that is fertilised and grows there are millions which necessarily perish.

On a dung-heap which will produce *C. radiatus*, other species, as *C. nycthemerus*, &c., are sure to appear; and not only do allied species come up in company with *C. radiatus*, but every intermediate form between one and the other may be gathered any morning. These latter plants belong to no species described as such, but are natural hybrids, doubtlessly produced by the spermatozoids of one plant piercing the spores of another. Amongst the larger

species of *Agaricus* similar forms are quite common, and they prove sore puzzles for those men who only want *names* for the fungi they find. I am convinced that at least three-fourths of the described species of the higher fungi have no claim to rank as true species, and that plants like *Agaricus procerus*, *A. rachodes*, and *A. excoriatus*, *A. gracilentus*, with others, are mere forms of one and the same plant with every intermediate link.

Van Tieghem has recently been working on this species, and he has arrived at the conclusion that the fungus produces spores of different sexes. But to me it is quite unreasonable to imagine seeds or spores to be of different sexes. Known facts point quite in the opposite direction, and if sex is once allowed in seeds and spores, then we must be prepared to allow sex in pollen and spermatozoids. A spore or ovule must be considered female, whilst unfecundated or still in the ovary, but when once fertilised it combines both sexes, and cannot be other than hermaphrodite. A secondary colour, as orange (which combines the red and yellow primaries), can never be red or yellow. In dicecious plants the seeds are capable of producing either sex, and are not themselves male or female, and even the great fleshy root-stock of *Bryonia dioica* will be male in one place, and if removed to a different position be female. The Rev. M. J. Berkeley, writing of *Coprinus* (*Gardeners' Chronicle*, April 17, 1875, p. 503), says—"Late examinations of the spores of some *Coprinus* under germination seem to show that impregnation takes place at a very early period."

Now my observations show that this impregnation often actually takes place on the hymenium itself, the product being a single cell, which in the species now described rapidly develops into a new individual. The spore and spermatozoid may be considered as somewhat analogous with an ovule and a pollen grain, or with what is seen in *Chara*; or like the escaped oosphere and spermatozoids in *Fucus* amongst the *Algae*.

I cannot attach much importance to *Ørsted's* interesting paper on the fructification of the *Agaricini*. His notes are on *Agaricus variabilis*, a plant he gathered from a Mushroom bed. Now, as far as my experience goes, *A. variabilis* is peculiar to dead stems, sticks, and leaves, and does not grow upon dung. Moreover *Ørsted* experimented upon threads of mycelium taken from dung, and presumed only to belong to this *Agaricus*; but this mycelium was quite as likely, in my opinion, to have belonged to fifty other things. De Bary, speaking of *Ørsted's* observation says—"It is impossible not to perceive the similitude between the phenomena seen by M. *Ørsted* and those I have described in *Peziza confluens*." It is quite doubtful whether or not *Ørsted* had got the mycelium of some dung-borne *Peziza* for his experiments, as *P. vesiculosa*, which is always present on dung-heaps.

In the observation of natural phenomenon it is never well to follow, without thought and original observation, in the footsteps of

others. In the case of *Peronospora infestans*, because De Bary said the resting spores were not likely to be found in the Potato plant, it was almost universally accepted as a fact that they never could be there found. Because conidia had not been described, it was commonly believed that no conidia existed. The mycelium of *Peronospora* has till lately been described as always destitute of suckers, but in some of the Chiswick plants the suckers were abundant. The same fungus is commonly described as having its threads without articulations or septa, but it is equally common to see the figures of this fungus with septa in profusion.

Many botanists, as Corda, Bulliard, Klotzsch, and others, have considered the cystidium in *Agaricus* to correspond in some way with an antheridium, but as these views have not at present been favoured by Tulasne and De Bary, many botanists seem disposed to agree with De Bary in regarding the cystids as mere "pilose productions of a particular order," which is very indefinite, and the granules as mere conidia (Tulasne). Klotzsch and others have considered it possible that the spores are fecundated by a lubricating fluid given out by the cystidia. This fluid is evidently the same with the threads observed by me, and which at length gives birth to spermatozoids. I consider it quite possible that the mere contact of the threads (or fluid) from the cystidia with the threads from the unpierced spores may be sufficient for the production of a new plant. But De Bary, in criticising Klotzsch, says an opinion of this nature is entirely gratuitous, and the contact and its result, if real, would represent nutrition rather than fecundation, and, as far as he knows, there exists, he says, no other observation on any female organ susceptible of fecundation by the cystidia. I cannot fall in with De Bary's views at all, especially after the analogy found in *Fucus* and in the confervoid pollen (which has no outer coat), and which exhibits rotation in the flowering plants found under *Zostera*, *Phucagrostes*, &c., and which are fecundated when in a state of immersion in water.

As regards the spores of woody species of fungi, they are probably fertilised on the parent plant, and are blown away by the wind in a condition suitable to at once form the first cell of a new plant on any proper habitat. If *Agarics* were perennial and persistent, instead of being annual and fugitive, we might expect to see a new hymenium produced each year upon the lower surface of the old one, and this state of things really does exist in many species belonging to the perennial and persistent woody fungi of trees, where a new stratum of tubes is every year produced underneath the old one, so that the age of the fungus in years may be correctly ascertained by merely counting the strata. As to the mycelium itself, and the possibility of its producing sexual organs in *Agaricus*, I have had the subject before me for many years, and have seen many germinating spores, but no trace of any sexual organ other than the spermatozoids as produced from the cystidia

themselves, or from the protoplasmic filaments which they throw out. I am therefore disposed to believe that the absence of sexual organs on the mycelium is owing to the threads being the produce of fertilisation.

As for the expressed juice of horse-dung, it abounds with nematoid worms, spores, and infusoria of many kinds—no drop can be examined from a dung-heap after a shower of rain without seeing large quantities of these organisms. Therefore, any uncertain thread taken for examination from dung is sure to lead to error. All my experiments were carried out in duplicate, one with expressed juice and the other with distilled water, with very little difference in result, as the new plant seemed to live principally on the remains of the old parent.

As a proof of how much there is still to be learnt respecting the life history of Agarics, I may say that in Sach's recently published *Text Book of Botany*, one of the very best and most complete books of its class ever published, there is no mention whatever made of cystidia in the description of *Agaricus*, and in La Maout and Decaisne's *Descriptive and Analytical Botany*, under fungi, it is stated that the male organs never produce antherozoids, and that the cystidia are always deprived of sterigmata or spicules.

To repeat and follow out these observations it is necessary to take the specimens for examination exactly at the proper period of growth, and to exercise the greatest care in securing an uniform moisture between the glasses. The life of the fungus is so short, and all the characters are so evanescent, that the points to be observed may be present one moment and all gone the next.

All the drawings have been made with a camera-lucida, and from different specimens, so where the dimensions of the parts slightly disagree, it is only such a disagreement (within defined limits) as is commonly found in Nature.

REHM'S ASCOMYCETEN.—The sixth fasciculus of these specimens has just been received and contains, as usual, several new or otherwise interesting species. Any critical remarks must be postponed until we have had an opportunity of examining more minutely. It is, however, but justice to remark, that for size and quality of specimens this collection stands unquelled by any which have ever been issued in any country, although sometimes not in quite so convenient a form for the herbarium; this, however, is a fault which can be remedied by transferring the specimens to flatter boxes.

BRITISH FUNGI.

By M. C. COOKE.

*(Continued from page 39.)***Radulum deglubens.** *B. & Br. Ann. N. H., No. 1440.*

Orbicular, ferruginous, subdiaphanous; tubercles erect, sub-cylindrical, irregular, scattered, interstices even, pulverulent from the white spores.

On ash. Jan. Forres. New Pitsligo.

About $\frac{1}{2}$ inch across.

Radulum corallinum. *B. & Br. Ann. N. H., No. 1441.*

Effused, white; subiculum shining, very thin, pelliculose; tubercles fasciculate, divided, obtuse, coralloid.

Oak branches. Scotland.

Effused for three inches; fascicles of tubercles $\frac{1}{4}$ or more across.

Radulum epileucum. *B. & Br. Ann. Nat. Hist., No. 1442.*

Effused, ochraceous white, wholly resupinate; subiculum snowy white, covered by a waxy stratum; tubercles scattered, cylindrical, slightly fimbriate, deciduous.

On decorticated wood. Glamis.

Effused for several inches, tubercles falling out and showing the white mealy subiculum, round which is an annular depression.

Grandinia crustosa. *Pers. Fr. Epic. ed. ii., p. 627.*

Floccoso-farinaceous, irregularly effused, crustaceous, adnate, white; granules somewhat rounded, crowded, obtuse.—*Berk. & Br. Ann. N.H., No. 1443. Nees Sys. f. 247.*

On *Polyporus versicolor*. Glamis. Feb.

Kneiffia subgelatinosa. *B. & Br. Ann. N.H., No. 1440.*

Thin, yellowish then cream-coloured; granules minute, subgelatinose, fimbriate at the tips.

On stumps of felled firs. Glamis.

Accompanied by a green alga, which penetrates the tissue of the fungus.

Craterellus clavatus. *Fr. Epic. ed. ii., p. 632.*

Pileus fleshy, turbinate, truncate or depressed, flexuous, unpolished, becoming somewhat yellowish, attenuated into a solid stem; hymenium even then corrugated, purplish then discoloured.—*Sverig. Atl. t. 91. Berk. & Br. Ann. N. H., No. 1445. Krombh. t. 45, f. 13-17.*

In a beech wood. Bisham, Berks.

Cyphella fraxinicola. *B. & Br. Ann. N.H., No. 1446.*

Minute, orbicular, externally snow-white, shortly villose; disc yellow, becoming brownish with the spores, proliferous.

On ash. Batheaston.

Hyphelia rosea. *Fr. Sys. Myc. iii.* 211.

Thallus radiating, white, pseudo-peridium flattened, pubescent, membranaceous, very fragile; spores minute, globose.—*Berk. & Br. Ann. N. H., No.* 1447.

New Pitsligo.

Clavaria curta. *Fr. Epic. ii.,* 668.

Small, very much branched, greenish-yellow; stem none; branches short, crowded, obtuse.—*B. & Br. Ann. N. H., No.* 1448.

On the ground. Coed Coch. Holm Lacy.

Clavaria tuberosa. *Sow. Fung. t.* 199.

Simple, yellowish, attenuated at the apex, swollen in a bulbous manner at the base, attached by mycelioid fibrils.

On sticks. Forres (Rev. J. Keith).

“Exactly the long lost plant of Sowerby, which is perhaps too near *C. ardenia*; and possibly the same may be said of *C. juncea*, notwithstanding the great difference of size.”—*B. & Br. N. H., Jan.* 1875, pp. 32.

Trichobasis Primulæ. *Cooke Fungi Britt. ii., No.* 141.

Uromyces Primulæ, Lev. “Cooke Handbook,” No. 1471.

Trichobasis Iridis. *Cooke Fungi Britt. ii., No.* 142.

Uromyces Iridis, Lev. “Cooke Handbook,” No. 1466.

Trichobasis Ulmaria. *Cooke, Fungi Britt. ii., No.* 146.

Uromyces Ulmaria, Lev. “Cooke Handbook,” No. 1461.

These three species all clearly belong to *Trichobasis*, and not to *Uromyces*. The peduncles are very fugacious, to say nothing of other points of structure in which the affinities are decidedly with *Trichobasis*.

Eustegia arundinacea. *Fr. Elench., ii.,* 112.

Erumpent, operculum collapsing, depressed, umbonate; cups at first membranaceous, pallid, then black. Asci linear-clavate, sporidia narrowly elliptical or subfusiform, straight, 1-2 nucleate, paraphyses copious, linear.—*Berk. & Br. Ann. N. Hist., No.* 1500. *Stegia Arundinacea*, Fekl. Syn., App. 328. *Peziza Kneiffii*, Wallr. Crypt. Fl. pp. 483 (not Rehm).

On reeds. New Pitsligo (Rev. J. Fergusson).

Sporidia 0.1 mm. long.

This is one of the plants about which much confusion has gathered. Under the name of *Peziza Kneiffii*, specimens are found in some herbaria which are only forms of *Peziza fusca*, and Dr. Rehm has published in his Ascomyceten a very neat little *Peziza* under the name of *Peziza Kneiffii*, which is something very different. This is a true *Peziza* of the section *Dasyascypha* to which we have attached the name of *Peziza Winteri*, Dr. Winter having collated most of Dr. Rehm's species. Specimens of *Peziza Kneiffii* from the late C. Montagne, of *Eustegia arundinacea* from Fries, and also from Mougeot, are all, with slight variations in the size of the sporidia, intrinsically the same.

Hysterium (Lophodermium) arundinaceum. *Schrad. var. gramineum.**H. culmigenum*, var. β . Fr. Sys. Myc., ii., 591.

On leaves of grass. Forres.

Var. **culmigenum.** Fr. *Cooke Fungi Britt.*, i., No. 459.

On sheaths of reed.

Nectria citrino-aurantia. *Lacr. Grevillea*, ii., p. 164.*Berk. & Br. Ann. N. H.* No. 1492, t. 2, f. 8.

On willow twigs. Batheaston. Dec.

Sporidia oblong ($\cdot 0003$ - $\cdot 00035$ in.) $\cdot 0075$ - $\cdot 0085$ m.m. long.**Sphæria (Villosa) membranacea.** *B. & Br. Ann. N. H.*
No. 1493, t. 2 f. 9.

Semi-immersed, perithecia large, membranaceous, clad with short flexible hairs; sporidia shortly fusiform, uniseptate.

On very rotten wood. Langridge. Ap.

Sporidia ($\cdot 0015 \times \cdot 0007$ in.), $\cdot 035 \times \cdot 0175$ m.m., accompanied by a minute flask-shaped *Sphaeronema*, with a long slender neck and minute globose spores; probably its stylosporous state. *B. & Br.***Venturia Alchemilla.** *B. & Br. Ann. N. H.*, No. 1493.*Perithecia minute, crowded in small stellate spots, asci short; lanceolate; sporidia fusiform, uniseptate.—*Asteroma Alchemilla.* *Grev. Fl. Ed.*, p. 369. *Stignatea Alchemilla*, *Cooke Handbook*, No. 2796. *Fckl. Symb. Myc.*, p. 96. *Fckl. Fungi, Rhen*, No. 425.On leaves of *Alchemilla*.Sporidia ($\cdot 0005$ in.), $\cdot 0127$ m.m. long.The following species are also figured on Plate 48, fig. 7; *Dendryphium ramosum*, C., Plate 49, fig. 1; *Puccinia malvacearum*, 2. *P. Polygonorum*; 3. *P. Lychnidearum*; 4. *P. Mæhringæ*; 5. *P. violarum*; 6. *P. Umbilici*; 7. *P. Saniculæ*; 8. *P. Primulæ*; 9. *P. compositarum*; 11. *P. Prunorum*; and 12. *P. Tunaceti*, all $\times 500$ (see scale).**Thelephora intybacea.** Fr. *Epicr.* ii., 635.Cæspitose, soft, whitish then ferruginous—red, at length fuliginous; stems somewhat lateral, growing together; pilei imbricate, fibrous, margin dilated, at first fimbriate and whitish, then entire and of one colour; hymenium inferior, papillose, subfloccose. *Pers. Syn.*, p. 567; *Bull. Champ.* t. 483 f. 6-7, and t. 278.

On the ground in woods. Glamis. Rev. J. Stevenson.

Exhibited at the Fungus Show at Perth.

Geaster Michelianus. *B. & Br.*Mr. Worthington G. Smith has expressed an opinion in the "Gardener's Chronicle" that *Geaster cryptorrhynchus*, Kalch., figured and described by Professor Hazslinszky in this journal, is identical with the above species. There is a slight difference in the size of the spores in Hazslinszky's specimen and the *Geaster Michelianus* found by Mr. Beech in this country, but that alone would not be sufficient to maintain them as distinct.

Badhamia fulvescens. *Cooke.*

Peridia sessile, subglobose, scattered, or 3-6 together, tawny-ochre, towards the base clad with a delicate white pubescence; spores pale brown, minute, ovate.

On old sacking. Dupplin Castle, Perth.

Spores ($\cdot 0003$ in.) $\cdot 0075$ m.m. diam.

The cysts investing the spores are quite distinct. I am indebted to Mr. C. E. Broome for examining this plant, and he coincides in the opinion that it is undescribed.

Ustilago intermedia. *Schröter.*

Produced within the florets, violet-brown; spores subglobose, ovate, or shortly elliptic, rather large; epispore minutely spinulose.—*Schröter in Rabh. F. Eur. No. 1696.*

On flowers of *Scabiosa*. Scotland. Rev. J. Fergusson.

The spores are larger and darker than in *U. flosculorum*; in the latter being $\cdot 01$ m.m., and in the present species $\cdot 015$ m.m.

Isaria spumarioides. *Cooke.*

Densely cæspitose, white, palmate or infundibuliform; apex crispate, lobed, or serrate, attenuated downwards into a slender stem, more or less connate; spores subglobose, minute.

On bark. Knowsley. Rev. H. Higgins.

A very curious and distinct species, not unlike *Spumaria alba* at a superficial glance, forming large patches an inch broad. Spores $\cdot 004$ - $\cdot 005$ m.m. diam.

Clasterisporium vermiculatum. *Cooke.*

Effused, forming a thin black stratum on the wood; mycelium creeping, branched or simple, septate, brown; spores erect, often fasciculate, cylindrical-fusiform, dark brown, multiseptate, straight, curved or geniculate, obtuse and pale at the extremities ($\cdot 15$ - $\cdot 2$ m.m. long).

On oak wood. Hereford. Mr. Griffith Morris.

This interesting black mould is certainly congeneric with *Clasterisporium caricinum*, Schweinitz, and resembles *Helminthosporium* without flocci, the spores being seated on the mycelium. Another rather aberrant form we have received from J. B. Ellis, New Jersey, U.S., to which the name of *Clasterisporium subulatum*, C., has been given, in which the apices of the spores are subulate. *Clasterisporium pedunculatum*, Peck, is = *Helminthosporium attenuatum*, C. & P.

Virgasporium.—Dr. Saccardo has pointed out that the genus characterised under this name in "Grevillea" is identical with *Cercospora*, Freis, and that *Virgasporium maculatum* is equal to *Cercospora Resedæ*, Fekl. Syn. Myc. p. 353, and Fung. Rhen. No. 1632. Such being the case the other species will bear the name of *Cercospora clavata*.

(To be continued in next number.)

SYMBOLÆ AD FLORAM MYCOLOGICAM AUSTRALIÆ.

Publicatæ per F. DE THUMEN.

I.

HYMENOMYCETES.

Determin.—C. KALCHBRENNER.

1. **Agaricus (Lepiota) excoriatus**, *Schff.* Fr. Hymenomyc. eur. p. 30.—Gracemere in locis aridis, leg. O'Shanesy. No. 117. Com. F. de Mueller.

2. **Agaricus (Lepiota) procerus**, *Scop.* Fr. Hymenomyc. eur. p. 29.—Rockhampton, in Queensland, in regionibus calidioribus vulgaris, leg. Thozet. Com. Müller.

3. **Agaricus (Lepiota) leontoderes**, *Berk. et Br.*, in Fungi Ceylon (Linn. Soc. Journal of Botany XI).—Gracemere in collibus aridis leg. O'Shanesy. No. 109. Com. Müller. "Cape Orange." (Non tuto determinandus.)

4. **Agaricus (Lepiota) clypeolarius**, *Bull.* Fr. Hymenomyc. eur. p. 32.—Gracemere in terra leg. O'Shanesy. No. 111. Com. de Müller.

5. **Agaricus (Lepiota) cheimonoceps**, *Berk. et Curt.*, in Fungi Cubenses (Linn. Soc. Journal of Botany X).—Rockhampton, in Queensland, leg. Thozet. No. 691. Com. de Müller. "Cape white, stipes hollow."

Habitus Agarici clypeolarii minoris. Pileus umbonatus, 1" latus, mollis, tomentosopulverulentus, albus. Stipes deorsum incrassatus, 1½" longus, albofurfuraceus. Annulus lacerus, disprensus.

6. **Agaricus (Lepiota) granulosus**, *Fr.* Fr. Hym. eur. p. 36.—Rockhampton in Queensland, in terra, leg. A. Thozet. No. 714. 717. Com. de Müller. Specimina nimis manca.

7. **Agaricus (Omphalea) scyphiformis**, *Fr.* Fr. Hym. eur. p. 159.—Gracemere inter gramina pascuorum leg. O'Shanesy. No. 100. Com. de Müller. "From its pure whiteness and delicacy it appears like a little flower."

8. **Agaricus (Pleurotus) illuminans**, *Müller.*—Rockhampton in Queensland, in ligno emortuo, leg. A. Thozet. No. 733. Com. de Müller.

Descriptioni Berkeleyi in Linn. Soc. Journal of Bot. XIII. sat convenit, sed-an phosphoreus fuerit, non constat. Specimina etiam nimis manca.

9. **Agaricus (Pleurotus) corticatus**, *Fr.* Fr. Hym. eur. p. 166.—Gracemere in truncis emortuis leg. O'Shanesy. No. 118. Com. de Müller.

Forma minor, pileo villosa, albo, annulo oblitterato.

10. **Agaricus (Hebeloma) nudipes**, *Fr.* Fr. Hym. eur. p. 242.—Gracemere in terra nuda leg. O'Shanesy. No. 114. Com. de Müller. Dubius.

11. **Agaricus (Flammula) picreus**, *Fr.* Fr. Hym. eur. p. 251.—Rockhampton in Queensland, in truncis emortuis Encephalarti Dennissonii, leg. Thozet. Com. de Müller.

12. **Agaricus (Naucoria) anguineus**, *Fr.* Fr. Hym. eur. p. 255.—Rockhampton, in Queensland, in terra, leg. A. Thozet. No. 715, 716. Com. de Müller.

13. **Agaricus (Psathyrella) hiascens**, *Fr.* Fr. Hym. eur. p. 314.—Rockhampton in Queensland, in pascuis, leg. Thozet. No. 710. Com. de Müller.

14. **Agaricus (Psathyrella) disseminatus**, *Pers.* Fr. Hym. eur. p. 316.—Rockhampton in Queensland, in ligno putrido, leg. A. Thozet. No. 707. Com. de Müller.

15. **Marasmius Rotula**, *Fr.* Fr. Hym. eur. p. 477.—Gracemere in terra et ligno emortuo, leg. O'Shanesy. No. 101. Com. de Müller. "Stipes black and shining."

16. **Marasmius rufo-pallidus**, *Kalchb.* nov. spec.—Gracemere in terra prope truncos, leg. O'Shanesy. No. 102. Com. de Müller.

M. pileo membranaceo, convexulo, late umbonato; umbone linea circulari terminato; striatulo, glabro, pallide rufescente (light reddish); stipite filiformi, glabro, pallido, basi mycelio albedo affixo; lamellis stipitem attingentibus, subconfertis, pallidis.

17. **Marasmius rhyticeps**, *Kalchb.* nov. spec.—Rockhampton in Queensland, in sarmentis Passiflorarum, leg. Thozet. No. 704. Com. de Müller. (*Agaricus mniatopodius* Müller?)

M. pileo membranaceo, hemisphærico, mox expanso, rugosoplicato, centro leviter papillato, glabro, 2" lato, fusco-rufescente; stipite carneo, capillari, velutino, 1-1½" longo; basi institia albotomentoso, rufo-fusco vel sursum pallescente; lamellæ 8-12, latiusculæ, ventricosæ, distantes, stipitem attingentes, albæ.

18. **Marasmius calobates**, *Kalchb.* nov. spec.—Rockhampton in Queensland, in foliis putridis Bougainvilleæ, leg. Thozet. No. 707. Com. de Müller.

M. pileo membranaceo, ½-1" lato, leviter, umbilicato, plicato (in siccis), ferrugineo-fuscescente; stipite cornco, fistuloso, capillari, nigricante, pro ratione longissimo 2-3", ad basin institiam glaberimo; lamellis paucis, latiusculis, pileo pallidioribus.

19. **Marasmius aciculæformis**, *Berk. et Br.* (Linn. Soc. Jour. of Botany x.).—Gracemere in ligno putrido, leg. O'Shanesy. No. 103. Com. de Müller.

Stipites dense cæspitosi pro hac specie characteristici sunt.

20. **Cantharellus aurantiacus**, *Fr.* Fr. Hym. eur. p. 455.—Rockhampton in Queensland, leg. A. Thozet. No. 712. Com. de Müller.

Pileo angusto, vix depresso et stipite clato a typo differt.—*Ag. Xeroto similis*.

21. **Lentinus pergamenus**, *Fr.* Fr. Symb. Myc. p. 37.—Gracemere in terra, leg. O'Shanesy. No. 112. Com. de Müller.

22. **Lentinus Lecomtei**, *Fr.* Fr. Ep. p. 388.—Gracemere in ligno emortuo, leg. O'Shanesy. No. 600. Com. de Müller. Rockhampton in Queensland, leg. Thozet. No. 721. Com. de Müller. "Crimson colour."

23. **Lenzites betulina**, *Fr.* var. **velutina**, *Berk.* Ann. of Nat. Hist. 1843, p. 181.—Rockhampton in Queensland, leg. Thozet. Com. de Müller.

24. **Lenzites Berkeleyi**, *Lév.* Ann. Sc. Nat. 1846, V. p. 121.—Brisbane River, Queensland, leg. A. Thozet. Com. de Müller.

Albo, pileo multizonato, zonis elevatis, tomentosis. Conf. Fr. Symb. Myc. p. 45.

25. **Hexagona Muelleri**, *Berk.* Linn. Soc. Jour. of Botany XIII.—Rockhampton in Queensland, in Eucalypto Crebra, leg. A. Thozet. No. 720. Com. de Müller. Forma minor.

26. **Polyporus vaporarius**, *Fr.* Fr. Hym. eur. p. 579.—Gracemere in ligno emortuo, leg. O'Shanesy. No. 106. Com. de Müller.

27. **Polyporus xerampelinus**, *Kalchb.* nov. spec.—Rockhampton in Queensland, in truncis, leg. A. Thozet. Com. de Müller.

E. Coriaceis, contextu colorato. P. pileis suberoso-coriaceis, dense imbricatis, conchatis, villosoglabratis, zonis plurimis concentricis exaratis, purpureo-umbrinis. Contextus fulvus. Pori minimis, rotundatis, aequalibus, pileo concoloribus.

28. **Polyporus versicolor**, *Fr.* Fr. Hym. eur. p. 568.—Rockhampton and Brisbane River in Queensland, leg. Thozet. Com. de Müller. Ubique terrarum.

29. **Polyporus murinus**, *Kalchb.* nov. spec.—Rockhampton in Queensland, leg. Thozet. Com. de Müller.

E. Coriaceis, contextu albo. Pileus semiorbicularis, vel subreniformis, conchatus, vertice in stipitem spurium protractus, subtiliter tomentoso-villosus, murinus vel subolivascens, zonatus, zonis in pileo calvescente, albis. Pori minuti, perbreves, passim inæquales, albi.

30. **Polyporus hirsutus**, *Fr.* Fr. Hym. eur. p. 567.—Rockhampton in Queensland, leg. A. Thozet. Com. de Müller.

31. **Polyporus chrysoleucus**, *Kalchb.* nov. spec.—Rockhampton in Queensland, leg. Thozet. Com. de Müller.

Inodermeus, stuposus. P. pileis effuso-reflexis, imbricato confluentibus, mollibus, villosotomentosis, azonis, forma variis, circa marginem tennem uno alteroque sulco notati. Pori mediocres, primum breves, alveolares, demum profundiores, subrotundi, acuti vel e situ obliqui, canaliculati, ceterum integri, albido et demum ochraceo-aurei. Substantia mollis, floccoso-fomentaria, pileo prorsus concolor ochraceo-badeo.

32. **Polyporus Eucalypti**, *Kalchb.* nov. spec.—Rockhampton in Queensland, in truncis Eucalypti, leg. Thozet. Com. de Müller.

Placodermeus, e Suberosis. Pileo e carnosio suberoso, in nostro specimine deformi, tuberoso, velutino, tectu mollissimo, azono, opaco, lævi, colore peculiari ex umbrino in badio, violaceumque vibrante. Poris minutulis, rotundis, ore integris, roseo-pruinosis. Substantia aquabilis, purpureo-violacea. Specimen nostrum monstrosum, sed characteres evidentes.

33. **Polyporus sanguineus**, *Mey.* Flora Essequeboensis, p. 304.—Ins. Lord Howe, leg. et com. de Müller.

34. **Polyporus salicinus**, *Fr.* Fr. Hym. eur. p. 560.—Rockhampton in Queensland, in fissuris truncorum emortuorum, leg. A. Thozet. No. 736. Com. de Müller.

35. **Polyporus leonotis**, *Kalchb.* nov. spec.—Australia (sine loco) in truncis, leg. et com. de Müller.

E. Spongiosis, Funalibus, carne colorata, juxta Polyporum Rheaden et P. leoninum collocandus. P. pileis spongioso-carnosis, imbricato-concrescentibus, plano-convexis, strigoso-hirsutis, azonis, sed nonnunquam obsolete-sulcatis, saturate ferrugineo-fulvis, margine obtusiusculo, repando. Poris minimis, rotundis, pallide cinnamomeis.

36. **Polyporus placodes**, *Kalchb.* nov. spec.—Rockhampton in Queensland, leg. Thozet. Com. de Müller.

E. Placodermeis, Lævigatis. Pileus floccoso-suberosus, utrinque applanatus, subreniformis, tenuis, rigidus, leviter concentricè sulcatus, sublaccatus, verrucis multis obsitus, rufescenti ochraceus, intus obscurior cinnamomeo-umbrinus (nec fulvus); poris minimis, brevissimis, ore rotundis, integris, griseo-cinnamomeis, demum fuscidulis. Pondere levissimus; fere æneo-nitens.

37. **Polyporus chilensis**, *Fr.* Fr. Symb. Mycol. p. 63.—Rockhampton in Queensland, leg. A. Thozet. Com. de Müller.

38. **Polyporus flabelliformis**, *Klotzsch.* Fr. Epicr. p. 444.—Rockhampton in Queensland, leg. A. Thozet. Com. de Müller.

39. **Polyporus gibbosus**, *Nees.* Fr. Epicr. p. 443.—Rockhampton in Queensland, leg. A. Thozet. Com. de Müller. Certe licet stipes desit.

40. **Polyporus picipes**, *Fr.* Fr. Hym. eur. p. 534.—Gracemere in truncis putridis, leg. O'Shanesy. No. 108. Com. de Müller.

41. **Polyporus Tricholoma**, *Mntg.* Fr. Epicr. p. 431.—Gracemere leg. O'Shanesy. No. 113. Rockhampton in Queensland, leg. Thozet. No. 713. Com. de Müller.

42. **Polyporus myclodes**, *Kalchb.* nov. spec.—Gracemere, in terra ad basin truncorum, leg. O'Shanesy. Com. de Müller.

Mesopus, carnosus. P. pileo carnosio, fragili, irregulari, subrepando, profunde umbilicato, fere infundibuliformi, superficie inæquali, ruguloso, obsolete villosio, alutaceo vel pallide fuscescente.

Stipite solido inæquali, obconico, in pileum dilatato, cum poris curtis, minutis, inæqualibus, albido. Caro albo. Edulis videtur. (Myclos = caro vegetabilis.

43. **Corticium nudum**, *Fr.* Fr. Hym. eur. p. 655.—Rockhampton in Queensland, ad corticem emortuam. Citri aurantiæ, leg. Thozet. Com. de Müller.

44. **Stereum lobatum**, *Fr.* Fr. Epier. p. 547.—Rockhampton in Queensland, leg. A. Thozet. Com. de Müller. Forma minor.

45. **Stereum Ostrea**, *Nees.* Acta Nat. Cur. XIII. Fr. Epier. p. 547.—Rockhampton in Queensland, in truncis, leg. Thozet. Com. de Müller.

46 **Stereum nitidulum**, *Berk.* Hooker, London Journal of Botany, 1843, p. 638.—Gracemere in terra, inter gramina, leg. O'Shanesy. No. 98. Com. de Müller.

TREMELLINI.

Determ.—C. KALCHBRENNER.

47. **Guepinia spathularia**, *Fr.* Fr. Epier. p. 566.—Rockhampton in Queensland, in ramulis putrescentibus Citri aurantiæ, leg. A. Thozet. No. 723. Com. de Müller.

GASTEROMYCETES.

Determ.—C. KALCHBRENNER.

48. **Mutinus papuasius**, *Kalchb.* nov. spec.—Rockhampton in Queensland, in terra, leg. Thozet. No. 722. Com. de Müller.

M. peridio exteriori laxo, cum stipite gracili pallido. Receptaculo ovoideo-oblongo, sublibero, læviusculo, nigro.

49. **Scleroderma strobilinum**, *Kalchb.* nov. spec.—Rockhampton in Queensland, ad vias, leg. Thozet. No. 683. Com. de Müller.

S. peridio globoso-depresso, superius profunde areolato, rimoso et demum juxta rimas disrumpente, glabro, pallido, areolis angulatis, squamarum stroboli instar prominentibus; stipite solido, siccitate fere ligneo, deorsum attenuato. Sporarum massa a stipite distincta, cinereo-fuscescens. Sporæ globosæ, verruculosæ, vix pellucidæ, nigricantes.

50. **Tulasnodea leprosa**, *Kalchb.* nov. spec.—Gracemere, in terra, locis aridis, leg. O'Shanesy. Com. de Müller.

Habitus prorsus Tulasnodeæ mammosæ, sed peridium furfure luride umbrino; demum secedente obductum. Sporæ minutæ, vix echinulatæ, cum capillitio carneo rufescentes.

51. **Bovista lilacina**, *Mntg. et Berk.* Hooker, London Journal of Botany, 1845—Rockhampton in Queensland, leg. Thozet. No. 690. Com. de Müller.

52. **Lycoperdon gemmatum**, *Batsch.* El. p. 147.—Gracemere, leg. O'Shanesy. No. 116. Com. de Müller.

53. **Lycoperdon pusillum**, *Batsch.* Cont. ii. p. 123.—Rockhampton, in Queensland, ad terram, leg. A. Thozet. Com. de Müller.

54. **Polysaccum pisocarpium**, *Fr.* Fr. Syst. Myc. iii. p. 54.—Rockhampton in Queensland, in terra, leg. A. Thozet. No. 719. Com. de Müller. Forma minor.

55. **Crucibulum vulgare**, *Tul.* Ann. Sc. Nat. 1844, i. p. 90.—Gracemere, in ramentis defossis, ramulisque dejectis, leg. O'Shanesy. No. 688. Com. de Müller.

ASCOMYCETES.

Determ.—Dr. REHM.

56. **Hypoxylon rutilum**, *Tul.* Tul. Sel. Fung. Carp. ii. p. 38.—Rockhampton in Queensland, in ligno putrido, leg. A. Thozet. No. 697. Com. de Müller.

Sporæ hyalinæ, dein fuscæ, ovales, inæquilaterales, 1-2 guttatae, 9 m.m. long, 8 m.m. crass, uniseriales, in ascis cylindraceutis, 75-78 m.m. longis. Paraphyses articulatae, evanidæ. Jod apicem ascorum dilute cœrulescit.

57. **Poronia Œdipus**, *Mntg.* Ann. Sc. Nat. 1855, iii. p. 114.—Gracemere, in terra, leg. O'Shanesy. No. 96. Rockhampton in Queensland, in fimo equino, leg. A. Thozet. No. 727. Com. de Müller.

58. **Xylaria polymorpha**, *Fr.* Nke. Pyr. Germ. i. p. 17.—Rockhampton in Queensland, in truncis putridis, leg. A. Thozet. Com. de Müller.

UREDINEI.

Determ.—DE THÜMEN.

59. **Æcidium Ranunculacearum**, *DeC.* Flore fr. vi. p. 97. **Forma Ranunculi rivularis**.—Port Phillip in Victoria, in foliis vivis, præcipue radicalibus Ranunculi rivularis Banks. Leg. et com. de Müller.

60. **Æcidium Lobeliæ**, *Thm.* nov. spec.—Colac in Victoria, in foliis, petiolisque vivis Lobeliæ platycalycis F. Müll. Leg. et com. de Müller.

Æ. acervulis rotundatis vel ovatis, dense gregariis, folia, petiolesque fere occupans, ampullaceis, primo epidermide tectis, dermm liberis, ore cras, siusculo laevi, elato, ochraceis; sporidiis irregulariter globosis, vel varie rotundatis, 18-22 mm. in diam., episporio punctulato, laevi, pallide ochraceis.

USTILAGINEI.

Determ.—DE THÜMEN.

61. **Ustilago urceolorum**, *Tul.* Ann. Sc. Nat. 1847, vii. p. 86.—New Zealand, in ovario Caricis sp. indeterminatae Com. de Müller.

MYXOMYCETES.

Determ.—DE THÜMEN.

62. **Arctyria punicea**, *Pers.* Pers. Syn. Fung. p. 185.—Rockhampton in Queensland, in ligno putrido, leg. Thozet. No. 699. Com. de Müller.

63. *Stemonitis fusca*, *Roth.* Roth. Flor. Germ. p. 448.—Rockhampton, in Queensland, in truncis putridis, leg. A. Thozet. No. 681. Com. de Müller.

MYCELIA.

Determ.—DE THUMEN.

64. *Xylostroma Corium*, *Pers.* Pers. Myc. eur. i. p. 93.—Melbourne, in trunco putrido Eucalypti, leg. et com. de Müller.

BLYTTIA MÖRKII, N. AB E.

ONE OF THE FRONDOSE HEPATICÆ, A NEW SPECIES TO BRITAIN.

B. Mörkii, N. ab E. Synopsis Hepaticarum.
Hamburgi, 1844, p. 474.

Pallavicinia Mörkii, Lindberg, sec. Carrington.

In July, 1874, at a considerable elevation on Ben Lawers, I met with this plant, not before known as British. It occurred in solitary plants, about half an inch long, furcate, with margins irregularly crisped and complicated at the apices, bearing no small resemblance in habit only, to forms of Fossombronina. I at once recognised this plant as new, and a member of the Blyttia from the male flowers, visible with the naked eye, so conspicuous from the lacerated leaflets, like those of our Sussex state of B. Lyellii. The Ben Lawers plant, like our B. Lyellii also barren.

The Sussex B. Lyellii from the Sand Rocks has long flat, or scarcely undulate fronds, and is gregarious.

Not being able to correctly determine the species of the Ben Lawers plant, I sent it to Dr. Carrington, who with his habitual kindness, pronounced it Pallavicinia Mörkii, sending also a specimen from Norway for comparison. It is probable it will be found on other high Scotch mountains, if sought for.

The following extracts from Nees' Synopsis shew the position in the tribe, the nature of the inflorescence, and the variations of the fronds.

Hemicyclum, 2. Frondosæ.

1. Codoniæ.

Fossombronina. *Raddi.*

Androcryphia. *Nat. E.* (exotic).

Petalophyllum. *Gottsche.*

Zoopsis. *Hook., fil.* (New Zealand).

2. Diplomitricæ.

Blyttia, Endlicher.

Blyttia. Frons simplex aut bifida, costa media ante limbum apicis desinente, subtus radiculosa, prædita; præter costam

tenera et membranacea. Involucrum monophyllum, lacerum, primo terminale e costa frondis ortum, dein ad speciem dorsale. Perianthium tubulosum, capsula ovalis, elateres decidui. Inflorescentia mascula dorsalis, e costa oriens, foliolis laceris tecta. Antheræ filamentis brevi suffultæ. Vegetatio frondosa costata.

B. Mörkii. *N. ab E.*

· B fronde sessili, obovata retusa, involucri laciniis lobatis plicatis.

β **contorta.**

Fronde brevi apice valde dilatata subrotundata, subinfundibuliformi undato subcontorta.

Habitat locis alpinis et subalpinis Germaniæ Norvegiæ.

B. Lyellii. *Endlicher.*

a major.

Fronde (subunciali) lineari explanata margine, subrepando hinc inde serrato leniter undulato, calyptra perianthium æquante, squamis perigonalibus confertis laceris.

β **Flotoviana.**

Fronde (breviori) oblonga undulato lobata marginibus adscendentibus crenulatis, calyptra perianthio duplo breviori, squamis perigonalibus confertis laceris.

Habitat locis udis paludosis, cæspitibus laxis.

B. Hibernica. *Hook.* *N. ab E.*

Fronde (unciali, quadriunciali), sublineari dichotoma planiuscula marginibus repandis lobalisve, calyptra perianthio breviori, squamis perigonalibus alternis ovatis ovalibus parce dentatis.

Habitat ad saxa rivulosum montorum.

From the foregoing it will be seen the Scotch *B. Mörkii*, and the Sussex *B. Lyellii*, are, as regards the fronds, the beginning and the end of the scale. But the first somewhat resembles *B. Hibernica*, utterly distinct though. Starting as *B. Mörkii* does with a simple frond, ending with a crisped, contorted, complicated, frond.

The addition of *Blyttia Mörkii* to the British Flora, makes it embrace all the European species of this group.

G. DAVIES.

Brighton.

NOTE ON *Lactarius Turpis*.—The cuticle and tissue contiguous to it, of *Lactarius turpis*, contains a red colouring principle freely soluble in a dilute solution of potash, to which it communicates a rich purple tint. The addition of a mineral acid to this solution causes the precipitation in an amorphous form of the red colouring matter, which reproduces the purple colour when treated with potash. This colouring principle is not soluble in alcohol, nor in mineral acid. The latex, the spores, the flesh and the gills do not yield it. It seems to be analogous to similar colouring principles existing in lichens.

C. J. MULLER.

LICHENOLOGICAL MEMORABILIA, No. 9.

By THE REV. W. A. LEIGHTON, B.A. Camb., F.L.S., &c.

NEW IRISH LICHENS.

In June, 1875, Mr. Larbalestier sent me collections of Lichens made by him in Connemara, a district of the west of Ireland, which has been hitherto scarcely at all examined with respect to Lichens. Mr. Larbalestier has most kindly included even the commoner species, which renders his communications still more valuable, as enabling us to add to our knowledge of their geographical distribution. Amongst them I detected the following, which I believe are new species, and communicated my determinations to Mr. Larbalestier (in litt.) the same month :—

1. *Verrucaria succina*, Leight.

Thallus fuscous, thin, effuse, scarcely, if at all, surrounding the base of the apothecia; apothecia numerous, large, amber-colour, hemispherico-conical, papillate; perithecium amber-colour throughout, dimidiate, spreading at the base; epithecium minute, poriform; paraphyses very delicate and slender; asci lineariclavate; spores 8, colourless, broadly fusiform. 7-septate, large.

On rocks near the lake, Kylemore, county Galway (1875). *Mr. Larbalestier*. Very rare.

The apothecia when wet become of a beautiful transparent amber-colour. Iodine has very slight, if any, reaction on the asci and spores. Its nearest ally would seem to be *V. illinita*, NYL., but that species differs in having a whitish thallus, nigricant apothecia, the perithecium colourless in lower part and fuscous in the upper part, and iodine turning the asci and spores of a dirty deep brown, and is also a corticolar lichen. Our lichen differs also in the size and colour of the apothecia from *V. chlorotica*, which is associated on the same rock, and which has also smaller 3-septate fusiform spores.

2. *Lecidea excelsa*, Leight.

Thallus whitish, slightly shining, thin, effuse, areolato-rimulose, subdiffract, areolæ plane and flat (K yellow, C yellow); apothecia bluish-black, large, innato-sessile or sessile, plane or slightly concave, very slightly pruinose; margin thickish, prominent, darker; hypothecium nigro-fuscous; paraphyses indistinct; spores 8, fuligineo-fuscous, oblong, 1-septate, small.

On the summit of Kylemore Mountains, county Galway. *Mr. Larbalestier* (June, 1875), rare.

3. *Lecidea livescens*, Leight.

Thallus white, granulose or granulato-verrucose; granules scattered and dispersed (K—C pale-reddish); hypothallus very black and predominating; apothecia scattered, arising from the

hypothallus, subinrate or innato-sessile, round or angulari-diformed, concave, the disk or epithecium of a pale grey livid appearance, surrounded with a thick, prominent, black, entire or flexuose margin; hypothecium nigro-fuscous; paraphyses thick, apices brown; spores 8, colourless, linear-oblong, simple, very minute.

On the Doughruagh, Kylemore, county Galway. Rare. *Mr. Larbalestier* (1875).

4. *Lecidea nitescens*, *Leight.*

Thallus white, thin, continuous, minutely and irregularly rimulose, effuse, indeterminate (K yellow, C yellow), often overspread, more or less, with a dark-brown alga; apothecia numerous, small, planoconvex, polished and shining, immarginate; hypothecium very thick, black; paraphyses distinct, but conglutinate, apices pale; spores 8, colourless, oblong or linear-oblong, simple, moderate in size; gelatina hymenea l. fulvescent.

On rocks, Salrock Road, Connemara. *Mr. Larbalestier* (1875).

CRYPTOGAMIC SOCIETY OF SCOTLAND.

The annual meeting of this Society has been held this year at Perth, and a detailed account of it having appeared in the "Gardener's Chronicle" (October 9th), it is unnecessary to repeat it here. A few remarks confined to the scientific aspects of the excursions and show may, however, not be wholly out of place. The Fungus Exhibition in the City Hall, on the 30th and the 1st Nov., was, perhaps, the largest ever seen, as far as the number of specimens is concerned, since the Society seemed fully resolved upon a "big thing" in the way of a show. Of fresh and dried specimens we are informed that there were more than 150,000. These covered a space of some 3000 square feet. When, however, it is remembered that, except the dried specimens arranged against the wall, very little attempt was made at naming the specimens, it can well be understood that numbers could be accumulated with less difficulty, and that though a "big show," it was not necessarily so perfect as it might have been. As a means of restriction, it may be objected, that a much smaller number of specimens, accurately named and somewhat systematically arranged, would have been far preferable. Nevertheless, it was meant to be a "big show," and it fully carried out the intention.

By dint of considerable perseverance the new and rare species were found here and there amongst the different collections over the room. It would occupy considerable space to enumerate all the interesting specimens to be seen amongst so many thousands.

Species new to Britain included *Agaricus aureus*, Fr., or at least a form of it, which Fries at one time seemed disposed to consider a distinct species under the name of *Agaricus Hornemannii*. *Clavaria Krombholzii* was also there, and *Thelephora intybacea*, Fr., from Glamis. One of the most interesting additions to the British Flora was a branched *Xylaria*, quite distinct from anything heretofore described (*X. Scotica*, C.), which was found on a melon bed, and sent by Mr. D. Matheson, of Meiklouer. Amongst others new to science, may be mentioned *Peziza coprinaria* on cow dung, from Rannock, contributed by Dr. Buchanan White; a curious form of *Geoglossum*, with small hyaline sporidia, probably not specifically distinct, from the North American *Geoglossum microsporum*. To which may be added, amongst Dr. Buchanan White's contributions, either to the show or found since, *Ascobolus crenulatus*, Karst., *Ascobolus pilosus* (variety), and *Sphæria (Spovornia) Notarisii*, Ces., all on grouse dung. During the excursion through the grounds of Dupplin Castle, on the 29th, upwards of 200 species of Fungi were seen and recorded. Of these the following are new:—*Peziza Comitessæ*, C., a beautiful golden yellow little *Peziza* on a fallen tree; *Helotium scoparium*, C., on old and rotten twigs of broom; an interesting little *Badhamia*, with pale brown spores, unlike anything hitherto described, and which has been named *Badhamia fulvescens*, C.; and, for the first time in Britain, the *Peziza*, called by Fueckel *Bispora monilifera*, growing amongst the Toruloid *Bispora monilioides*. Unfortunately the rain soon after midday brought the exploration rather suddenly to an unwelcome close, yet sufficient had been done to prove that much more may yet be accomplished north of the Tay towards augmenting the catalogue of British Fungi. With such earnest workers as Dr. Buchanan White, of Perth; the Rev. J. Keith, of Forres; the Rev. J. Stevenson, of Glamis; the Rev. J. Fergusson, of Brechin; and the Rev. M. Anderson, of St. Andrew's, we may hope that the next twelve months will witness a considerable increase in the list of Scottish Fungi.

Next year's show is to be held at Kelso, which will be more convenient for English visitors, and Cryptogamists from the South would do well not to let such an opportunity pass without an effort to meet the Scottish Cryptogamists. Enthusiasm is rather infectious, and a slight importation from the North would not do the southerners much harm. The influence of the Perth meeting on all who took part in it will probably be a long time in passing away.

PILOPHORON FIBULA, *Tuck*.—Among specimens from Herb. Borrer given me by Mr. Mitten, I find a fragment of a Lichen, which appears to be the above, although it is too small to speak positively. It is from Vire, Normandy, ex Herb. Montagne, and is named *Stereocaulon pileatum*, Ach. This needs enquiry.

Brighton.

G. DAVIES.

WOOLHOPE CLUB FORAY.

The annual Foray of the Woolhope Club was for nearly a week, from October 11th to the 16th, the excitement of Hereford. As usual a number of mycologists met together from far distant parts of the country, and enjoyed the hospitality of their Hereford friends. Of course Dr. Bull was the centre of all energy, and he had left nothing undone to make this Woolhope meeting as successful as any of its predecessors. What a comparison do these Perth and Hereford meetings afford to the declining and flickering London meeting, which latter seems to be making a last "struggle for existence."

Amongst the most interesting "finds" at the excursions of the week were *Agaricus (Armillaria) bulbiger*, a most distinct species in a small subgenus, now found in Britain for the first time. Rarities were represented by *Strobilomyces strobiliaceus*, *Sistotrema confluens*, *Clavaria amethystina*, *Tremella epigæa*, *Russula aurata*, *Agaricus enchrous*, *Clavaria botrytis*, and *Hydnum diaphanum*, the latter new to Britain, as well as *Agaricus macrorhizus*.

The more minute forms of Fungoid life do not usually absorb much attention at these Forays and shows, but afterwards we gradually learn of new or rare additions having been made by stealth during the day. On this occasion Mr. W. Phillips found a little red *Peziza* identical with the *Peziza humosa*, of Dr. Rehm, but not of Fries. Almost simultaneously the Rev. M. J. Berkeley found this species in Kent, and the name proposed for it is *Peziza constellatio*, B. & Br. Although found some time since, yet Mr. Griffith Morris exhibited for the first time a black mould clearly congeneric with Schweinitz's *Clasterisporium caricinum*. It resembles the spores of an *Helminthosporium* borne on creeping threads. Amongst other rarities of a minute kind were *Ascobolus viridis*, Curr.; the interesting, but perhaps not rare, *Peziza trechispora*; the larger *Peziza succosa*, B. & Br.; and a few such things as *Torrubia militaris*, *Hypocrea alutacea*, *Peziza cæsia*, a small spored variety of *Peziza Crouani*, &c.

Altogether the Woolhope meeting was as complete a success as any of its predecessors. There was an equal amount of social enjoyment, a most excellent room for the display of the spoils (were it not unfortunately as dark as a cellar), private dinners and a public dinner, and last, but not least, considerable additions to our knowledge of rare species, with some very interesting acquisitions to the British Flora. Pleasure, combined with science in a manner so harmonious and satisfactory, characterises the Woolhope Forays, and render them things worthy of remembrance for one half the year, and of pleasurable anticipation for the rest.

PARASITISM OR POLYMORPHISM—WHICH?

BY W. PHILLIPS.

The little that is known of the life-history of the black moulds (*Dematiæ*), and the consequent value of any fact bearing on the subject, however apparently insignificant, induces me to bring before your readers a curious growth that has recently come under my notice. On the stump of a decayed tree was growing a dark velvety fungus, covering a space of some inches, which, on removing a portion and placing it under the microscope, was seen to consist of a small forest of upright black stems, varying in length from .009in. to .1in., most of them bearing spherical or pear-shaped heads. There were at least three different species, intermixed and associated in such a manner as to suggest the question at the head of this note. The undergrowth (pl. 53, fig. 10 *aa*) consisted of nearly black unbranched threads, articulated at frequent intervals; when seen by transmitted light, opaque at the base, translucent towards the summit, as commonly seen in *Helminthosporia* (fig. 11). When young some of these threads were surmounted by a spherical head (fig. 11*a*), which was a simple, thick-walled cell, containing a gromous, subtransparent protoplasm, which becomes at a later period dark brown, nearly opaque (fig. 11*c*), in which state it might safely be referred to *Monotospora sphærocephala*, B. & Br. Other threads were surmounted by oval heads passing through a similar change of density according to age (fig. 11 *b, d*), as the spherical ones. These might be referred to *Monotospora megalospora*, B. & Br. A third lot of threads had heads differing from both those described, approaching a pear in shape (fig. 11 *e*), the dark brown contents being divided into three or four portions by broad septa. These may be referred to *Helminthosporium obovatum*, Berk. Now the question arises, are we to consider these three forms as distinct species, accidentally growing together, or one and the same species passing through these several forms? If we had found either growing alone there could have been little hesitation in naming it as above, but the idea is forced on us that when they are found thus intermixed, they may be different developments of the same species, the progression of which may be best seen by the arrangement (fig. 12 *a, b, c, d, e*), of the different heads according to age, taking the small transparent spherical head as the youngest, and the septate pear-shaped head as the most mature, the other forms being intermediate. A fact tending to strengthen this view is that nearly all the heads which had fallen on the matrix were the pyreform septate ones (fig. 12 *e*).

In addition to what I have just described as the undergrowth, there were also seen thinly scattered taller stems, with spherical heads of a totally different structure (fig. 13), answering to *Stilbum rigidum*, P. The stem consisted of a densely com-

packed mass of fine threads, only distinguishable when crushed in water under the microscope (fig. 14), branching out at the summit, and giving off a vast number of minute spores too small to admit of accurate measurement, which are held together by some glutinous substance forming the head (fig. 14 *a*). Extending up the stem, and branching from it at different intervals (fig 13 *c, c*), either as natural growth or parasitic growth, were what exactly corresponded to what I have called above *Monotospora sphaerocephala*, B. & Br. (fig. 15). I tried to trace some difference in the threads composing the stem of the *Stilbum*, but was unsuccessful, and I am quite unable to say whether they exist or not. This association of growth of four different species appeared so curious in some particulars that I have thought it well to place the facts before your readers.

DESCRIPTION OF PLATE LIII.

Fig. 10.—A magnified group of black moulds $\times 75$ linear. *a, a*, *Monotospora sphaerocephala*, B. & Br., *M. megalospora*, B. & Br., and *Helminthosporium obovatum*, Berk.

Fig. 11.—The same magnified 284.

Fig. 12.—The heads in the suggested order of growth.

Fig. 13.—*Stilbum rigidum*, P., with *Monotospora sphaerocephala* growing from its stem $\times 75$.

Fig 14.—The head of *Stilbum rigidum*, P. $\times 284$.

Fig. 15.—One of the branches from *Stilbum rigidum*, magnified 284.

BRITISH LICHENS.

In the Journal of Botany for May, Mr. Crombie records the following additions to the British Lichen Flora: 1. *Pyrenopsis phylliscella*, Nyl. sp. n. 2. *Collempsis oblongans*, Nyl. sp. n. 3. *Collema terrulentum*, Nyl. sp. n. 4. *C. granuliferum*, Nyl. sp. n. 5. *Pilophoron strumaticum*, Nyl. sp. n. 6. *Alectoria sarmentosa*, Ach. 7. *Parmeliu sulcata*, var. *lævis*, Nyl. f. *hirsuta*, Cromb. 8. *Physcia tribacoides*, Nyl. sp. n. 9. *Lecanora subexigua*, Nyl. sp. n. 10. *Lecanora leucophæiza*, Nyl. sp. n. 11. *L. austera*, Nyl. sp. n. 12. *L. subcinerea*, Nyl. 13. *L. cinerea*, f. *lepidota*, Leight. 14. *L. fuscescens* (Smmrf.) 15. *L. Bischoffii* (Hepp.) 16. *Pertusaria xanthostoma* (Smmrf.) 17. *Lecidea prasiniza*, Nyl. 18. *Lecidea lubens*, Nyl. sp. n. 19. *L. ochracea* (Hepp.) 20. *L. scopulicola*, Nyl. sp. n. 21. *L. phylliscina*, Nyl. 22. *L. phylliscocarpa*, Nyl. sp. n. 23. *L. dealbatula*, Nyl. sp. n. 24. *L. solediza*, Nyl.* 25. *L. confusior*, Nyl. sp. n. 26. *L. luteo-atra*, Nyl. 27. *L. neglecta*, Nyl. 28. *L. advenula*, Leight. 29. *L. urceolata*, Ach. 30. *Xylographa laricicola*, Nyl. sp. n. 31. *Ptychographa xylographoides*, Nyl. sp. et gen. n. 32. *Arthonia punctiliformis*, Leight, sp. n. 33. *Melaspilea vermiformis*, Leight, sp. n. 34. *Thelocarpon superellum*, Nyl. 35. *Verrucaria fluctigena*, Nyl. sp. n. 36. *Obryzum corniculatum*, Wallr. 37. *Endococus triphractoides*, Nyl. sp. n.

* This = Mudd exs. n. 181. not *L. subconfluens*, Th. Fr. Scand, p. 437 (excl. Syn. Mudd), which is sufficiently distinct.

ON A NEW BRITISH SPECIES OF ASCOBOLUS.

BY W. PHILLIPS, F.L.S.

Ascobolus amethystinus, n.s.—Sessile, scattered, at first spherical, then expanded, concave, externally dark purple, verrucose; disc nearly black; margin serrated; asci sub-cylindrical; sporidia 8, elliptical, rather narrow at the ends, hyaline, becoming purple, coarsely verrucose; paraphyses simple, enlarged at the apices. Sporid $\cdot 0011 \times \cdot 0006$ in.

On damp sandy soil on the margin of the river Severn. Shrewsbury. Oct., 1875.

This beautiful species in its early condition is perfectly spherical, without any trace of a pore at the summit, it then becomes fractured by an irregular aperture, which gradually expands, leaving rather a thin serrated margin to the cup. The cells composing the exterior are of a beautiful amethyst purple under the microscope, and when pressed yield their coloring matter to surrounding objects. The cups attain a diameter of half an inch.

This species is near *A. atrofuscous*, but differs from it in the receptacle being purple, the sporidia narrow at the ends and more coarsely verrucose, the asci being sub-cylindrical and the paraphyses enlarged at the summits, beside other characters given above.

ELVELLACEI BRITANNICI.

By W. PHILLIPS.

The second Fasciculus just issued contains:—

51. *Morchella semilibera*, D.C. 52. *Verpa digitaliformis*, Pers.
 53. *Mitrella cucullata*, (Batsch.) Fr. 54. *Geoglossum viride*, Pers.
 55. *G. glabrum*, Pers. 56. *Rhizina undulata*, Fr. 57. *Peziza trachycarpa*, Curr.
 58. *P. Chateri*, Sm. 59. *P. macrocystis*, Cooke. 60. *P. semi-immersa*, Karst. 61. *P. coccinea*, Jacq.
 62. *P. lanuginosa*, Bull. 63. *P. sepulta*, Fr. 64. *P. scutellata*, L.
 65. *P. umbrata*, Fr. 66. *P. resinaria*, Cooke & Phillips. 67. *P. clandestina*, Bull. 68. *P. palearum*, Desm.
 69. *P. trichodea*, Plow. & Phill. 70. *P. controversa*, Cooke. 71. *P. luzulina*, Phillips.
 72. *P. flammea*, A. & S. 73. *P. escharodes*, B. & Curt. 74. *P. ulmariae*, Lasch. 75. *P. villosa*, Pers.
 76. *P. cæsia*, Pers. 77. *P. fusca*, Pers. 78. *P. firma*, Pers. 79. *P. cyathodea*, Bull.
 80. *P. solani*, Pers. 81. *P. hepatica*, Batsch. 82. *P. fusaroides*, Berk. 83. *P. ulcerata*, Phillips.
 84. *P. arenevaga*, Desm. 85. *P. viburnicola*, B. & Br. 86. *Helotium æruginosum*, Fr.
 87. *H. herbarum*, Fr. 88. *H. epiphyllum*, Fr. 89. *H. pruinosum*, Jerd. 90. *Patellaria atrata*, Fr.
 91. *P. rhabarbarina*, Berk. 91. *P. discolor*, Mont 93. *Tympanis ligustri*, Tul. 94. *Oenangium subnitidum*, Cooke & Phillips.
 95. *Ascobolus vinosus*, B. 96. *A. glaber*, Pers. 97. *A. ciliatus*, Schm. 98. *A. testaceus*, B. & Br. 99. *Stictis graminis*, Desm. 100. *Stictis seriata*, Lib.

HEPATICÆ IN HIBERNIA, MENSE JULII, 1873.

Lectæ a S. O. LINDBERG.

Acta Societatis scientiarum fennicæ, x, p. 467—559.

That any one on their first visit to a country should, in a few weeks, collect so many as 87 species of Hepaticæ, may certainly be looked upon as remarkable, but still more exceptional is it to find recorded a critical notice of every one of these, with elaborate synonymy, and structural details devised from careful dissections. All these, however, are given in the paper before us, and with a clearness and precision that stamp it at once as the work of a master mind. Nor is this all, a new arrangement of the order is brought forward which we transcribe entire, as being likely to prove a useful guide to students in these interesting plants, especially as many may not have an opportunity of consulting the original.

The whole are divided into three families, and these are subdivided into *Schizocarpæ* and *Cleistocarpæ* according to the nature of the fruit. The great group of *Jungermaniaceæ Schizocarpæ* is again broken up into the following sections:—

a. **Anomogamæ.**

Prothallium disciform, producing a plantigenous bud from the margin. Stems more or less regularly pinnate, twice or thrice compounded, more rarely dichotomously branched. Leaves incubous, never opposite nor connate, conduplicate, the front lobe round, ovate or rarely ovate-lanceolate, entire, sometimes toothed, ciliate or more deeply emarginate, very rarely sublobulate, the hinder lobe smaller, saccate, galeate, cucullate or flattish, rarely somewhat indistinct, with some minute, irregular, commonly styliform lobules frequently placed between the hinder lobe and the stem. Amphigastria round ovato-rectangular, entire, bilobed, many-cleft, or sometimes with galeate lobes, rarely none. Gamœcium dioicous, autoicous or much more rarely paroicous. Perichætium apical, or proceeding from the posterior face of the stem, next its side above the axil of the leaves as a proper ramulus, never from the axil of the amphigastrium. Pistillidia usually very few. Colesula commonly small, 5-plicate and sometimes winged or compressed, rarely terete or densely plicate, with the mouth often very narrow and beak-shaped; rarely none. Seta very short, or short, slender. Theca minute, globose, almost always very thin and pellucid, as if composed of very few strata, most frequently cleft to the middle, and with erect valves, shewing internally few or no spiral fibres. Elaters one- or two-spined, sometimes scarce, spirally thickened, adhering pencil-like to the apex of the valves or to the interior face of the theca. Spores minute, rarely large, smooth or nearly so. Androecia lateral to

the stem like the perichætia, antheridia two or solitary, fixed in the axils of semiglobosely concave bracts, rarely in the axils of leaves or perichætial bracts, the foot stalk commonly arcuato-curved, paraphyses none. Propagula rather large, almost always disciform, arising from the leaves.

b. **Homogamæ.**

Prothallium shortly filiform, entire or branched in the frondose forms, bulbiform-subglobose. Stem irregularly branched, with branches from the amphigastrial axil, or with innovations more or less approximate to the colesula, rarely dichotomous, pinnate or twice compound. Leaves succubous or incubous, sometimes opposite and connate, very rarely conduplicate and then almost always the front lobe is smaller, as to form highly variable, round or reniform to sublinear, quite entire to broken up into filiform segments. Amphigastria narrow, more or less ovato-lanceolate, rarely round, quite entire to broken up into filiform segments, not unfrequently none. Gamocidium dioicous, paroicous or much more rarely autoicous. Perichætium passing out from the amphigastrial axilla as a proper branch, either apical on the stem itself, and its innovations, or in very many frondose forms, fixed on the interior face, more or less below the apex of stem, sometimes saccato-dependent. Pistillidia commonly very numerous. Colesula usually large, three or five plicate, very rarely winged, sometimes complanate or compressed, sometimes terete or densely plicate, with the mouth more or less wide, hardly ever beak-shaped; not unfrequently none. Seta long or very long, often thickish. Theca large globose-cylindric, of thick texture, brown and not pellucid, as if formed of at least two strata; cut down to the base, with the valves patent or divaricate, almost always showing spiral fibres internally. Elaters two—rarely one—tri, or quadrispiral, adhering to the internal face of theca, very rarely to apex of valves, or free. Spores minute or rather large, sometimes appendiculate externally. Androecia proceeding from the amphigastrial axilla as perichætia, or antheridia, commonly two, more rarely more or one, in the axils of the uppermost leaves, or in the frondose forms, fixed over the anterior face of the stem or immersed in it; the foot-stalk straight, hardly ever arcuato-curved, paraphyses sometimes present, usually filiform. Propagula minute, globose or angular, formed of one or few cells, arising from the leaves, amphigastria or apex of stem, very rarely large, more or less globose, and immersed in the frond.

† **Opisthogamæ.**

Stem irregularly branched by bifurcation of apex, or with branches from the amphigastrial axillæ, sometimes pinnate or twice compounded. Leaves incubous or succubous, very rarely conduplicate, entire or lobed. Amphigastria present at least in the perichætium of all, very like the leaves, or more or less ovate, undivided or lobed. Gamocidium dioicous, autoicous, rarely

paroicus. Female shoot proceeding from the amphigastrial axilla, almost always short. Colesula triangular, very rarely terete, compressed or none. Antheridia on a proper branch proceeding from the amphigastrial axilla, hardly ever placed in the foliar axillæ of the stem itself, paraphyses none.

† † **Acrogamæ.**

Stem commonly branched by innovations proceeding from beneath the perichætium, rarely pinnate or dichotomous. Leaves succubous, sometimes conduplicate, entire to broken up into capillary segments. Amphigastria most frequently absent, commonly small and ovato-subulate, rarely larger and like the leaves, undivided to broken up into capillary segments. Gamoecium dioicous or paroicus. Perichætium apical on the stem itself and its innovations. Colesula terete, commonly five—or sometimes more densely plicate, not unfrequently compressed, very rarely none. Antheridia placed in the highest axils of the stem and innovations, paraphyses present in some, most frequently leaf-shaped.

EUROPEAN GENERA OF HEPATICÆ NATURALLY ARRANGED.

I. MARCHANTIACEÆ.

A. SCHIZOCARPÆ.

- | | |
|-------------------------------------|-----------------------------|
| <i>α</i> MARCHANTIEÆ. | |
| 1. <i>Marchantia, March.—F., L.</i> | 7. <i>Dumortiera, Nees.</i> |
| 2. <i>Preissia, Corda.</i> | 8. <i>Sauteria, Nees.</i> |
| 3. <i>Conocephalus, Hill.</i> | 9. <i>Clevea, Lindb.</i> |
| 4. <i>Fimbriaria, Nees.</i> | 10. <i>Aitonia, Forst.</i> |
| 5. <i>Duvalia, Nees.</i> | 11. <i>Lunularia, Mich.</i> |
| 6. <i>Asterella, P.-B.</i> | <i>β. TARGIONIEÆ.</i> |
| | 12. <i>Targionia, Mich.</i> |

B. CLEISTOCARPÆ.

- | | | |
|-----------------------------|--|--------------------------|
| <i>γ</i> CORSINIEÆ. | | <i>δ</i> RICCIEÆ. |
| 13. <i>Corsinia, Raddi.</i> | | 15. <i>Riccia, Mich.</i> |
| 14. <i>Tessclina, Dum.</i> | | |

II. JUNGERMANIACEÆ.

A. SCHIZOCARPÆ.

a. ANOMOGAMÆ.

- | | |
|------------------------------|------------------------------|
| <i>α</i> FRULLANIEÆ. | |
| 16. <i>Frullania, Raddi.</i> | 19. <i>Porella, Dill.</i> |
| 17. <i>Lejeunea, Lib.</i> | 20. <i>Pleurozia, Dum.</i> |
| 18. <i>Radula, Dum.</i> | <i>β. METZGERIEÆ.</i> |
| | 21. <i>Metzgeria, Raddi.</i> |

b. HOMOGAMÆ.

†. *Opisthogamæ.*

- | | |
|----------------------------------|---------------------------------|
| <i>γ</i> LEPIDOZIEÆ. | |
| 22. <i>Lepidozia, Dum.</i> | 28. <i>Chiloscyphus, Corda.</i> |
| 23. <i>Bazzania, B. Gray.</i> | 29. <i>Harpanthus, Nees.</i> |
| 24. <i>Odontoschisma, Dum.</i> | <i>δ</i> SACCOGYNEÆ. |
| 25. <i>Cephalozia, Dum.</i> | 30. <i>Kantia, B. Gray.</i> |
| 26. <i>Lophocolea, Dum.</i> | 31. <i>Saccogyna, Dum.</i> |
| 27. <i>Pedinophyllum, Lindb.</i> | <i>ε</i> RICCARDIEÆ. |
| | 32. <i>Riccardia, B. Gray.</i> |

† † *Acrogamæ.*

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| ζ BLEPHAROZIEÆ.
33. <i>Trichocolea, Dum.</i>
34. <i>Blepharozia, Dum.</i>
35. <i>Mastigophora, Nees.</i>
36. <i>Herberta, B. Gray.</i>
37. <i>Anthelia, Dum.</i>
38. <i>Blepharostoma, Dum.</i>
η JUNGGERMANIEÆ.
39. <i>Martinellia, B. Gray.</i>
40. <i>Diplophyllum, Dum.</i>
41. <i>Plagiöchila, Dum.</i>
42. <i>Mylia, B. Gray.</i>
43. <i>Southbya, Spruce.</i> | 44. <i>Junggermania (Rupp) L.</i>
45. <i>Nardia, B. Gray.</i>
46. <i>Cesia, B. Gray.</i>
θ ACROBOLBEÆ.
47. <i>Acrobolbus, Nees.</i>
48. <i>Calypogeia, Raddi.</i>
ι FOSSOMBRONIEÆ.
49. <i>Scalia, B. Gray.</i>
50. <i>Fossombronina, Raddi.</i>
51. <i>Petalophyllum, Gottsche.</i>
52. <i>Pallavicinia, B. Gray.</i>
53. <i>Blasia, Mich.</i>
54. <i>Pellia, Raddi.</i> |
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B. CLEISTOCARPÆ.

- | | |
|---|--|
| λ SPHÆROCARPEÆ.
55. <i>Durieuia, B. M.</i>
56. <i>Sphærocarpus, Mich.</i> | κ THALLOCARPEÆ.
57. <i>Thallocarpus, Lindb.</i> |
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III. ANTHOCEROTACEÆ.

a. ANTHOCEROTEÆ.

- | | |
|------------------------------|------------------------------|
| 58. <i>Anthoceros, Mich.</i> | 59. <i>Notothylas, Sull.</i> |
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As an appendix is given a revision of the European species of *Rhacomitrium*, and also the description of a new species of *Zygodon* as follows:—

***Zygodon aristatus.*—Lindb.**

Dioicous, branched, sparingly radiculose; the leaves dense, erecto-patent, straight or a little recurved at apex, somewhat carinate, elongato-lanceolate, the wings at apex of unequal length, that of one side (usually the left) running higher on the nerve, the margin crenulate by the minute papillæ; nerve yellow, thick, strongly prominent at back, excurrent as an arista, which is long, very thick, subterete, pungent, fragile and quite smooth above; cells pleuren chymatous, quite smooth, but at the extreme apex oblong—oval, and slightly papillose, all rather large and strongly incrassate, the basal oval—rectangular or—quadrate, quite smooth, the others roundish, bearing at the thickened circumference 2-5 short acute papillæ.

Hab.—On a beech intermixed with *Z. conoides* at Cromaglow, Killarney, and on the bark of beech along with *Z. conoides* and *viridissimus* at Muckross.

On a limestone wall at Plymouth (1867, E. M. Holmes). Sweden—Isl. Gotland. (Lindberg).

ON RIMULARIA LIMBORINA. NYL.

(Extract of Letter from Dr. Nylander to the Rev. J. M. Crombie.)

In "Lichenological Memorabilia," No. 8, the Rev. Mr. Leighton speaks of *Rimularia limborina*, Nyl., and declared that it is identical with *Lecidea trochodes*, Tayl. I do not know what *L. trochodes* may really be, but from the figures of section of apothecium given by Mr. Leighton, it is entirely different from *R. limborina*, such as

I have described it from France, and such as it is in the three or four apothecia I received from yourself from Scotland.* This is at once distinguished by the conceptacle involving the hymenium, and not being open above, as is represented in the figure given by Mr. Leighton (c). Very imprudently the reverend author, in an excess of confidence, has embraced those rude opinions, that "the paraphyses becoming dead, subcarbonaceous, and fuscous-black, especially at their apices, form a continuous or partial carbonaceous stratum over the epithecium or disk," which "is purely imaginary" (to use the "gentlemanly" words of the author). Equally "purely imaginary," and more grievous a mistake was it when the reverend author, in "Lich. Memorabilia," No. 4, said "*Zoospores* or *spermatozoids* do exist in ferns, mosses, *hepaticæ*," &c., thus showing scarcely any knowledge of the *zoospores* of which he treats, and concerning the nature of which he might have learned in any elementary treatise. In *Rimularia* there is no stratiform epithecium present, but it appears in the form of a fissure of the conceptacle.

Moreover, with respect to the *Lecideæ*, of which he treats, it is not sufficient that new species should be definitely and certainly constituted, unless after a fuller and more acute examination of anatomical differences, than what is afforded by giving merely a section of the apothecium and the spores without any micro-metrical measurements for comparison. The characters of the spermogones ought also at the same time to be given. But of this elsewhere. Meanwhile, *Rimularia* remains as a distinct lichen, and is always to be distinguished from every *Lecideæ* whatever with gyrose apothecia; for these in *Rimularia* are never gyrose.

[We cannot approve the tone of this communication.—*Editor.*]

MYCOGRAPHIA.†

Unfortunately the literature of Mycology consists largely of fragments, memorials of splendid designs never prosecuted, of good intentions never fulfilled. We cannot but call to mind one after another the splendid works we might have consulted had they attained completion. We might instance Venturi's Miceto Bresciano, which came to a close at the fourth part; Fries's Icones, which fortunately have attained a tenth part; Notaris' Sferiacei Italici, of which one part appeared; Hoffmann's Icones Analyticæ, which encountered sudden death at the 4th part; Gonnerman and Rabenhorst's Mycologia Europæa, which expired with the ninth part; Smith & Saunders's Illustrations, which never got beyond a second part; Nitschke's Pyrenomycetes Germanici, of which only two parts have appeared; the splendid Flore d'Algerie

* Of my own specimen and of the true *Opegrapha trochodes*, Tayl., in Herb. Tayl., in Herb. Brit. Mus., I shall have something to say afterwards.—J. M. C.

† Mycographia, seu Icones Fungorum. Figures of Fungi from all parts of the world, by M. C. Cooke. Part i. Williams and Norgate.

stopped in the middle of the Fungi. All these instances seem to indicate some want of adequate support, which may perhaps occasion the addition of the present work to the long catalogue of failures. Let us hope not!

It is wholly beyond our province, for obvious reasons, to make any comment on "Mycologia," except to introduce it to our readers, with a list of the figures contained in the first part, and a reprint of the notice which appears therein:—

Figs.		Figs.	
1.	<i>Geoglossum hirsutum</i> var. [Americanum.	41.	<i>Peziza</i> (<i>Humaria</i>) <i>xanthomela</i> , <i>P.</i>
2.	" <i>Mulleri</i> , <i>B.</i>	42.	" <i>adusta</i> , <i>C. & P.</i>
3.	" <i>hirsutum</i> , <i>P.</i>	43.	" <i>pinetorum</i> , <i>Fckl.</i>
4.	" <i>Walteri</i> , <i>B.</i>	44.	" <i>Gerardi</i> , <i>C.</i>
5.	" <i>Peckianum</i> , <i>C.</i>	45.	" <i>tetraspora</i> , <i>Fckl.</i>
6.	" <i>glutinatum</i> , <i>P.</i>	46.	" <i>semi-immersa</i> , <i>K.</i>
7.	" <i>difforme</i> , <i>Fr.</i>	47.	" <i>Oocardi</i> , <i>Kalch.</i>
8.	" <i>australe</i> , <i>C.</i>	48.	" <i>salmonicolor</i> , <i>B. & Br.</i>
9.	" <i>glabrum</i> , <i>P.</i>	49.	" <i>astroidea</i> , <i>Hazs.</i>
10.	" <i>viscosum</i> , <i>P.</i>	50.	" <i>Polytrichi</i> , <i>Sch.</i>
11.	" <i>microsporium</i> , <i>C. & P.</i>	51.	" <i>asperior</i> , <i>Nyl.</i>
12.	" <i>luteum</i> , <i>Peck.</i>	52.	" <i>hinnulea</i> , <i>B. & Br.</i>
13.	" <i>olivaceum</i> , <i>P.</i>	53.	" <i>vivida</i> , <i>Nyl.</i>
14.	" <i>viride</i> , <i>P.</i>	54.	" <i>araneosa</i> , <i>Bull.</i>
15.	" <i>Hookeri</i> , <i>C.</i>	55.	" <i>Sowerbei</i> , <i>C.</i>
16.	" <i>atropurpureum</i> , <i>P.</i>	56.	" <i>ollaris</i> , <i>Fr.</i>
17.	<i>Peziza</i> (<i>Humaria</i>) <i>Crouani</i> , <i>C.</i>	57.	" <i>rutilans</i> , <i>Fr.</i>
18.	" <i>Wrightii</i> , <i>B. & C.</i>	58.	" <i>bella</i> , <i>B. & C.</i>
19.	" <i>sanguinaria</i> , <i>C.</i>	59.	" <i>granulata</i> , <i>Bull.</i>
20.	" <i>lætirubra</i> , <i>C.</i>	60.	" <i>exidiiformis</i> , <i>B. & Br.</i>
21.	" <i>exasperata</i> , <i>B.</i>	61.	" <i>ustorum</i> , <i>B.</i>
22.	" <i>echinosperma</i> , <i>Peck.</i>	62.	" <i>Chateri</i> , <i>Sm.</i>
23.	" <i>auriflava</i> , <i>C.</i>	63.	" <i>macrocystis</i> , <i>C.</i>
24.	" <i>miltina</i> , <i>B.</i>	64.	" <i>Thumeni</i> , <i>K.</i>
25.	" <i>humosa</i> , <i>Fr.</i>	65.	" <i>omphalodes</i> , <i>Bull.</i>
26.	" <i>Mulleri</i> , <i>B.</i>	66.	" <i>subbirsuta</i> , <i>Sch.</i>
27.	" <i>euchroa</i> , <i>K.</i>	67.	" <i>melaloma</i> , <i>A. & S.</i>
28.	" <i>leucoloma</i> , <i>Hedw.</i>	68.	" <i>Franzoniana</i> , <i>Not.</i>
29.	" <i>carbonigena</i> , <i>B.</i>	69.	" <i>deformis</i> , <i>K.</i>
30.	" <i>corallina</i> , <i>C.</i>	70.	" <i>hæmastigma</i> , <i>Fr.</i>
31.	" <i>aggregata</i> , <i>B. & Br.</i>	71.	" <i>rubricosa</i> , <i>Fr.</i>
32.	" <i>fusispora</i> , <i>B.</i>	72.	" <i>scatigena</i> , <i>B.</i>
33.	" <i>modesta</i> , <i>K.</i>	73.	" <i>canina</i> , <i>K.</i>
34.	" <i>globifera</i> , <i>B. & C.</i>	74.	" <i>nobilis</i> , <i>K.</i>
35.	" <i>convexella</i> , <i>K.</i>	75.	" <i>leporum</i> , <i>Fckl.</i>
36.	" <i>convexula</i> , <i>P.</i>	76.	" <i>murina</i> , <i>Fckl.</i>
37.	" <i>quisquiliarum</i> , <i>B. & C.</i>	77.	" <i>macrospora</i> , <i>Wall.</i>
38.	" <i>flavotinctens</i> , <i>B.</i>	78.	" <i>brunneoastra</i> , <i>Desm.</i>
39.	" <i>glumarum</i> , <i>Desm.</i>	79.	" <i>spissa</i> , <i>B.</i>
40.	" <i>limnicola</i> , <i>Hazs.</i>	80.	" <i>schizospora</i> , <i>Ph.</i>

The following is the "Notice" above alluded to:—

It would be more than could be expected of one man, within the limits of a natural life, to publish coloured figures of every known species of Fungus, even did he possess the materials for the purpose. Nevertheless one person may contribute to this desirable result, hence I have commenced the present work, intending for the present to confine it to the *Discomycetes*. It was intended to have presented each smaller genus, and sections or subgenera of the larger ones, complete in themselves, but the difficulties have been

found insurmountable. Although the genus *Geoglossum* is comparatively complete in the present number, a number of the group *Humaria* still require illustration, and for assistance with these I seek the aid and co-operation of European Mycologists.

The printing has been so arranged that hereafter the sequence of plates, with their descriptions, may be arranged and bound in accordance with individual tastes.

The great increase in the number of species during late years, and the want of uniformity in the determination of species attributed to older authors, render some such work as the present necessary. It is hoped that "Mycographia" will prove a welcome aid to mycologists.

The sporidia in all instances are drawn by camera lucida to an uniform scale, which is given herewith. To the other figures an indication of the enlargement is given.

It is proposed that a second part should be issued early in the year 1876, and succeeding parts at intervals of about six months.

In order to complete this section *Humaria* as far as possible, I am desirous of examining and illustrating such of the following as may be regarded allies, viz. :—

<i>Peziza endocarpoidea</i> , Berk.	<i>Peziza hyperborea</i> , Karst.
„ <i>Archeri</i> , Berk.	<i>Ascobolus microscopicus</i> , Crouan.
„ <i>aurantio-rubra</i> , Fckl.	<i>Peziza squamosa</i> , Schum.
„ <i>subgranulata</i> , Berk.	„ <i>sulfurata</i> , Fries.
„ <i>obnupta</i> , Karst.	„ <i>subfusca</i> , Crouan.
„ <i>intérmixta</i> , Karst.	„ <i>fimeta</i> , Fries.
„ <i>epitricha</i> , Berk.	„ <i>Sphagni</i> , Bong.
„ <i>miniata</i> , Preuss.	„ <i>merdaria</i> , Fries.
„ <i>Crechqueraultii</i> , Crouan.	„ <i>fimiputris</i> , Weinm.
„ <i>Ricciae</i> , Crouan.	<i>Ascobolus Persoonii</i> , Crouan.
„ <i>cremoricolor</i> , Berk.	„ <i>caninus</i> , Fckl.
„ <i>muscorum</i> , Holm.	<i>Peziza Ingrica</i> , Weinm.
„ <i>ascobolimorpha</i> , Crouan.	„ <i>Scheuckii</i> , Batsch.

If specimens of any of these are sent to me for the above purpose, they shall be promptly returned, with thanks.

M. C. COOKE, 2, Grosvenor Villas, Junction Road, Upper Holloway, London, N.

NEW SCOTCH PEZIZA.

Peziza (Sarcoscypha) coprinaria. Cooke.

Subgregarious, sessile, crimson. Cups hemispherical, soon flattened (1 c.m. broad); margin slightly elevated, fringed with long pale brown septate hairs; asci cylindrical; sporidia elliptical, smooth; paraphyses clavate at the tips, filled with orange granules.

On dung. Rannoch. Dr. Buchanan White and Mr. Carrington.

A very distinct species. The cups remain flattened in drying, external cells very large, hairs $\frac{1}{2}$ n.m. long. Sporidia $\cdot 02 \times \cdot 01$ m.m. The hairs are never stellate as in *P. stercorea*, nor is the cup so densely hairy, the hairs being confined to the margin. The name of *P. hippocopa*, under which this species was first reported, has

been replaced since it appears to have occurred on cow-dung. It is curious that at the same time an interesting species allied to *P. stercorea*, on dung, was sent from the United States by Mr. W. R. Gerard, which also is undescribed.*

CRYPTOGAMIC LITERATURE.

SMITH, W. G. Resting Spores of the Potato Fungus, in "Monthly Microscopical Journal," Sept., 1875.

LEIGHTON, REV. W. On *Stigmatidium dendriticum*, in "Journal of Botany," Sept., 1875.

MELVILL, J. C. On Marine Algæ of S. Carolina and Florida, in "Journal of Botany," Sept., 1875.

NYLANDER, W. Addenda nova ad Lichenographiam Europæum, in "Flora," July, 1875.

WINTER, DR. G. Über das *Æcidium* von *Puccinia arundinacea*, in "Hedwigia," No. 8, 1875.

LINDBERG, S. O. & Gackström, Hepaticæ Scandinaviæ. Fasc. i. enumeratio.

LINDBERG, S. O. Manipulus muscorum secundus, in "Hedwigia," No. 9, 1875.

NISSL, G. v. Neue Kernpilze i. serie, in "Hedwigia," No. 10, 1875.

ROSTAFINSKI, J. *Hæmatococcus lacustris* et sur les bases d'une classification naturelle des Algues chlorosporées, in "Mem. Soc. Nat. de Sci Nat.," de Cherbourg, 1875, vol. xix.

SACCARDO, P. A. Fungi Veneti novi vel Critici, ser. iv.

AUSTIN, C. F. Some New North American Musci, "in Bull. Torr. Club," May, 1874.

MOHR, C. Additions to the Bryology of the United States, in "Bull. Torr. Club," Aug., 1874.

AUSTIN, C. F. New Hepaticæ, in "Bull. Torr. Club," March, 1875. Notes on the Anthocerotaceæ of N. America, in "Bull. Torr. Club," April 1875. New Mosses from Colorado, in "Bull. Torr. Club," July, 1875.

DICKIE, DR. G. Algæ from the Island of Mangaia, S. Africa, in "Journ. Linn. Soc.," No. 81.

SACCARDO, P. A. Fungi Veneti novi vel critica, in "N. Giorn. Bot. Ital.," Oct., 1875.

THUMEN, F. "Mycotheca Universalis," Cent. iii.

REHM, DR. Ascomyceten, Fasc. vi.

* *Peziza scubalonta*, C. & Ger.—Scattered, sessile, rather fleshy. Cups hemispherical, soon expanded (1 c.m. broad), contracting when dry, externally strigose with rather dense pale brown hairs; disc concave, orange-red; asci cylindrical; sporidia elliptic, smooth (0.18 × .009 m.m.); paraphyses septate, slightly thickened upwards.

On horse dung, Catskill Mountains. W. R. Gerard.

Quite distinct from *P. stercorea*, to which it is allied, by the simple hairs and much smaller sporidia, as well as some other features. Hairs about 2 m.m. long.

Grevillea,

A QUARTERLY RECORD OF CRYPTOGAMIC BOTANY
AND ITS LITERATURE.

NOTICES OF NORTH AMERICAN FUNGI.

By the REV. M. J. BERKELEY, M.A., F.L.S.

(Continued from Vol. III., Page 52.)

845. **Hypoxylon concurrens.** *B. & C.*—Peritheciis minutis confluentibus sursum tantum denudatis minutissime granulatis; ostiolo minuto, papillæformi.

Car. Inf. No. 2258.

Perithecia connate, forming a thin black uniform stratum, very minutely granulated, the upper part only exposed; ostiola minute, papillæform; sporidia shortly cymbæform uninucleate.

846. **Hypoxylon Beaumontii.** *B. & C.*—Peritheciis globosis conatis; ostiolo distincto papillæformi; sporidiis oblongo-ellipticis uniseptatis.

Alabama, Beaumont. No. 4617, 4857.

Perithecia rather small at first, slightly brown, then black, smooth, with a distinct papillæform ostiolum; asci linear; sporidia uniseriate, oblongo-elliptic, .0004 long, uniseptate.

* **Hypoxylon serpens.** *P.*—Car. Inf. No. 1936. Ravenel. No. 1749. Alabama, Beaumont. No. 4868.

* **Hypoxylon coprophilum.** *Fr.*—On cow dung. Car. Sup. No. 464.

847. **Hypoxylon equinum.** *B. & Rav.*—Peritheciis e mycelio albo oriundis ostiolis nigris papillæformibus; sporidiis breviter cymbæformibus.

On horse dung. Car. Inf. Ravenel. No. 710.

Perithecia springing from a thin effused white mycelium; ostiola papillæform, black; sporidia shortly cymbæform, .0006 long.

848. **Hypoxylon nudicolle.** *B. & C.*—Peritheciis conatis materie umbrina tectis; ostiolis prominentibus nigris; sporidiis oblongis uniseptatis.

On pine wood. Car. Inf. No. 3275.

Forming a continuous or slightly interrupted umber brown stratum; ostiola black, papillæform; perithecia crowded, covered

with a brownish matter; asci linear; sporidia uniseriate; sporidia oblong, narrow, uniseptate.

* **Hypoxylon botryosum.** *Fr.*—On *Nyssa*. Carolina. No. 3276.

849. **Hypoxylon rhyodes.** *B. & C.*—Linear; peritheciis congestis minutis albo-pulverulentis; sporidiis allantoideis.

On oak wood. Pennsylvania, Michener. No. 4386.

Growing in lines following the grain of the wood; perithecia minute, connate, covered with white meal; sporidia minute, sausage-shaped.

850. **Hypoxylon erinaceum.** *B. & Rav.*—Peritheciis ovatis connatis pulverulentis, collo elongato; sporidiis clavatis.

On *Liquidambar*. Car. Inf. Ravenel. No. 1367.

Perithecia ovate, pulverulent, with an elongated often curved neck; sporidia clavate, much attenuated below. A very curious species.

* **Hypoxylon ustulatum.** *Bull.*—White Mountains. New Hampshire, Tuckerman. *Rav.* No. 1720. Car. Sup. No. 386, 441, 597. Car. Inf. Ravenel.

* **Hypoxylon discretum.** *Schwein.*—On apple branches. Car. Inf. No. 3860. On *Cercis*. Alabama, Peters. No. 4554. On *Magnolia glauca*. Car. Inf. Ravenel. No. 1338.

Sporidia uniseriate, broadly elliptic, .00057 long; border gelatinous.

851. **Hypoxylon Broomeianum.** *B. & C.*—Crassum fuscum marginatum; ostiolis punctatum; stromate fusco; peritheciis ostiolo excepto abditis; sporidiis ellipticis.

On rotten logs. Car. Inf. No. 1894.

Irregular, brown, about $1\frac{1}{2}$ inch across, with a raised obtuse margin, about $\frac{1}{3}$ inch thick, brownish; surface quite even, with the exception of the punctiform ostiola; asci linear; sporidia uniseriate, elliptic.

* **Hypoxylon nummularium** *D.C.*—On *Acer rubrum*, *Quercus falcata*, *Platanus*. Car. Inf. No. 1437, 1438, 1496, 1554, 1887, 2964. Ravenel. No. 926.

* **Diatrype quadrata.** *Schwein.*—On *Rhus copallina*. Car. Inf. No. 3744. Ravenel. No. 1793. On *Prunus*. No. 1917. Ravenel. No. 635. On *Ulmus Americana*. No. 1559. On *Liquidambar*. No. 1559. Car. Inf. Ravenel. No. 1559. On *Acer rubrum*. Pennsylvania, Michener. No. 4351.

Sporidia uniseptate, sometimes contracted at the septum, .00063-.0005 long. Sent out as *Sph. obesa*, *B. & C.*

* **Diatrype punctulata.** *B. & Rav.*—Latissime effusum nigrum ostiolis punctiformibus depressis.

On dead trunks of oak.

Spreading for many inches, black, punctated, with the minute depressed ostiola.

* **Diatrype stigma.** *Fr.*—On dead branches. Car. Sup. No. 123, 342, 848, 929. Car. Inf. No. 1172, 1507, 1624, 2321, 2409. Ravenel. No. 1573, 1693, 1780. Pennsylvania, Michener. No. 3580, 3965, 4245.

The fruit varies a little in size. In No. 1780 the sporidia are scarcely curved, but I can see no external difference. In No. 2409 they are just intermediate.

* **Diatrype platystoma.** *Schwein.*—On dead branches. Car. Sup. No. 141. Car. Inf. No. 2096. New York, Sartwell. On *Hamamelis*. No. 2626. Pennsylvania, Michener. On *Acer rubrum*. No. 6347.

* **Diatrype atropunctata.** *Schwein.*—On dead branches. Car. Sup. No. 128. Car. Inf. No. 2507. Ohio.

Sporidia dark, subelliptic, .00114 long.

* **Diatrype clypeus.** *Schwein.*—On dead oak. Car. Inf. No. 2471. Sporidia dark, subelliptic.

851 (bis). **Diatrype grandinea.** *B. & R.*—Late decorticans transversim rimosa, ostiolis frequentissimis aspera; stromate subrufo; sporidiis fuscis subellipticis.

On oak. Car. Inf. Ravenel. No. 1572.

Spreading for many inches, cracked transversely; stroma somewhat rufous, rough, with crowded ostiola; asci clavate; sporidia dark, subelliptic.

* **Diatrype disciformis.** *Fr.*—Car. Sup. No. 42, 715, 810, 817. 847, 938. Alabama, Peters. No. 5215. Pennsylvania, Michener, No. 4406.

Var. **Virescens.** Alabama, Peters. No. 6085. Sporidia sausage-shaped, .0004 long. Cotoosa Springs, Georgia. Ravenel. No. 1742. Vermont, J. D. Russell. No. 5885.

* **Diatrype microplaca.** *B. & C.* Journ. Linn. Soc. x. p. 386.—Car. Inf. No. 2007. On *Laurus Sassafras*. Ravenel. No. 752. Cuba.

852. **Diatrype hypophlæa.** *B. & Rav.*—Suborbicularis tenuis ostiolis prominulis exasperata; sporidiis oblongis nec allantoideis.

On dead limbs of *Magnolia glauca*. Car. Inf. Ravenel. No. 1710, 1799.

Forming thin suborbicular patches, which spring from beneath the cuticle, rough with the scattered ostiola; sporidia oblong, in a single row, not sausage-shaped.

* **Diatrype undulata.** *Fr.*—New England, Sprague. No. 5849.

* **Diatrype verrucæformis.** *Fr.*—Car. Sup. No. 59, 3433, 3439. Car. Inf. No. 1488, 1585, 2198, 3690, 4926, 4943. Ravenel. No. 1431. New England, Murray. No. 6326.

* **Diatrype quercina.** *Tul.*—Car. Sup. No. 520. Alabama, Peters. No. 4005.

* **Diatrype Duriæi.** *Mont.*—Car. Inf. No. 2491. New Jersey. No. 4703. Connecticut, C. Wright. No. 5643.

Sporidia eight in each ascus, .0006 long, sausage-shaped.

* **Diatrype Smilacicola.** *Schwein.*—On *Smilax rotundifolia*. Pennsylvania, Michener. No. 3540. Car. Inf. No. 3837.

Sporidia sausage-shaped.

* **Diatrype Cephalanthi.** *Schwein.*—Alabama, Beaumont. No. 4663.

Sporidia numerous, sausage-shaped.

853. **Diatrype asterostoma.** *B. & C.*—Pustulis elevatis; ostiolis stellatis; stromate albo; sporidiis allantoideis majoribus octonis.

On fallen branches. Car. Inf. No. 2203.

Pustules raised; ostiola stellate; stroma white; sporidia rather large, sausage-shaped, eight in each ascus.

854. **Diatrype plagia.** *B. & C.*—Pustulis transversim erumpentibus; ostiolis substellatis; stromate parvo fusco; sporidiis octonis allantoideis.

On *Liriodendron*. Car. Inf. No. 212.

Bursting through the bark transversely; ostiola substellate; stroma brown, scanty; asci clavate; sporidia eight in each ascus, sausage-shaped.

* **Diatrype aspera.** *Fr.*—On *Alnus serrulata*. Pennsylvania, Michener. No. 3505.

* **Diatrype viticola.** *Schwein.*—Car. Inf. No. 4975. Sporidia oblong, elliptic, uniseptate, constricted slightly at the septum, .0006 long.

854. **Diatrype carpinigera.** *B. & C.*—Pustulis parvis nigris; peritheciis abditis; sporidiis oblongis uniseptatis.

On hornbeam. Pennsylvania, Michener. No. 4388.

Pustules small, black; perithecia hidden; sporidia oblong, uniseptate, .0006-.00057 long.

855. **Diatrype sphenammina.** *B. & C.*—Pustulis longitudinaliter erumpentibus; ostiolis brevibus cylindricis; ascis clavatis; sporidiis uniseriatis oblongis angustis hyalinis.

On *Acer rubrum*. Pennsylvania, Michener. No. 4221.

Pustules splitting the bark longitudinally, and overtopped by its fragments; ostiola short, cylindrical; asci clavate; sporidia uniseriate, oblong, narrow, hyaline.

* **Diatrype corniculata.** *Fr.*—On dead limbs of *Fraxinus*. Santee Canal, Ravenel. No. 1836. On oak. No. 1715.

* **Diatrype Vitis.** *Schwein.*—Car. Inf. No. 32, 30.

* **Diatrype hystrix.** *Tode.*—On *Benzoin odorifera*. Pennsylvania, Michener. No. 4329.

* **Diatrype ferruginea.** *Fr.*—On oak. Car. Inf. No. 1078. Pennsylvania, Michener. No. 3969. On *Populus tremelloides*.

856. **Diatrype subfulva.** *B. & C.*—Pustulis parvis apice fulvo-pulverulentis; ostiolis nigris pertusis demum emergentibus; sporidiis allantoideis plurimis.

On *Nyssa*. *Car. Inf.* No. 4929.

Pustules small, covered above with tawny meal; ostiola at length emergent, black, pierced; asci clavate, with long pedicels; sporidia numerous in each ascus, sausage-shaped, .0004 long.

* **Diatrype strumella.** *Fr.*—On gooseberry. Mountains of New York. No. 4499.

Sporidia fusiform, triseptate, .0005 long.

857. **Diatrype Titan.** *B. & Rav.*—Pustulis irregularibus ex ostiolis emergentibus rugosis subtiliter granulatis; sporidiis maximis 6-septatis.

On bark of hornbeam. *Car. Inf.* Ravenel. No. 1552.

Pustules irregular, black, rough with the protruding ostiola minutely granulated; sporidia fusiform, obtuse at either end, dark with about 6-septa, .004 long.

* **Eutypa lata.** *Tul.*—*Car. Sup.* No. 626, 819, 828. *Car. Inf.* No. 1896, 1916, 1904, 4946. *Ravenel.* No. 1543, 1357. *Virginian Mountains.* No. 3328, 3365. *Pennsylvania, Michener.* No. 4128.

* **Eutypa leioplaca.** *Fr.*—*Car. Inf.* No. 1475.

* **Eutypa milliaria.** *Fr.*—*Pennsylvania, Michener.* No. 4166. *Sporidia* .0003 long, sausage-shaped.

* **Eutypa limæformis.** *Schwein.*—On oak. *Car. Sup.* No. 921. On *Liquidambar.* No. 836. *Cotoosa Springs, Georgia.* *Ravenel.* No. 1737. *Ohio.*

858. **Eutypa subpyramidata.** *B. & C.*—Effusa; peritheciis nigerrimis subpyramidatis; sporidiis biconicis elongatis.

On oak. *Car. Sup.* No. 741.

Effused, perithecia of a somewhat pyramidal shape, forming a rasp-like stratum; asci lanceolate, much attenuated below; sporidia biconical, each division much attenuated.

* **Eutypa scabriseta.** *Schwein.*—*Car. Inf.* *Ravenel.* No. 770. *Sporidia* sausage-shaped, .0002 long.

* **Melogramma gastrinum.** *Tul.*—On oak. *Car. Inf.* *Ravenel.* No. 1365. *Cotoosa Springs, Georgia.* No. 1736.

* **Melogramma gyrosum.** *Tul.*—*Car. Sup.* No. 55, 238, 462. 713. *Car. Inf.* On *Liquidambar.* *Ravenel.*

* **Melogramma quercuum.** *Schwein.*—*Car. Sup.* No. 99, 188, *Car. Inf.* No. 188, 1169, 1280, 1353, 3865. *Ravenel.* No. 1583, 1787. *New York, Sartwell.* No. 1858, 3070.

There are also many numbers on various plants with similar sporidia, which have been distributed as *Sphaeria mutila*.

* **Melogramma Meliæ.** *Schwein.*—Car. Inf. No. 2679, 1615. Ravenel. No. 597, 1811.

* **Melogramma Calycanthi.** *Schwein.*—Car. Inf. No. 3704.

* **Melogramma rhizogenum.** *B. Hook Lond. Journ.* 1845, p. 312.

On *Gleditschia.* Car. Sup. No. 1788.

Sporidia elliptic.

* **Melogramma ambiguum.** *Schwein.*—On *Rhus copallina.* Car. Inf. No. 1132, 2770. Ravenel. No. 939, 1788, 1791. On *Rhus radicans.* No. 157.

Sporidia hyaline, cymbæform, .0015 long.

859. **Melogramma horizontale.** *B. & C.*—Transversim erumpens; peritheciis subtiliter pulverulentis; ascis clavatis amplis; sporidiis fusiformibus hyalinis.

On *Gossypium.* Car. Inf. No. 1892. Ravenel. No. 588.

Bursting the bark transversely; perithecia minutely pulverulent; asci large, clavate; sporidia hyaline fusiform.

* **Melogramma Gleditschiæ.** *Schwein.*—Pennsylvania, Michener. No. 3943.

Very distinct from the *M. rhizogenum.*

* **Melogramma Hibisci.** *Schwein.*—Car. Inf. No. 1486. On *Hibiscus Syriacus.*

* **Melogramma Van Vleckii.** *Schwein.*—On *Bignonia radicans.* Pennsylvania, Michener. No. 6009.

Sporidia narrow, fusiform, hyaline, .0006 long.

Schweinitz' original specimen is probably the stylosporous state.

860. **Melogramma graphideum.** *B. & Rav.*—Breve graphideum cortice marginatum; sporidiis breviter fusiformibus hyalinis.

On *Myrica cerifera.*

Looks at first sight like a Lichen, as the strata are of various shapes, triangular, sinuated, &c., and surrounded by the rigid border of the bark; sporidia shortly fusiform, hyaline, .0008 long.

There are other allied forms in the collection. On *Cratægus cordata*, Pennsylvania, No. 3509, with cymbæform spōridia, .0008 long; on *Cercis Canadensis*, No. 795, Car. Sup., with similar sporidia; on *Cyrilla*, Car. Inf., No. 2189, and several which seem externally distinct, but without fruit, especially Car. Inf., No. 1139, on *Magnolia glauca.*

861. **Melogramma dichænoides.** *B. & C.*—Maculis ostiolis conicis rugosis exasperatis; sporidiis oblongis obtusis uniseptatis.

On oak. Alabama, Beaumont. No. 4662.

Looks at first sight like a *Dichæna*; spots bursting out transversely, but generally orbicular, very rough with the conical rugose pulverulent ostiola; asci clavate; sporidia hyaline in one or sometimes two rows, oblong, sometimes narrower below, obtuse, .001 long.

862. **Melogramma subaquilum.** *B. & C.*—Peritheciis paucis

longitudinaliter erumpentibus; ascis clavatis; sporidiis hyalinis uniseptatis angustis.

On *Acer striatum*. Massachusetts. No. 3405.

Perithecia few, bursting through the bark longitudinally; asci clavate; sporidia narrow, uniseptate, constricted more or less at the septum, sometimes almost biconical, .00083 long.

* **Melogramma insidens.** *Schwein.*—On ash. No. 4394. Pennsylvania, Michener. No. 4353.

Sporidia oblong, in one or two rows uniseptate, .0003 long.

Car. Inf., No. 1542, 2960, *Sphaeria collematoides*, B. & C., scarcely differs, except in the stratum being more pulvinate. *Sphaeria Gallæ*, *Schwein.*, is a *Sphaeropsis*.

863. **Melogramma Spraguei.** B. & C.—Massa undulata pulverulenta; ascis linearibus; sporidiis clavatis triseptatis verticilliter devisis.

On *Pinus strobus*. Massachusetts, C. J. Sprague.

Undulated, pulverulent, looking like the work of some burrowing larva; perithecia entirely concealed; asci linear; sporidia shortly clavate, with three horizontal and a few vertical septa.

* **Valsa prunastri.** *Fr.*—On *Cerasus*. Car. Inf. Ravenel. No. 1271.

* **Valsa stellulata.** *Fr.*—Car. Inf. No. 2277. Ravenel. No. 547, 583, 584, 615, 1341, 1343, 1430, 1453, 1792. Pennsylvania, Michener. No. 3427, 4119, 4176, 4224, 4391, 4412. Texas, C. Wright. No. 3900. New Jersey. No. 4678, 4693. Ohio. No. 5884. To these might be added fifty more numbers, many of which have been sent out as *Sph. tetraploa*.

* **Valsa Toxici.** *Schwein.*—On *Rhus radicans*. Car. Inf. Ravenel. No. 1424.

* **Valsa anomia.** *Schwein.*—On *Robinia*. Virginian Mountains. No. 3345.

In the Schweinitzian specimen the sporidia are sausage-shaped, .0004-.0003 long. In the Virginian we have the stylospores fusiform or slightly curved and obtuse, uniseptate, .0013 long, with a long slender pedicel.

* **Valsa haustellata.** *Fr.*—On *Alnus serrulata*. Car. Inf. Ravenel. No. 1663, 1764. On *Ostrya virginica*. No. 1805. Santee Swamp. No. 1815.

* **Valsa Leaiana.** B.—Hook. Lond. Journ., 1845, p. 311.

On hornbeam. Car. Inf. Ravenel. No. 1364.

Sporidia sausage-shaped. In *Sphaeria carpini* linear oblong, 3-septate.

* **Valsa fibrosa.** *Fr.*—Mountains of New York. No. 4467.

Sporidia oblong, elliptic, uniseptate, at length fenestrate, .0006 long.

* **Valsa Notarisii.** *Mont. & Dur.*—On *Robinia*. Car. Sup. No. 122. On *Gleditschia*. No. 83. Car. Inf. No. 2594. On oak.

Sporidia uniseptate, constricted at the septum, obtuse at either end, or apiculate.

* **Valsa nivea.** *Fr.*—On *Poplar*. Pennsylvania, Michener. No. 4248, 5890.

* **Valsa leucostoma.** *Fr.*—Car. Sup. No. 25, 36, 193. Car. Inf. Ravenel. No. 1590, 1591. Pennsylvania, Michener. No. 4343, 6004. New York. No. 1796.

* **Valsa angulata.** *Fr.*—Car. Sup. No. 237. On *Ilex opaca*.

* **Valsa dissepta.** *Fr.*—On *Salix*. Car. Inf. No. 3798. On *Amorpha fruticosa*. Car. Inf. Ravenel. No. 1219.

864. **Valsa munda.** *B. & C.*—Subcuticularis disco parvo albocincto; ascis lanceolatis, sporidiis allantodeis.

On smooth yellow branches of *Cornus*. Alabama, Peters. No. 5196.

Pustules completely covered by the bark, which is blackened over them, or appears black by transparence, the disc alone, which is bordered with white, being free; asci lanceolate; sporidia sausage-shaped.

865. **Valsa Pennsylvanica.** *B. & C.*—Transversim erumpens; peritheciis incisis; sporidiis oblongis triseptatis.

On *Cerasus pennsylvanica*. Mountains of New York. No. 4434.

Bursting transversely; perithecia in the centre of a facette; sporidia narrow, oblong, sometimes wide at one end, sometimes slightly curved, triseptate, .001 long.

866. **Valsa glyptica.** *B. & Currey.*—Epidermide tecta nigrocincta; sporidiis fusiformibus uniseptatis.

On willow. Car. Inf. No. 3011.

Quite covered by the bark, which is merely pierced by the ostiola, surrounded more or less evidently by a black line; sporidia fusiform, sometimes sigmoid, uniseptate, .0018-.0022 long.

* **Valsa colliculus.** *Wormsk.*—On pine. New York, Sartwell. No. 3449.

867. **Valsa orbicula.** *B. & C.*—Minuta orbicularis nigro-cincta; ostiola albo-cincto, ascis lanceolatis, sporidiis allantodeis.

On willow. Car. Inf. No. 3404.

Minute, orbicular, showing the subjacent perithecia by transparence, but not blackened, surrounded by a black line; asci lanceolate; sporidia sausage-shaped, .0004 long.

* **Valsa subscripta.** *Fr.*—On *Robinia*. Car. Inf. No. 3291. Sporidia sausage-shaped; asci minute.

* **Valsa coronata.** *Fr.*—On *Castanea*. Virginian Mountains. No. 3351.

* **Valsa leiphæmia.** *Fr.*—On fallen logs of oak. Car. Inf. Ravenel. No. 1580. Pennsylvania, Michener. No. 4137.

868. **Valsa leiphæmioides.** *B. & C.*—Pustulis subcorticalibus, ostiolis congestis tandem expositis; pulvere niveo intermixtis, sporidiis allantoides.

On oak. Car. Inf. No. 2505. New England, Sprague. No. 5415.

Pustules, when the cuticle is stripped off, covered by the brown bark, the ostiola only exposed and mixed with white matter; sporidia sausage-shaped, $\cdot 0004$ long. Closely resembling the last, but with different fruit.

869. **Valsa castanicola.** *B. & C.*—Parva sudepressa, ascis subclavatis; sporidiis biseriatis cymbæformibus, triseptatis, septis verticaliter divisis.

On small twigs of *Castanea*. Virginian Mountains.

Pustules small, rather flat; ostiola not prominent; asci slightly clavate; sporidia biseriate; sporidia cymbæform, pointed, triseptate, at length vertically divided, $\cdot 0004$ long.

* **Valsa pini.** *Fr.*—New England, Sprague. No. 5296, 5427. Sporidia sausage-shaped, $\cdot 0046$ long.

* **Valsa vitis.** *Schwein.*—Car. Inf. No. 2135. Car. Sup. No. 628, 3706. Pennsylvania, Michener. No. 4238. Sporidia sausage-shaped, $\cdot 0006$ long.

* **Valsa stilbostoma.** *Fr.*—Car. Inf. On *Acer*. On *Melia*. Ravenel. No. 557.

* **Valsa salicina.** *Fr.*—Car. Sup. No. 4. New England, Russell. No. 5039, 5955, 3494.

I cannot distinguish No. 4209. Pennsylvania, Michener, on *Viburnum dentatum*. Car. Inf. on *Liquidambar*. No. 2072. All these agree as to the sporidia with *Scl. Myc.* No. 10, 0006-0007. On *Platanus*. New England, Sprague. No. 6321. The sporidia are $\cdot 001$. In *Syringa*, Pennsylvania, Michener, No. 4086, they are $\cdot 0006$.

Valsa ambiens. *P.*—On apple. Pennsylvania, Michener. No. 3980, 4089, 4095, 4118. New York, Sartwell. On *Prunus*. No. 2627, 2628.

* **Valsa suffusa.** *Fr.*—New Jersey. No. 4635.

870. **Valsa fulvella.** *B. & Rav.*—Pustulis cortice arcte inclusis, disco fulvello ostiolis nigris punctato; sporidiis allantoides.

On *Platanus occidentalis*. Car. Inf. Ravenel. No. 1825.

Pustules closely covered by the bark, which is raised up, disc pale-tawny, dotted with the black ostiola; sporidia sausage-shaped.

871. **Valsa corynostoma.** *B. & Rav.*—Pustulis cortice abditis; ostiolis clavatis, sporidiis allantoides.

On *Acer rubrum*. Car. Inf. Ravenel. No. 1587.

Pustules small, scarcely raising the bark; ostiola fasciculate, club-shaped; sporidia minute, sausage-shaped.

872. **Valsa caryigena.** *B. & C.*—Pustulis seriatis; ostiolis maticis alba intermixtis; sporidiis allantoideis.

On branches of *Carya*. Pennsylvania, Michener. No. 5150.

Pustules small, in rows, covered below with the smooth bark, disc white, studded with the black ostiola; sporidia sausage-shaped, .0004 long.

873. **Valsa Americana.** *B. & C.*—Pustulis epidermide tectis, ostiolis congestis necs tellatis; ascis clavatis; sporidiis allantoideis.

On branches of various trees from various parts of the United States; almost as common as *Valsa stellulata*. It has the appearance of *V. stilbostoma*, but the sporidia are quite different.

874. **Valsa innata.** *B. & C.*—Pustulis subcorticalibus planis; ostiolis disco elevato brevi abditis; ascis filiformibus; sporidiis oblongis.

On *Castanea vesca*. Mountains of New York.

Perithecia forming a flat annular ring round the raised disc, within which the ostiola are concealed; asci filiform; sporidia in a single row, oblong, slightly narrowed either way from the centre, .0003 long.

875. **Valsa albo-velata.** *B. & C.*—Pustulis cortice tectis; disco albo; ostiolis nigris cylindricis punctato; ascis clavatis; sporidiis angustis fusiformibus quadrinucleatis.

On *Rhus copallina*. Car. Inf. No. 1885, 2479.

Pustules hid by the bark; disc white, pierced by the cylindrical ostiola; asci clavate; sporidia biseriate, fusiform, or narrowly cymbiform, with four nuclei. The specimens are accompanied by an *Helminthosporium*, with short fusiform, triseptate spores.

* **Valso pulchella.** *Fr.*—Car. Sup. No. 310. Car. Inf. No. 1545, 1890. On peach.

876. **Valsa gemmata.** *B. & C.*—Peritheciis paucis, collis una erumpentibus apice stellatis; sporidiis fusiformibus brevibus 3-septatis.

On *Rhus radicans*. Car. Inf. No. 3046.

Perithecia few, circinating; necks united; ostiola stellate; sporidia shortly fusiforms, triseptate.

877. **Valsa tribulosa.** *B. & C.*—Peritheciis paucis, collis spiculis; sporidiis fusiformibus 3-septatis.

On alder. Car. Inf. No. 5003.

Perithecia few; necks subcylindrical, projecting; sporidia fusiform, triseptate, .0008 long.

878. **Valsa condensata.** *B. & C.*—Pustulis parvis; ostiolis brevibus; stromate fusco; sporidiis obovatis, 5-septatis, hic illic verticaliter devisis.

On *Quercus montana*. Virginian Mountains. No. 3364.

Pustules small; ostiola short; sporidia obovate, divided horizontally and vertically, .0008 long.

879. **Valsa mesoleuca.** *B. & C.*—Disco albo, ostiolis cincto vel consperso; sporidiis allantodeis hyalinis.

On *Viburnum dentatum*. Pennsylvania, Michener. No. 4207.

Disc white, surrounded by the black ostiola, or sometimes dotted; sporidia hyaline, sausage-shaped, .0008 long.

* **Valsa quaternata.** *Fr.*—On poplar and *Alnus serrulata*. Pennsylvania, Michener. No. 4102. 4229. Vermont, Rev. J. D. Russell. No. 5888.

Sporidia .0005 long.

* **Valsa aculeans.** *Schwein.*—On *Rhus typhina*. Massachusetts. No. 3376.

Sporidia fusiform, narrow, triseptate, .0006 long.

* **Melanconis chrysostroma.** *Tul.*—On *Quercus alba*. No. 2961.

* **Gibbera pulicaris.** *Fr.*—On *Zea*. Car. Sup. No. 301. On wheat. No. 897. Car. Inf. No. 3843, 2126, 2218. Ravenel. No. 1831. On *Hibiscus syriacus*. No. 2726. On *Brassica*. Car. Inf. No. 6017. On *Gourd*. Pennsylvania, Michener. No. 3821. On *Juglans nigra*. No. 3421.

* **Gibbera Saubinetii.** *Mont. & Dur.*—On *Zea*. Car. Inf. No. 1412, 1431. New England, Murray. No. 6282. Pennsylvania, Michener. On *Scirpus pungens*. No. 4381. On willow. No. 4372.

* **Dothidea graminis.** *Fr.*—Car. Sup. No. 370, 663, 746. Car. Inf. No. 3205, 3221. Ravenel. No. 1804. On *Scirpus*. New York, Sartwell. No. 3466.

Sporidia .0004 long.

* **Dothidia gangræna.** *Fr.*—On leaves of *Isolepis capillaris*. Car. Inf. No. 1653. Ravenel. No. 1657.

Sporidia narrow, as in *D. stenospora*, *B. & Br.*, Journ. Linn. Soc. xiv., p. 134.

Alabama, Beaumont. No. 4658. Sporidia .001 long.

* **Dothidea canaliculata.** *Schwein.*—On leaves of *Cyperus Baldwinii*. No. 1755.

* **Dothidea Trifolii.** *Fr.*—On leaves of clover. Pennsylvania, Michener. No. 3489. Canada, Poe. No. 6165.

880. **Dothidea perisporioides.** *B. & C.*—Superficialis reticulata nigra; ascis clavatis; sporidiis uniseptatis medio constrictis.

On leaves of *Rhynchosia monophylla*. Car. Inf. No. 1263. On *Indigofera Caroliniensis*. No. 1289. Ravenel.

Forming a net work on the upper surface of the leaves; asci clavate; sporidia biseriate, oblong, uniseptate, constricted at the septum, obtuse or slightly pointed at either end, .0012 long.

* **Dothidea Lespedezæ.** *Schwein.*—Car. Inf. Ravenel. No. 1977.

* **Dothidia anemones.** *Fr.*—On leaves of *Anemone Virginica*. Car. Sup. No. 744, 774.

* **Dothidea ribesia.** *Fr.*—Maine, Rev. J. Blake. No. 6302, 5296. New England, Sprague. No. 5309. Russell. No. 5950. Pennsylvania, Michener. No. 4071. Without fruit, I cannot distinguish. On honeysuckle. No. 4326. On *Maclura aurantiaca*. No. 6001. *Dothidea capreolata*, Schw. Car. Inf. No. 2685. On *Bignonia capneolata*.

881. **Dothidea Haydeni.** *B. & C.*—Irregularis papillata; sporidiis linearibus utrinque attenuatis.

On stems of *Aster* and *Erigeron*. Nebraska, Hayden. No. 6404.

Forming elongated, irregular, papillose patches; sporidia linear, attenuated at either end.

882. **Dothidea Coluteæ.** *B. & C.*—Pulvinata lævis, cellulis; stromate inclusis; ascis clavatis; sporidiis oblongis uniseptatis centro constricti.

On twigs of *Colutea*. Pennsylvania, Michener. No. 4072. 4250.

Pulvinate, even, containing several cells; asci clavate; sporidia oblong, uniseptate, constricted at the septum, .0005-.0008 long.

* **Dothidea culmicola.** *Schwein.*—On stalks of grass. Car. Inf. No. 4938. Canada, Poe. No. 5000.

* **Dothidea Berberidis.** *D. Not.*—Murray. No. 6242.

* **Dothidea Sambuci.** *Fr.*—On *Morus multicaulis*. Car. Inf. No. 2044. *Dothidea Missouriensis*, Schwein, Car. Inf., No. 2233, is not a fungus.

883. **Dothidea seminata.** *B. & Rav.*—Sparsa granulata centro demum punctata; sporidiis biseriatis, cymbæformibus uniseptatis.

On leaves of *Desmodium*. Ravenel. No. 1503.

Rather large, scattered, granulated, at length pierced in the centre; asci clavate; sporidia biseriate, cymbiform, narrow, uniseptate, .001 long, much narrower than in *D. perisporioides* or *D. grammodes*.

884. **Dothidea simillima.** *B. & Rav.*—Sparsa minor granulata; ascis angustis; sporidiis arcuatis utrinque attenuated.

On leaves of the same plant, and under the same number; scattered, smaller, granulated, asci narrow, sporidia hyaline, arcuate, suddenly attenuated at either end as in many *Vermiculariæ*, .0006 long. *Dothidea Desmodii*, Curt., on *D. lineatum*, is apparently the same.

* **Dothidea artemisiæ.** *Schwein.*—On *Artemisia abrotanum*. Pennsylvania, Michener. No. 4348.

Sporidia oblong, uniseptate, constricted at the septum, one division being smaller than the other, .001 long.

885. **Dothidea ambrosiæ.** *B. & C.*—Convexa nitida; ascis linearibus; sporidiis uniseriatis ellipticis hyalinis.

On leaves of *Ambrosia elatior*. *Car. Inf.* No. 1387. On *A. artemisiæfolia*. Alabama, Beaumont. No. 4668.

Convex, shining; asci linear; shorter than the slender paraphyses; sporidia uniseriate, elliptic, hyaline.

886. **Dothidea vorax.** *B. & C.*—Culmum circumdans congesta; ascis linearibus; sporidiis filiformibus.

On *Panicum*. *Car. Inf.* No. 1810. Ravenel. On *Uniola*.

Forming a black patch surrounding the stem, $\frac{1}{3}$ inch long; asci linear, sporidia filiform. Sometimes very irregular, and then *D. pilulæformis*, *B. & C.* *Car. Inf.* On *Uniola*. No. 1809. *D. atramentaria*, on the under side of grass leaves. *Car. Inf.* No. 1657, is probably a form.

887. **Dothidea eupatorii.** *B. & C.*—Erumpens; elongata irregularis, ascis brevibus.

On stems of *Eupatoria coronopifolia*. *Car. Sup.* No. 798.

Forming black, thin, irregular erumpent, granulated patches, an inch or more long; asci short, obovate.

888. **Dothidea picea.** *B. & C.*—Maculis minutis orbicularibus; ascis brevibus; sporidiis angustis cymbæformibus hyalinis.

On twigs of *Vitis æstivalis*.

Forming little orbicular papillose patches; asci short, clavate; sporidia hyaline, narrow, cymbæform.

* **Dothidea fructigena.** *Schwein.*—On apples, which have been lying out all the winter. *Car. Sup.* No. 336.

* **Dothidea Pteridis.** *Fr.*—Rhode Island. *Curtis. Car. Inf.* Ravenel. No. 1744.

* **Dothidea alnea.** *Fr.*—On *Alnus serrulata*. Pennsylvania, Michener. No. 3499.

Spores linear, .0004 long. Not a true *Dothidea*.

* **Dothidea geographica.** *Fr.*—On leaves of *Prunus serotina*. *Car. Inf.* No. 2142. Ravenel. On *Nyssa*. No. 3218.

* **Dothidea phytolacæ.** *Schwein.*—Alabama, Peters. No. 546.

* **Dothidea lineola.** *Schwein.*—On *Hemerocallis*. New England. Russell.

* **Dothidea heliopsidis.** *Schwein.*—On *Helianthus*. Missouri, Dr. Engelmann. No. 3680.

* **Dothidea Rhois.** *Schwein.*—On leaves of *Rhus copallina*. *Car. Inf.* No. 3173.

889. **Dothidea scutula.** *B. & C.*—Orbiculata applanata, cellulis plurimis globosis; ascis brevibus.

On the upper surface of leaves of *Laurus Caroliniensis*. *Car. Inf.* Ravenel. No. 478.

Orbicular, placentæform, containing numerous cells, asci oblong; sporidia immature.

* **Dothiora pyrenophora.** *Fr.*—On *Pyrus Americana*. Mountains. Car. Sup. No. 4463.

* **Sphæria corticium.** *Schwein.*—On oak. Car. Sup. No. 706. New York, Lévillé.

In original specimens sporidia cymbæform; .0011 long. In the Carolina specimens the byssus is not so red as in the original and Lévillé's specimens.

* **Sphæria aquila.** *Fr.*—Car. Sup. No. 107, 303. On ash. No. 769. Car. Inf. On oak. No. 6022. On *Cornus florida*. No. 4972. Ohio.

* **Sphæria Desmazierii.** *B. & Br.*—"Cooke Handb.," p. 854.

On birch. Maine, Rev. J. Blake. No. 6345. Pennsylvania, Michener. On *Cornus florida*. No. 4880.

* **Sphæria foveolata.** *B. & C.*—"Journ. Linn. Soc.," x., p. 387.

On prostrate branches. Car. Inf. Ravenel. No. 1358.

Sporidia shaped like seeds of a *Veronica*.

* **Sphæria acanthostroma.** *Mont.*—On *Acer*, oak and *Myrica cerifera*. Car. Inf. Ravenel. No. 1320, 1361, 1638, 1829. Pennsylvania, Michener.

* **Sphæria tristis.** *Tode.*—Car. Inf. No. 1599. New England. Sprague. No. 5843.

* **Sphæria phæstroma.** *M. & Dur.*—Car. Inf. No. 1569, 2797.

On *Ulmus Americana*. Ravenel. No. 1857. Sporidia triseptate, the two central articulations dark, .00125-.0016 long.

890. **Sphæria pezizula.** *B. & C.*—Peritheciis cupularibus in byssum floccosam nigram insidens; ascis clavatis; sporidiis oblongo-linearibus curvis pluriseptatis. Car. Inf. No. 1774. Ravenel. No. 1344. New Jersey. No. 4694.

Perithecia cup-shaped seated on a thin byssus; asci clavate; sporidia linear-oblong, about 7-septate. The New Jersey plant differs in having the sporidia clavate with about seven septa, .0013 long.

891. **Sphæria papilionacea.** *B. & C.*—Peritheciis minutis in byssum compactam tenuem insidentibus apice niveis.

On leaves apparently of some rosaceous plant. Car. Inf. No. 6381. Ravenel. No. 1927.

Perithecia minute, seated on a thin compact byssus, their tips white.

892. **Sphæria Russellii.** *B. & C.*—Peritheciis minutis demum collapsis in byssum compactam tenuem insidentibus.

On leaves of *Mespilus*. Massachusetts, Russell. No. 6399.

Perithecia minute, at length collapsed, seated on a thin byssus, consisting of intricate threads which cover the whole under surface

of the leaf. Unfortunately I cannot find perfect fruit in either of these species, which are very curious.

893. *Sphæria parietalis*. B. & C.—Peritheciis cupularibus in byssum parcam insidentibus; ascis clavatis; sporidiis biseriatis oblongis utrinque sub-attenuatis uniseptatis, medio constrictis.

On the inside of a hollow oak. Car. Inf. No. 2192.

Perithecia cup-shaped, seated on a sparing byssus; asci clavate; sporidia biseriate, oblong, slightly attenuated at either end, so as to be almost biconical, uniseptate, constricted at the septa.

894. *Sphæria pannicola*. B. & C.—Peritheciis globosis in stroma crassiusculum pilosum fuscum insidentibus; sporidiis oblongis arcuatis obtusis triseptatis.

On roots of birch. New Jersey. No. 4583.

Perithecia globose, seated on a rather thick brown pilose stratum consisting of straight acute threads; sporidia oblong, obtuse at either end, arcuate with three septa, .0008 long.

895. *Sphæria ranella*. B. & Rav.—Peritheciis globosis collapsis rugosis in stroma tenue insidentibus; sporidiis caudatis uniseptatis, sursum coloratis.

On *Platanus*. Car. Inf. Ravenel.

Perithecia globose, collapsing, rugged, seated on a brown stratum; sporidia of two joints, the upper elliptic or pointed dark, the low elongated and attenuated with several nuclei, .005 long or more.

896. *Sphæria xestothele*. B. & C.—Peritheciis congestis umbrino-lanatis, ostiolo nudo perforato, sporidiis fusiformibus uniseptatis.

On *Cornus florida*. Car. Inf. No. 4972.

Perithecia crowded, connected with brown woolly matter; ostiolum naked, perforated, tinged with rufous; sporidia biseriate, fusiform, uniseptate, .0008 long, hyaline.

* *Sphæria racodium*. Fr.—On *Liquidambar*. Car. Inf. No. 1466, 3247.

* *Sphæria ovina*. On dead wood. New Jersey. No. 4697.

Sporidia linear, sigmoid, .002 long.

* *Sphæria hispida*. Tode.—On *Juglans nigra*. Car. Sup. No. 858. Car. Inf. No. 2705.

* *Sphæria canescens*. P.—On *Platanus*. Car. Sup. No. 1782.

* *Sphæria strigosa*. A. & S.—On damp pine wood. Car. Inf. No. 1610.

* *Sphæria exilis*. A. & S.—Car. Sup. On *Prunus serotina*. No. 701. On *Quercus montana*. No. 928. Car. Inf. On *Cornus florida*. No. 2396, 2732. Ravenel. No. 1814.

* *Sphæria mutabilis*. P.—Pennsylvania, Michener. No. 4385.

* *Sphæria lignaria*. Grev.—Car. Inf. No. 1594, 1800, 2568. Virginian Mountains. No. 2348.

Sporidia elliptic, brown, .0004. This is quite distinct from *Sphæria hispida*.

* **Sphæria pilosa.** *P.*—*Car. Inf.* No. 1183. Under the shingles of a roof. On pine. *Car. Inf.* No. 2165, 2524.

* **Sphæria cladosporiosa.** *Schwein.*—On *Agaricus salignus*. Sartwell. No. 3076.

Not a true *Sphæria*, though it has much the appearance of one.

* **Sphæria vermicularia.** *Nees.*—*Car. Inf.* No. 1219.

897. **Sphæria orthotricha.** *B. & C.*—Peritheciis gregariis pilis longis rectis vestitis; sporidiis linearibus fuscis 6-septatis.

On decayed *Nyssa*. *Car. Inf.* No. 4927.

Perithecia gregarious, but scarcely crowded, clothed with long, straight, acute hairs; sporidia linear, with 6-septa, dark, .002-.0025 long, sometimes slightly curved.

898. **Sphæria lanuginosa.** *B. & C.*—Peritheciis globosis sursum leviter applanatis; basi lanuginosis; sporidiis uniseriatis subbiconicis.

On *Robinia*. *Car. Inf.* No. 2618.

Perithecia globose, slightly flattened above, lanuginous at the base; sporidia oblong, uniseptate, curved, sometimes pointed at either extremity, so as to be biconical.

899. **Sphæria ootheca.** *B. & C.*—Congregata globosa glabrescens nitida in maculam nigram insidens; ascis obovatis fartis.

On oak. No. 2110.

Perithecia crowded into little groups, globose, seated on a dark spot; asci obovate, stuffed with numerous sausage-shaped minute sporidia.

This is *Sphæria mucida* β . *rostellata*, *Schwein*, on *Rhus*, in whose specimen the asci are .001 long. In No. 2110 they are rather larger.

900. **Sphæria Berenice.** *B. & C.*—Minima undique villosa; ascis lanceolatis; sporidiis hyalinis oblongis utrinque leviter attenuatis.

On the under side of leaves of *Magnolia macrophylla*.

Minute, ovate, clothed all over with radiant flocci; asci lanceolate; sporidia hyaline, oblong, slightly attenuated at either end, or subcymbiform.

901. **Sphæria flavido-compta.** *B. & C.*—Peritheciis ovatis pilis rigidis flavis ornatis; sporidiis oblongo-ellipticis triseptatis.

On *Cyrilla*. *Car. Inf.* No. 5021.

Perithecia ovate, black, clothed with rigid yellow hairs; sporidia oblong, elliptic, triseptate, .0003-.001 long.

902. **Sphæria cerea.** *B. & C.*—Minuta parasitica fulvella; ascis lanceolatis; sporidiis fusiformibus plurinucleatis.

Parasitic, on *Sphæria stigma*. *Car. Inf.* No. 2315.

Minute, globose, tawny; asci lanceolate; sporidia fusiform, with many nuclei, probably not mature.

NEW BRITISH FUNGI.

By M. C. COOKE, M.A.

(Continued from page 69.)

Puccinia Luzulæ. *Libert. Ess.* 94.

Spots purplish. Sori scattered, somewhat rounded, girt by the ruptured epidermis, amphigenous. Spores brown, elongated, lower cell pyriform, upper cell subglobose, quadrate or irregular, with a thickened epispore, pedicels long, hyaline.

On living *Luzula*. Darenth.

This is considered the perfect condition of *Trichobasis oblongata*. (See "Handbook.")

Puccinia Cirsii. *Lasch. Rabh. F. Eur.* 89.

UREDO-SPORES.—Sori scattered, pulverulent, brown. Spores globose, cinnamon-brown, granular, at length delicately roughened.

Uredo Cirsii, Lasch. Rabh. F. E. 90.

On leaves of *Cirsium*. Scotland.

BRAND-SPORES.—Sori scattered, dark-brown, epiphyllous, encircled by the ruptured cuticle. Pseudospores shortly pedicellate, obtuse, dark-brown.—*Thumen F. Austr.*, No. 68. *Sacc. Myc. Ven.*, 128.

On leaves of *Cirsium*. Dupplin Castle, Perth.

Fueckel's Fungi Rhen., No. 340. is *Puccinia syngenesiarum*, and not the species published by Lasch.

Peronospora Viola. *D. By. Ann. Sc. Nat.* xx. p. 125.

Effused. Flocci fasciculate, rather short, 2-6 times dichotomous, ultimate ramuli shortly subulate, deflexed; conidia ellipsoid, slightly apiculate.

On living leaves of *Viola*. Forden. Rev. J. E. Vize.

Apparently rather too close to *Peronospora effusa*.

Ramularia Viola. *Fckl. Sym. Myc.* p. 361, t. i. fig. 26.

Tufts delicate, in orbicular white spots, with a brownish border; flocci very short, simple, fasciculate; spores cylindrical, obtuse, simple, hyaline.—*Oidium fusisporioides*, Fckl. Fungi. Rhen, No. 134.

On leaves of *Viola*. Forden. Sept., 1875.

Spores $\cdot 008 \times \cdot 002$ m.m.

Ramularia Ulmaria. *Cooke.*

Tufts greyish-white, forming irregular ovate or angular spots, mostly circumscribed by the veins; flocci very short; spores cylindrical, obtuse, simple, hyaline.

On under surface of leaves of *Spiræa Ulmaria*. Near Manchester. T. Brittain.

Spores $\cdot 03\text{-}\cdot 04 \times \cdot 007$ m.m.

Geoglossum microsporum. *Cooke & Peck.* "Mycographia," fig. 11.
Var. **tremellosum.**

Sporidia biseriate, cylindrical, or subfusiform, hyaline, becoming at length faintly 5-7 septate.

On the ground. Rannoch. Dr. Buchanan White.

This is referred to the American species as a variety, but it seems to be more tremellose than the typical form, and the sporidia do not flow out and cover the surface of the club; this may be accounted for in that the specimens were not so fully matured. Sporidia $\cdot 03$ m.m. long.

Peziza (Humaria) Phillipsii. *Cooke Mycographia ii., fig. 88.*

Sessile scattered, fleshy, cup-shaped, at length expanded, externally fuliginous, rough; hymenium, dark vinous, plane, margin sometimes crenulate, sporidia elliptic, attenuated at each end, verrucose, paraphyses clavate, septate. *Ascobolus amethystinus*, Phillips in part.

On sandy ground. Shrewsbury.

Sporidia $\cdot 025 \times \cdot 011$ m.m.

Peziza (Humaria) violascens. *Cooke, Mycographia ii., fig. 83.*

Subhemispherical, violaceous-brown, whitish at the base, seated on pallid rooting fibrils, hymenium plane or convex, asci cylindrical. Sporidia globose, uninucleate, granular. Paraphyses filiform. *Ascobolus Persoonii*, Cronan Flor. Fin., p. 56.

Amongst small mosses. Shrewsbury (W. Phillips).

Cups 5-7 m.m. broad. Sporidia $\cdot 008$ - $\cdot 009$ m.m. diam.

Peziza (Humaria) lechithina. *Cooke.*

Gregarious, sessile, egg-yellow; cups (5 m.m. broad), hemispherical, then flattened, becoming convex; margin narrow, distinct; asci cylindrical; sporidia elliptical, smooth; paraphyses septate, clavate above, filled with orange granules. *Cooke, Mycographia, ii., fig. 89.*

On old trunk crossing a stream. Sept. Forden.

This interesting species is quite distinct from anything hitherto described. Sporidia $\cdot 025 \times \cdot 012$ m.m.

Peziza (Humaria) constellatio. *B. & Br. Ann. Nat. Hist.*

Scattered, sessile, red. Cups (1-2 m.m.) hemispherical, soon flattened, disc at length convex; asci cylindrical; sporidia globose, smooth; paraphyses profuse, filiform, filled with orange granules. — *Peziza humosa*, *Rehm Ascomy. No. 4. Cooke, Mycographia, ii., fig. 81.*

On the ground. Hereford (W. Phillips). Kent (M. J. B.).

Sporidia $\cdot 012$ - $\cdot 013$ m.m. The same species was sent us by Professor Saccardo from Italy, under the name of *Peziza humosa*. There is a slight difference in the size of the sporidia from different localities ranging from $\cdot 011$ to $\cdot 013$ m.m. diameter. In all there are the same linear granular orange paraphyses, in great number, curved at the tips. Fuckel's *Crouania humosa* has much larger sporidia ($\cdot 016$ m.m.), though it is doubtful whether this is sufficient to constitute it a distinct species, in the absence of any other difference.

Peziza (Humaria) pluvialis. *Cooke.*

Gregarious, sometimes densely crowded, rather soft, flesh-colour, or with an orange tint. Cups ($\frac{1}{2}$ m.m. broad), soon flat-

tened, and plane or slightly convex, with radiating white byssoid filaments at the base; asci cylindrical; sporidia elliptical, hyaline, smooth; paraphyses filiform, numerous, distinct, granular. *Cooke, Mycographia, fig. 90.*

On a damp wall. Eastbourne (C. J. Müller). On wall paper. Chichester (Dr. Paxton).

Sporidia $\cdot 018 \times \cdot 008$ m.m.

In both instances this *Peziza* was found after the heavy rains in early summer. There is a little difference in the two specimens. The Eastbourne specimens have more of an orange tint, the cups are less crowded, and the white mycelium is more distinct, but the fruit corresponds in both. The Chichester specimens resemble externally some forms of *Ascobolus carneus*; both are rather closely allied to *Peziza Franzoniana*, Not. (*Mycographia, fig. 68*), but perhaps distinct in the sporidia, and more profuse and decided paraphyses, as well as some other features.

Peziza (Sarcoscypha) coprinaria. *Cooke in Grevillea iv., p. 91.*

On cow dung. Rannoch.

Peziza (Dasyscypha) comitessæ. *Cooke.*

Cæspitose or single and gregarious, bright golden-yellow, externally paler, and tomentose, stipitate, common stem branching below. Cups at first clavate, then expanded and cupulate; asci cylindrical; sporidia minute, linear, straight or curved; paraphyses filiform. *Fungi Britt., ii., No. 371.*

On a fallen tree. Dupplin Castle, Perth.

Asci $\cdot 05 \times \cdot 006$ m.m.; sporidia $\cdot 006$ - $\cdot 0075$ m.m. long.

The branching stem resembles that of *Peziza pygmea*, to which this species is allied; the tufts contain from two to four cups proceeding from a common stem, or sometimes single. It is an elegant species dedicated to the Countess of Kinnoull, on whose estate it was discovered.

Peziza (Hymenoscypha) monilifera. *Fckl. Sym. Myc. 310.*

Stipitate, scattered, or cæspitose. Cups seated amongst *Bispora*, at first subclavate, at length dilated; disc concave, patellate when mature, marginate, waxy, externally and rather long stem, smooth, pallid brown; disc slightly darker; asci elongated; sporidia biseriata, oblong, attenuated towards each end, but obtuse, at length uniseptate, hyaline; paraphyses filiform, subclavate.

Amongst *Bispora monilivides* on cut timber. Dupplin Castle.

Cups 1-2 m.m. broad, 1-3 m.m. high; sporidia $\cdot 012 \times \cdot 004$ m.m.

Fuckel has constituted a new genus under the name of *Bispora* for this species, of which he assumes that *Bispora monilivides* is the conidia form.

Helotium scoparium. *Cooke.*

Scattered or subgregarious, pallid, sessile; disc convex, rather paler, whole plant becoming greyish in drying; asci clavate; sporidia cylindrical, obtuse, straight or curved, binucleate, at

length with the endochrome divided; paraphyses simple, filiform, slightly granular.

On dead twigs of broom. Dupplin Castle, Perth.

Cups 1 m.m. broad; Asci $\cdot 1 \times \cdot 02$ m.m.; sporidia $\cdot 02\text{-}\cdot 025 \times \cdot 005$ m.m.

Ascobolus amethystinus. *Phillips, Grevillea iv., p. 84.*

On damp sandy soil, near Shrewsbury.

Ascobolus crenulatus. *Karst. Fung. Fenn. No. 763.*

Gregarious, sessile, at first spheroid, then flattened, nearly plane, greenish-yellow, furfuraceous; margin crenulate (1-5 m.m. broad); asci clavate; sporidia elliptical, striate, violet, becoming brownish; paraphyses slender.—*Karst. Myc. Fenn. i. p. 77.*

On grouse dung. Rannoch. Dr. Buchanan White.

Sporidia $\cdot 012\text{-}\cdot 016 \times \cdot 006\text{-}\cdot 008$ m.m.; cups about $1\text{-}1\frac{1}{2}$ m.m. broad; disc of the Rannoch specimens, vinous when old, retaining the greenish colour at the base of the cups.

Ascobolus (Saccobolus) obscurus. *Cooke.*

Subgregarious, sometimes densely crowded, fuliginous, hymenium convex, rather paler. Asci clavate. Sporidia elliptical, rough, becoming violet, collected into an elliptical mass. Paraphyses linear.

On old sacking. Forden.

Cups $\frac{1}{4}\text{-}\frac{3}{4}$ m.m. Sporidia $\cdot 012\text{-}\cdot 014 \times \cdot 007$ m.m.

Ascobolus (Ascophanus) pilosus. *Fr.*

Minute, sessile, yellow, testaceous-yellow or tawny-orange, externally pilose with long hairs; disc papillate; margin naked; hairs simple, incrassated at the base; asci clavate; sporidia hyaline, oblong ovate; paraphyses slender, septate, simple, or branched, granular. *Boud. Mem. p. 64.*

On grouse dung. Rannoch. Dr. Buchanan White.

Cups $\frac{1}{10}$ th m.m. broad; sporidia $\cdot 02 \times \cdot 01$ m.m.

This is referred to *A. pilosus* as a variety, but the specimens were more minute than usual, scarcely visible to the naked eye, pallid. It differs from any form of *A. papillatus* and *A. ciliatus*, in the hairs not being marginal but clothing the surface of the cup; they are also more slender than in the other species. It was accompanied by a minute *Ryparobius* and *Sphaeria (Sporormia) Notarisii*.

Xylaria Scotica. *Cooke.*

Suberose; stem very long, pallid, root-like, slender, 1-3 times dichotomously branched above; branches elongated, or very short and fasciculate; heads elongated, subcylindrical; apex more or less acute, greyish-brown, then black; perithecia very numerous, slightly papillate; asci cylindrical; sporidia uniseriate, elliptical, brown, minute.

On the ground. Meihlouer. Mr. Matheson.

Entire length, including rooting base, 2 to 6 inches. Clubs about 1 inch long; sporidia $\cdot 005\text{-}\cdot 006 \times \cdot 003$ m.m.

A most interesting addition to the British Flora. It was exhibited at the Perth Fungus Show, and is wholly unlike any described species. The sporidia are smaller than in any other British *Xylaria*. Commonly 6-8 heads arise from the rooting stem.

Valsa lauro-cerasi. *Tul. Carp.* ii. 196.

STYLOSPORES = *Ceuthospora lauri*.

ASCOPHORE = Perithecia 6-8, disposed in a circle, raising the cuticle, which is sometimes blackened above the swollen clusters; asci clavate; sporidia narrowly elliptical, small, hyaline, straight.—*Cooke Fungi Britt.* ii. *ined.*

On branches of cherry laurel. Forden.

Not having seen specimens, which are authenticated as the species intended by Tulasne, it is difficult to determine whether our plant is his species. The sporidia are larger, but for the present it seems advisable to include it under his name.

This is interesting from its association with *Ceuthospora Lauri*, which occurred at the extremities of the twigs; passing downwards it was replaced by the *Valsa*, which resembled the former so closely that the two could scarcely be distinguished by a lens. On the older branches the absence of the blackened cuticle caused the resemblance to be less perfect. Asci $\cdot 04$ m.m. long; sporidia $\cdot 01$ - $\cdot 012$ m.m. long.

Sphæria (Sporozmia) Notarisii. *Car. Rabh. Fung. Eur.* 976 b.

Perithecia black, rather shining, ovoid or rounded; ostiola wart-like or mamillæform; asci cylindrical, octosporous; sporidia tetramerous, brown, not apparently surrounded by a hyaline coat.—*Hedwigia*, 1868, p. 69, t. 1, fig. 1.

On grouse dung. Rannoch. Dr. Buchanan White.

Sporidia $\cdot 022$ - $\cdot 026 \times \cdot 004$ - $\cdot 005$ m.m.; segments of the sporidia $\cdot 005$ - $\cdot 006$ m.m. long.

Sphæria (Sordaria) curvula. *D. By. Morph. Pilze*, p. 209.

Perithecia scattered, superficial, or rarely semi-immersed, oblong-conical, rugulose, densely clothed with articulate fasciculate brown hairs; asci broad, cylindrical, stipitate; sporidia ovate or elliptic, dark brown, with hyaline terminal appendage; paraphyses articulated, longer than the asci.—*Sphærea stercorarii*, *Fungi Britt.* i. 589.

On cow dung. King's Lynn (C. B. Plowright). Rannoch (Dr. Buchanan White).

Sporidia $\cdot 029 \times \cdot 015$ m.m., without appendage.

Sphæria (Denudatæ) ostioloidea. *Cooke.*

Gregarious. Perithecia minute, black, subglobose, with a slight papillate ostiolum, seated on the stroma of *Diatrype*; asci cylindrical, narrow; sporidia uniseriate, linear, straight, minute, hyaline.

Parasitic on *Diatrype quercina*. Forden.

Quite different from *Sphæria nigerrima*. The perithecia are very

minute, looking like the ostiola of the *Diatrype*. Asci $\cdot 04 \times \cdot 004$ m.m; sporidia $\cdot 008$ m.m. long.

Lophium fusisporum. *Cooke.*

Perithecia subsessile, expanded upwards, conchiform, laterally compressed, black, shining, striate. Asci subcylindrical. Sporidia fusiform, multiseptate (about 7) yellowish.—*Lophium mytilinum*. *Cooke Fungi, Britt. ser. ii., 200.*

On fir branches and bark.

Sporidia $\cdot 05$ m.m. long. I have now no doubt that the true *L. mytilinum* has filiform sporidia the length of the ascus, as described in "Handbook." Specimens from Dr. Capron, of Shere, and in Fiedler's "Exsicc." are of this character. Fuckel's No. 762 in my copy is sterile.

DESCRIPTION OF PLATE LXIV.

Fig. 1. Specimen of *Xylaria Scotica*, natural size.

- " 2. Section of portion of club.
- " 3. Ascus and sporidia $\times 500$.
- " 4. Asci and sporidia of *Sphaeria ostioloidea* $\times 500$.
- " 5. Asci and sporidia of *Valsa lauro-cerasi* $\times 500$.
- " 6. Ascus and sporidia of *Ascobolus crenulatus*, with free sporidia $\times 500$.
- " 7. Ascus and sporidia of *Ascobolus (Saccobolus) obscurus*, with free sporidia $\times 500$.
- " 8. Threads and spores of a variety of *Helminthosporium echinulatum*, on *Ornithogalum* $\times 500$.
- " 9. Spores of *Badhamia fulvescens* $\times 500$.
- " 10. Ascus and sporidia of *Peziza Comitessa* $\times 500$.
- " 11. Spores of *Clasterisporium vermiculatum* $\times 500$.
- " 12. Ascus and sporidia of *Peziza Phillipsii* $\times 500$.
- " 13. Ascus and sporidia of *Helotium scoparium* $\times 500$.
- " 14. Threads and spores of *Verticillium tumorum* $\times 500$.

SOME INDIAN FUNGI.

By M. C. COOKE, M.A.

Septoria Artocarpæ. *Cooke.*

Peritheciis aggregatis in maculis brunneis orbicularibus insidentibus. Sporis minutis linearibus.

On leaves of *Artocarpus integrifolia*. Mysore.

Spots orbicular, brown; perithecia dark brown, flattened, with an apical pore; spores minute, linear, about $\cdot 01$ min. long.

Diplodia Catappæ. *Cooke.*

Peritheciis globosis, primo tectis, dein erumpentibus; sporis variabilis, demum septatis, atro brunneis, utrinque subnucleatis.

On nuts of *Terminalia Catappa*. Pondicherry (1862).

The perithecia are soon erumpent. Spores very variable in

shape and size, becoming uniseptate and dark brown, at first with a globose nucleus in each cell.

Hendersonia Loniceræ. *Cooke.*

Peritheciis gregariis, minutis, primo tectis, atris; sporis ovatis, oblongisve, brunneis, endochromatis 2-3 divisis.

On twigs of *Lonicera diversifolia*. Saharunpore (Dr. Jameson).

The perithecia are very minute. Spores not constricted at the septa, 2-3 partite.

Pestalozzia palmarum. *Cooke.*

Erumpens, atra, gregaria vel sparsa; pustulis sphaeriæformibus; sporis fusiformibus quadriseptatis, pallide fuscis, triaristatis, stipite elongatis, hyalinis.

On dead sprout of cocoa-nut. Bengal (precise locality unknown). Jan., 1870.

Spores $\cdot 015 \times \cdot 005$ m.m., fusiform, with 4-septa, pale brown, the ultimate cells hyaline, crested with three hyaline setæ.

Ustilago pulveracea. *Cooke.*

Pulverulenta, atrobrunnea; sporis globosis, granulatis vel subreticulatis, brunneis.

On male florets of *Zea Mays*. Lahore (Dr. J. L. Stewart).

Pulverulent, occupying the male florets, but very different in habit from *U. Maydis*. Spores globose, brown, rather large, with a granulated epispore, $\cdot 015$ m.m. diam.

Uromyces heterogenis. *Cooke.*

Hypophylla. Soris dense aggregatis in maculis suborbicularibus, purpureo-brunneis; pseudosporis subglobosis, ovatis, obovatis, vel pyriformibus, variabilis, pallide fuscis, longe pedicellatis.

On leaves of *Hibiscus*. Kolapore, Bombay (Col. Julian Hobson).

The sori are densely aggregated in suborbicular patches, of a dark purplish-brown colour. Pseudospores very variable, subglobose, ovate or pear-shaped, $\cdot 01\text{--}\cdot 02 \times \cdot 017\text{--}\cdot 03$ m.m., on very long slender peduncles $\cdot 06$ m.m. long.

Uromyces sphæropleum. *Cooke.*

Hypophylla. Soris parvis, sparsis, orbicularibus, atro-brunneis; pseudosporis globosis, subopacis, longe pedicellatis.

On leaves, apparently of *Ononis*. Kolapore, Bombay (Col. Julian Hobson).

The sori are minute and scattered; pseudospores globose, rather opaque, dark brown, $\cdot 017\text{--}\cdot 022$ m.m. diam., on long slender pedicels, $\cdot 05$ m.m. long. The dark globose opaque spores are very peculiar, resembling those of *Pileolaria*.

Uromyces Hobsoni. *Vyse.*

Canlicola. Soris irregularibus, in tuberculis magnis, sclerotiformibus collectis, rubro-brunneis; pseudosporis compactis, oblongis, longe pedicellatis.—*Rev. J. E. Vize, in litt.*

On stems of *Jasminum*. Kolapore, Bombay (Col. Julian Hobson).

Forming compact bullate pustules on the stems, with the appear-

ance of reddish-brown sclerotia; pseudospores compact, oblong, brown, on long hyaline pedicels.

Puccinia Kurdistani. *Cooke.*

Hypophylla. Soris in maculis suborbicularibus, aggregatis; pseudosporis magnis, elongato-ellipticis, leniter constrictis, fuscis, breviter pedicellatis.

On *Taraxacum glaucum*. Koordistan.

Sori collected in suborbicular spots in a manner similar to those of *P. glomerata*; pseudospores large, elongated, elliptical, slightly constricted at the septum, brown, $.05 \times .025$, much larger than in *P. glomerata*, *P. chondrillæ* and allied species.

Puccinia rostrata. *Cooke.*

Published in "Grevillea" iii., p. 75, under the name of *P. cruciferarum*; but as that was previously appropriated by Rudolphi, the present name must be substituted.

On *Cruciferae*. Himalayas.

Hemileia vastatrix. *B. & Br.* "Gardener's Chronicle," Nov. 6, 1869, with fig.

On coffee leaves. Mysore.

This pest was first described from specimens communicated from Ceylon. Although less destructive to the coffee plantations in Mysore, it has now established itself on the Continent of India.

Isaria stellata. *Cooke.*

Nivea, stellata, incrustans. Floccis tenuissimis, circinatis.

Encrusting dead insects attached to the under surface of mango leaves. Mysore.

Snow white, encrusting minute insects, and assuming the appearance of stellate bodies, about 1 line in width. Threads very delicate circinate, sigmoid or variedly curved. (Spores not seen.)

Pellicularia. *Gen. Nov.*

Parasitica. Floccis repentibus ramosis, septatis, in pelliculam sub-gelatinosam intertextis. Sporibus sessilibus, simplicibus, hyalinis.

Hab. On living plants.

Pellicularia koleroga. *Cooke.*

Hypophylla, effusa, griseo-alba, sporibus globosis, hyalinis, echinulatis.

On under surface of leaves of *Coffea arabica*. Mysore.

Effused in large greyish white patches, sometimes nearly covering the under surface of the leaves; threads creeping, branched, septate, interwoven into a subgelatinous pellicle, which can be stripped from the leaf when moist. Spores sessile, scattered over the threads, globose, hyaline, echinulate $.0075$ m.m. diam. Very destructive in coffee plantations, where it is known under the name of "Kole-roga," or black rot. Probably allied to *Amphiblistrum*. Corda.

Clasterisporium maculatum. *Cooke.*

Epiphylla. Maculis orbicularibus, velutinis; sporis fasciculatis, arcte clavatis, ad basim attenuatis, supra atro-brunneis, inferne hyalinis, multiseptatis.

On leaves of *Ficus cordifolia*. Kolapore, Bombay (Col. Julian Hobson).

Forming orbicular spots $\frac{1}{4}$ inch broad. Spores fasciculate, narrowly clavate, $.08 \times .006$ m.m., dark brown above, hyaline below, seated on the creeping mycelium, with from 7-9 septa, which at length become obscure. Clearly congeneric with *Clasterisporium caricinum*, Schw.

Glenospora didyma. *Cooke.*

Epiphylla. Maculis atris, irregularibus, subconfluentibus; floccis repentibus, ramosis, divaricatis, lateraliter papillatis; sporis ellipticis, brunneis, endochrome bipartitis.

On fading leaves of some undetermined plant. Kolapore, Bombay (Col. Julian Hobson).

Forming irregular black patches on the upper surface of the leaves. Threads creeping, brown, branched, divaricate, with lateral papillæ, to which the spores are attached; spores elliptical, $.016-.018 \times .009$ m.m., brown; endochrome bipartite.

In the original diagnosis of this genus the spores are characterized as globose; but the Rev. M. J. Berkeley does not regard this as an essential character of his genus, which will have to be modified accordingly, as all the features of the present species indicate its close affinity with *Glenospora melioloides*, B. & Curt.; even to the curious discoid bodies composed of radiating flocci, the relation of which to the creeping threads has not yet been accurately determined. Probably they are the early stages of the sporiferous threads.

Dothidea perisporioides. *Berk. & Curt.* "North American Fungi," *Grevillea* iv.

On leaves of some leguminous plant. Bombay (Col. Julian Hobson).

Sporidia brown, uniseptate, constricted, each extremity attenuated.

Chaetomium Indicum. *Cordz.*

On paper. Burmah.

Eurotium herbariorum. *Link.*

Common, on various substances. Bengal. Chittagong. Burmah.

Capnodium mangiferum. *C. & Broome.*

Effusum, velutinum; peridiis ovatis pyriformibus vel lageniformibus; sporidiis arcte ellipticis, hyalinis, uniseptatis.

On leaves of *Mangifera Indica*. Mysore.

Effused, forming a velvety stratum on both surfaces of the leaves. Peridia ovate or pear-shaped, or flask-shaped $.075-.08$ m.m. long; sporidia hyaline, uniseptate about $.0125-.015$ m.m. long.

DESCRIPTION OF PLATE LXIII.

- Fig. 1. Threads and spores of *Pellicularia Koleroga* \times 500.
 „ 2. Portion of thread and spores further magnified.
 „ 3. Pseudospores of *Uromyces sphaeropleum* \times 500.
 „ 4. Pseudospores of *Uromyces heterogenum* \times 500.
 „ 5. Spores of *Ustilago pulveracea* \times 500.
 „ 6. Pseudospores of *Puccinia Kurdistani* \times 500.
 „ 7. Pseudospores of *Puccinia rostrata* \times 500.
 „ 8. Portion of stem with sori of *Uromyces Hobsoni*.
 „ 9. Pseudospores of *Uromyces Hobsoni* \times 500.
 „ 10. Spores of *Clasterisporium maculatum* \times 500.
 „ 11. Threads and spores of *Glenospora didyma* \times 500.
 „ 12. Discoid body accompanying the threads of *Glenospora* \times 500.
 „ 13. Conidia and peridium of *Capnodium Mangiferum* \times 500.
 „ 14. Asci and sporidia of same \times 500.
 „ 15. Free sporidia of *Capnodium mangiferum* \times 500.

NEW AND RARE BRITISH FUNGI.

By WM. PHILLIPS and CHARLES B. FLOWRIGHT.

[Continued from Vol. III., p. 126, with plate 62.]

31. **Hygrophorus mucronellus.** Fr. *Hymen. Europ.* p. 418. Fr. *Ep.* p. 331.

Fragile, pileus submembranaceous, conico-campanulate, acute, smooth, bright-red, becoming pale, stem fistulose, thin fibrous, somewhat silky, base white, gills decurrent, triangular, thick, yellow.

In a grass field by the sea bank. Kings Lynn. Dec., 1875, in company with *H. russo-coriaceus*. Probably not uncommon.

32. **Paxillus paradoxus.** (Kalehb.) Berk. *Kalehb. Fung. Hung.* t. 16, fig. 1.

Spores $\cdot 0006 \times \cdot 0002$ in., with a nucleus at each end.

The Rev. M. J. Berkeley considers this a *Paxillus*. Wrekin, Salop, Sept., 1875.

- * **Sistotrema confluens.** Pers.

A curious and interesting form of this plant occurred at Hereford this year, it was for the most part stemless, incrusting sticks, leaves, fragments of earth, etc., extending into the holes made by the burrowing of some animal, either a mole or a rat, some of the best developed specimens growing subterraneously upon the roof of the burrows.

33. **Stereum pini.** Fr. *Hymen. Europ.* p. 643. Fr. *Ep.* p. 553.

Resupinate coriaceo-cartilaginous peltato-adsnate submarginate, smooth beneath, pallid, at length bullate, hymenium purple, flesh-coloured, then brownish, pruinose.

Growing upon the under side of dead branches of *Pinus*

sylvestris, while they were still attached to the tree. North Wootton.

34. **Corticium typhæ** *Fekl. Symbol. Mycol. p. 27.* *Athelia typhæ, Pers. Mycol. Europ. p. 84.*

Longitudinally effused, thin, then quite smooth, very pale tan-coloured.

On *Typha latifolia*. North Wootton, 1874.

Almost invisible when dry.

- * **Solenia fasciculata.** *Fr.*

This occurred on dead *Salix*, near Shrewsbury, Jan., 1876.

- * **Phallus iosmos.** *Berk.*

This plant occurred abundantly on the sand hills by the sea shore at Scratby, near Yarmouth, in November, 1874, from whence the Rev. Kirby Trimmer kindly sent us specimens; after a very careful examination we were unable to differentiate these specimens from various forms of *P. impudicus* we have met with either by habit, colour, or odour; one specimen only had a reddish tinge upon the stem, several of the older ones were blackened by some *Cladosporium*. Mr. Trimmer, however, says—"I have had the opportunity of testifying to the appropriateness of the specific name of 'iosmos,' though, in the midst of these specimens, I found them by sight and not by scent. In getting them up from the sand, they yielded a pleasant violet odour, and it was not until the third day after gathering that they became offensive." Rev. M. J. Berkeley, to whom specimens were sent, says, "doubtless the plant of *Curtis' Entomology*, but it is very doubtful whether it is a species."

35. **Dinemasporium fimeti.** *n. sp.*

Excipulum subrotund, superficial, black. Spores appendiculate, .0003 exclusive of appendage. Smaller and more compact than *D. graminum*, Lév., with much smaller spores.

On rabbits' dung. Kings Lynn, 1874.

Pl. 62 fig. 1. Spores.

36. **Excipula petiolicola.** *Fekl. Symb. Mycol. p. 400.*

Perithecia scattered, minute, hemispherical or oblong; black, cup-shaped when dry.

On the petioles of *Tilia*. Ringstead, Ap., 1872.

37. **Torula pinophila.** *Chev. Rabh. F. E., No. 1668.* *Cooke's Fung. Brit. 2nd edit. fus. IV. No. 335.*

On *Abies pectinata*. Dolgelly, North Wales. June, 1875.

38. **Gymnosporium Physciæ.** *Kalchbr. Szep. Gomb. Jcb. No. 856.*

On the apothecia of *Physcia parietina*. Common about King's Lynn, but we have never seen it upon any other lichen.

39. **Puccinia acuminata.** *Fekl. Symb. Mycol. p. 55.*

On *Galium saxatile*. Montgomeryshire. Rev. J. E. Vize.

40. **Uromyces Beta.** *Kühn in Bot. Zeitg. 1869, sp. 540.* *Fuekel. Symb. Mycol. 64.*

On *Beta vulgaris*, doubtless the advanced condition of *Tricho-*

basis betæ, Lèv., from which it may readily be distinguished by the naked eye from the darker colour of its pustules.

Kings Lynn, October, 1875.

41. **Fusidium cylindricum.** *Corda Fockel Symb. Mycol. p. 371.*

On green but fading leaves of *Lapsana communis*, Mr. T. Brittain, 1875. Agreeing with Continental specimens from Dr. Geo. Winter, etc.

42. **Fusisporium Kühnii.** *Fckl. Symb. Mycol. p. 371.*

Mycelium arachnoid, white, effused. Hypha thin, branched, septate, matted, then vanishing; conidia in little heaps, subregular, lunate, uniseptate, hyaline.

Overrunning mosses, lichens, etc., on the bark of trees, frequently about Kings Lynn, but by no means always in a fruitful condition.

43. **Ramularia variabilis.** *Fckl. Symb. Mycol. p. 361.*

Cæspitose, spreading, thin, white, on a brownish or greenish spot. Hypha fasciculate, flexuous, very short; conidia hyaline, very various, ovate, obovate, elliptical or cylindrical.

On fading leaves of *Digitalis purpurea*. Mr. T. Brittain.

44. **Vibrissia Guernisaci.** *Cr. Ann. des Sc. Nat. Vol. vii., 1857, c. i.*

Very small, 1-3 millm. in diameter, sessile, gelatinous, lenticular or turbinate, slightly brown beneath; hymenium plane or convex, white, greenish-yellow or ochery-yellow, pale grey or bluish-grey; asci usually straight, containing 8 uncoloured sporidia, which are long, filiform, curved, much attenuated, and excessively slender; paraphyses numerous, articulated, presenting one to three chain-like bifurcations, the terminal cells being round or pear-shaped, and larger than the others; sporidia about $\cdot 0038$ in. long.

On the inner side of dead bark of willow. Shrewsbury. Nov., 1875.

45. **Peziza (Humaria) semi-immersa.** *Karst. Myc. Fenn. I., p. 45. Phillips, El. Brit., No. 60.*

Sub-gregarious, sessile, half immersed in the earth, at first sub-spherical, then hemispherical, at length expanded, applanate, very slightly pubescent, or becoming glabrous; margin crenulate-unequal, pallid, ochraceous, or incarnato-testaceous, epithecium darker; asci cylindraceo-clavate; sporidia ellipsoid, one or two nucleate, $\cdot 016\text{-}\cdot 024 \times \cdot 09\text{-}\cdot 011$ m.m.; paraphyses articulated; apices curved and unequal.

On damp earth. Shrewsbury.

* **Peziza (Sarcoscyphæ) melastoma.** *Sow.*

A single specimen was found at Whitfield, near Hereford, in May, 1875.

* **Peziza (Sarcoscyphæ) sepulta.** *Fr.*

Terrington, St. Clements, Norfolk (C. B. P.). Nov., 1874.

46. **Peziza (*Dasyscyphæ*) palearum.** *Desm. Ann. Sc. Nat.* 1846. *Crypt de Fr. Exs. ii.*, No. 917. *Phillips, El. Brit.*, No. 68.

Minute, scattered, stipitate, whitish-tawny, acetabuliform, then plane, externally furfuraceo-tomentose, ciliated round the margin; disc ivory; stipes rather long, dark brown at the base; asci small, cylindrical; paraphyses large, acute at the summits; sporidia 0.013×0.002 m.m.

On straw. King's Lynn (C. B. P.). On *Psamma arenaria*. Towyn, North Wales. June, 1875.

47. **Peziza (*Dasyscypha*) luzulina.** *Phillips. Grevillea, Vol. iv.*, pl. 51, fig. 266.

Gregarious or scattered, shortly stipitate, minute, white, pubescent; disc pale yellow, plane, margined; asci clavate; sporidia 8, fusiform, straight or slightly curved, $0.0005-0.0008 \times 0.0002-0.00025$ in.; paraphyses linear.

At the base of dead leaves of *Luzulina sylvatica*. Conway, North Wales.

48. **Peziza (*Dasyscypha*) friabilis.** n.s.

Scattered or congregated, sessile, when young globose, then hemispherical, externally whitish, minutely pubescent, concave, brittle; margin fractured, uneven; disc testaceous; asci cylindrical-clavate; sporidia 8, filiform, 0.06×0.001 m.m., multiseptate; paraphyses slender.

On dead oak branches, growing on the woody fibre only. Dolgelly, North Wales. June, 1875.

PLATE 62, FIG. II.—1, natural size of plant; 2, a cup magnified; 3, asci and paraphyses; 4, sporidia.

49. **Peziza (*Dasyscyphæ*) flammea.** *A. & S. Consp. p.* 319, *t.* 11, *f.* 7. *Phillips, El. Brit.*, No. 72.

Gregarious or scattered, sessile, hemispherical, strigoso-villous, dull red throughout; sporidia oblong, simple or spuriously uniseptate, $0.01-0.016 \times 0.0025-0.0035$ m.m.; paraphyses slender.

On *Salix aurita*. Aviemore, N.B. (Rev. J. Keith).

50. **Peziza (*Dasyscypha*) miliaris.** *Wallr.*

Sessile, scattered, minute, becoming pallid, externally thinly pruinose, immarginate, same colour as the disc, which becomes somewhat convex; asci clavato-cylindrical, 0.002×0.0003 in.; sporidia 8, oblong-ovate, 0.0004×0.00015 in.

On the upper side of *Peltigera canina*. North Wootton. Nov. 15, 1875.

- * **Peziza (*Tapesia*) Bloxami.** *B. & Br.*

On dead wood. Near Barmouth, North Wales. June, 1875.

We were unable to find fruit in our specimen, and are indebted to Dr. Cooke for confirming our determination.

51. **Peziza (*Mollisea*) litoralis.** n.s.

Sessile, scattered or crowded, minute, black; disc dark brown, concave; margin incurved, fractured; asci subclavate; paraphyses

linear; sporidia cylindrical, narrow, enucleate, straight, or slightly bent, $\cdot 025 \times \cdot 002$ m.m.

On dead wood washed up from the Loch. Lynwilg, Scotland (Rev. J. Keith).

PLATE 62, FIG. IV.—1, natural size of plant; 2, cups magnified; 3, asci and paraphyses; 4, sporidia.

52. *Peziza (Mollisea) maura*. n.s.

Scattered, sessile, at first globose, becoming patellate, sooty-black; margin raised, crenulate; asci clavate, elongated, and narrow below; paraphyses curved at the summits; sporidia narrowly fusiform, with five to seven nuclei, $\cdot 03\text{--}\cdot 038 \times \cdot 005\text{--}\cdot 006$ m.m.

On dead wood. Dinnore, Hereford. Oct., 1875.

PLATE 62, FIG. III.—1, natural size of plant; 2, cups enlarged; 3, cells of exterior of cup \times same as sporidia; 4, asci and paraphyses; 5, sporidia.

53. *Peziza (Mollisea) retrusa*. n.s.

Minute, scattered, at first concealed by the epidermis, then erumpent, sessile, hemispherical, or oblong, straw-coloured, smooth; asci clavate; sporidia eight, biseriate, oblong-ellipsoid, $\cdot 017\text{--}\cdot 019 \times \cdot 005\text{--}\cdot 006$ m.m.; paraphyses not visible.

On needles of larch. Trefriw, North Wales. May, 1874.

When dry this is found with difficulty, as it becomes contracted, and conceals itself under a kind of lid formed of the ruptured epidermis; but when moist it is sufficiently conspicuous under a pocket lens. It should stand near *Peziza erumpens*, Grev.

PLATE 62, FIG. VI.—1, natural size of *P. retrusa*; 2, the same, much enlarged; 3, ascus; 4, sporidia.

54. *Peziza (Mollisia) ulcerata*. n.s. *Phillips, El Brit., No. 83.*

Scattered, erumpent, sticticiform, then patellate; margin fractured; disc dirty-orange; asci clavate, tetrasporous; paraphyses enlarged at the summits, simple or forked, often contorted; sporidia ovate, granular within, $\cdot 015 \times \cdot 008$ m.m.

This is allied to *P. fusarioides*, Berk., and *P. assimilis*, C. & P.; but differs from both in the much larger sporidia, and having only four in each ascus.

On *Aster tripolium*. Kings Lynn (C. B. P.). Sept., 1875.

PLATE 62, FIG. V.—1, natural size of plant; 2, the same magnified; 3, asci and paraphyses; 4, sporidia.

Since the foregoing was in type, we have discovered that the same species is described by Berk. & Br. in *Ann. Nat. Hist.* as *Pez. Tripolii*.

55. *Peziza (Mollisia) arenevaga*. *Desm. Ann. Sc. Nat. 1852. Pl. Crypt. ii., No. 517. Phillips' El Brit., No. 84.*

Erumpent, minute, scattered, of a soft waxy consistency, glabrous, sessile, when young globose, then plane, externally tawny, with a somewhat tumid tawny elevated margin, which is black when dry; disc watery, nearly white, when dry brown; asci

clavate, subcylindrical, erect amongst simple paraphyses; sporidia eight, oblong-ovoid, hyaline, obtuse at the ends, $0.15 \times 0.05-0.1$ m.m.

On *Psamma arenaria*. North Wales, 1874. Scotland (F. Currey, Esq.).

56. *Stictis seriata*. *Lib. Phillips, El Brit., No. 100.*

Cups innate, punctiform, orbicular, plane or but slightly concave, disposed in approximate series, rubro-fuscous; asci linear, including 6-8 globose, minute, hyaline sporidia.—*Fckl.*

On *Carex ampullacea*. Forres, North Britain (Rev. J. Keith).

* *Stictis lichenicola*. *Mont.*

The Rev. W. A. Leighton received specimens from Ireland of this doubtful *Stictis*, and kindly communicated them to us.

57. *Hypocrea contorta*. *Berk. & Curt. Sphæria contorta, Schweinitz Synopsis, p. 194, No. 1224.**

Subrotund, fixed to the matrix by the central portion, spreading, becoming thin towards the margin, where it is free and variously lobed, dark olive-green externally, yellowish-white within; perithecia minute, globose, confined to the upper surface; asci 0.003 in. long; sporidia, 16, spherical, with a central nucleus, 0.002 in.

On a rotten oak stick. Foxley Woods. Oct., 1875.

A very interesting addition to our flora, and agreeing exactly with American specimens received from Mr. J. B. Ellis.

58. *Hypocreopsis pulchra*. *Winter. Hedwigia, 1875, p. 26. Sphæriacei Britannici Cent. ii., No. 100.*

Compound. Perithecia 1 to 3, immersed in the elliptical verrucæform, or irregular, fleshy, red stroma, which is covered on the surface by a reddish down; ostiola erumpent, darker; asci oblongo-ventricose, sessile, 4 to 8 spored; sporidia crowded in the ascus, broadly elliptic, simple, hyaline, 0.002×0.008 in.

Near Shrewsbury, on sheep dung, 1874; on cow and sheep dung, Terrington, St. Clements, 1875.

59. *Nectria peltigeræ*. *Ph. & Pl.*

Nectriella carnea, *Fckl. Symb. Mycol. p. 176. Cryptodiscus Lichenicola*, *Ces. in Kl. Herb. Myc. ii., 523.*

On the living thallus of *Peltigera canina*, in company with and usually following its conidia, *Illiosporium carneum*, Fr. Castle Rising, Nov., 1875.

Fuckel is undoubtedly right in classing this plant with the *Nectriæ*, both on account of the perithecium and also by reason of the fruit.

60. *Sphæria (Sordaria) merdaria*. *Fr. Fr. Elench. ii. p. 100.*

Coprolea merdaria, *Fckl. Symb. Mycol. p. 240. Sordaria merdaria*, *Winter. Sord. p. 13, t. 7. f. 1. Sphæriacei Brit. ii. No. 56.*

Perithecia single or in groups of 2 or 3, surrounded by a stroma, which is black, shining, and semi-immersed in the matrix;

perithecia rugulose, dark brownish-black, shortly conical; ostiola obtuse; asci elongato-cylindrical; sporidia 8 ovate, simple, or with a nucleus, opaque, black, surrounded by gelatin, $\cdot 001 \times \cdot 0004$ in.

On horse dung, Terrington St. Clements, 1874. On rabbits' dung, Kings Lynn, 1875.

61. **Sphæria (Sordaria) Equorum.** *Winter. Sord. p. 13, t. 7. fig. 2. Coprolepa Equorum, Fckl. Symb. Mycol. p. 240. Sphariacei Britannici ii. No. 57. Cooke Fungi, Britt. ii., 241-2.*

Perithecia scattered, in a thin subcoriaceous crust-like stroma on the surface of the matrix, covered with a dark brown villosity; ostiola black, somewhat conical; asci cylindrical, octosporous; sporidia uniseriate, ovate, or oblong, black, simple, surrounded by a gelatinous envelope, $\cdot 0007 \times \cdot 0003$ in.

On horse dung. North Wootton, Shrewsbury.

Grevillea vol. iii., t. 42, fig. 7.—*a*, section of fungus enlarged; *b*, sporidia; *c*, ascus and paraphysis.

62. **Sphæria parmeliarum.** n. sp.

Superficial perithecia, small, black, crowded, somewhat shining, smooth; ostiola minute but distinct, papillæform; sporidia eight, triseptate, elongated, somewhat constricted, pale brown, usually uniseriate, rarely 4-septate, $\cdot 001 \times \cdot 0005$ in.

Growing parasitically upon *Parmelia saxatilis*, on a living spruce fir tree, Dolgelly, North Wales. June 22, 1875 (Rev. W. A. Leighton).

PLATE 62, FIG. VIII.—1, natural size; 2, asci; 3, sporidia.

63. **Sphæria (Diaporthe) resecans.** *Nke. Nitschke Pyren. Germ. p. 314. Sphariacei Brit. ii., No. 43.*

Elongated, bursting through the bark longitudinally; perithecia, minute, globose, or slightly depressed; ostiola very small, short; asci clavate or oblong, octosporous; sporidia biseriata, obtusely fusiform, straight, hyaline, bipartite, 2-4 septate, somewhat constricted, $\cdot 0004$ in. $\times \cdot 0001$ in.

On *Syringa vulgaris*. Terrington St. Clements, 1874.

64. **Sphæria (Diaporthe) pinophylla.** n. sp.

Perithecia scattered, sometimes two or three in a group, seated beneath a widespreading black crust, immersed in the matrix; ostiola elongated, abruptly truncate at the apex; asci $\cdot 001$ in. long; sporidia biseriata, hyaline, acute, quadrinucleate, then uniseptate, $\cdot 007 \times \cdot 0002$ in.

On decaying fir needles (*Pinus sylvestris*), Belmont, Hereford. May, 1875.

PLATE 62, FIG. VII.—1, natural size; 2, a perithecium magnified; 3, ascus; 4, sporidia.

ON PEZIZA BRUNNEA, A. & S.

By M. C. COOKE.

It is very difficult to determine with accuracy many of the species of fungi described by old authors in the absence of authentic specimens. When specific characters depend nearly entirely on microscopic features, the difficulty becomes almost an impossibility. Since the species of *Peziza* have been subjected to microscopical examination, the limits of species have been more clearly defined, and it is by no means unusual to find that two or three forms, greatly resembling each other in external features, but widely different in fruit, have been confounded together under one name. An instance of this kind we had occasion to point out a short time since in the case of *Peziza calycina*, and now a difficulty presents itself as to the *Peziza brunnea*, Alb. & Schw.

In this instance we have a *Peziza* belonging to the group *Sarcoscypha* and a close ally of *Peziza hemispherica*, but much smaller. A careful perusal of the description given in the *Conspectus*, combined with the coloured figure, will convey a pretty accurate idea of the external features of this *Peziza*. It is from one to three lines broad, of an elegant brown colour, clad externally with scattered fascicles of hairs, but not truly ciliate, of a caespitose habit, expanded when mature, with the margin inflexed. For a long time, and by many authors, a small *Peziza* has been referred to this species, which Dr. Rehm has called *Peziza gregaria*, and Dr. Nylander *Peziza hemisphaerica* var. *minor*. Doubtless it was this which was published by Desmazieres (No. 1312) as *Peziza brunnea*, and since then many have followed his example. It was this form which we had in view as *Peziza brunnea* when the "Handbook of British Fungi" was written.

There are some features in which the above-named species corresponds with the *Peziza brunnea*, A. & S.; but sufficient attention was not paid to their figure, which has a brown hymenium, and, also, to that important phrase in the description, "unicolor, eleganter brunnea," whereas, in the *Peziza gregaria*, Rehm, the disc is of a livid or pale watery grey, and not in the least brown. At a period when the colour of the disc in *Peziza* was regarded as alone of specific value, it would not have been possible for Schweinitz to have described and figured a species with a brown disc, when it really had a pallid one. Hence we cannot regard the *Peziza gregaria*, Rehm, as the *Peziza brunnea*, A. & S.

It is very probable that the *Peziza proximella*, Karst. (Monogr. p. 125), *Peziza hæmispherica* var. β , *proximella*, Karst. (Myc. Fenn. p. 69), is the same as the *Peziza brunnea*, Desm. (not A. & S.), and the *Peziza gregaria*, Rehm. A comparison of the figure given by Sowerby (pl. 369, fig. 1) as *Peziza hybrida* will be found to correspond with Alb. & Schw. figure of *Peziza brunnea*, and not with *Peziza gregaria*.

Recently another *Peziza* has been referred to *Peziza brunnea*, A. & S., with some greater reason, since it has a bright clear brown disc, and is about the same size as that indicated in the "Conspetus." It is this which Dr. Nylander (Observ. p. 21) names *Peziza brunnea*; and also Karsten (Myc. Fenn. p. 75), with spherical sporidia from .013-.017 m.m. diameter. We received the same species from the United States, and applied thereto the name of *Peziza confusa* (U.S. Discomycetes), under the impression that there was no evidence to show that this species was known to Albertini and Schweinitz, or that it exists in any old collection, or has been met with at all until very recently. Although in colour this species approaches the figure given in the "Conspetus," this feature cannot be accepted alone; for we have received from Hungary, through the kindness of Professor Hazslinzzky, a brown terrestrial *Peziza* under the name of *Peziza brunnea*, which has elliptical sporidia, somewhat incurved margin, but not distinctly hairy externally, and much smaller than 1-3 lines.

Until more distinct evidence can be afforded of the identity of Karsten's species with that described by Albertini and Schweinitz, we deem it much more consistent to retain the name of *Peziza confusa*, which we applied to it provisionally, than to take for granted that it is the true *P. brunnea* of which we still have grave doubts. As far as we are aware no brown hairy *Peziza* corresponding with Sowerby's figure has been found in Britain since his time. The nearest approach to it is a pale condition of *Peziza umbrorum*, which is sometimes found with a flesh-coloured disc. Hitherto we do not find that *Peziza confusa* has been recorded at all in the west of Europe, or any where near where the *Peziza brunnea*, Alb. & Schw., was found and figured.

We are, therefore, content to hold the true *Peziza brunnea* in abeyance, and not to accept any of the species which have been referred to it in recent times, in the hope that some more conclusive evidence will be forthcoming in the future to identify and establish this lost species.

LICHEN PILULARIS, DAV.

Can any lichenist inform me what this lichen really is? The Hook. Herb. at Kew has two specimens under this name, which once belonged to Dr. Withering. One of them, which externally admirably resembles the fig. of *L. pilularis*, in "Linn. Trans.," Vol. ii, p. 283, tab. 28, fig. 1, proved, on microscopic examination, to be undoubtedly *Lecidea centigua*, Fr., and the other as certainly to be *Trachylia tympanella*, Fr. The genuine *L. pilularis*, Dav., remains yet to be deciphered. Is the Rev. Hugh Davis's herbarium in existence; and, if so, where preserved?

W. A. LEIGHTON.

PUBLISHED FASCICULI.

The great number of published Fasciculi of Cryptogamia which have been issued during the past year, and are being continued in the present, has caused us to come to a decision as to the publication in this Journal of lists of species contained in such fasciculi. With every desire to assist the energetic cryptogamists who are issuing these fasciculi, it would be clearly impossible to publish lists extending to at least a thousand species in one number of "Grevillea;" and to publish some and exclude others would be manifestly unjust. Hence we have resolved not to publish lists of any of the Fasciculi which are issued on the Continent; but, professing as this does to be a British Journal devoted to the interests of British Cryptogamists primarily, we reserve to ourselves the liberty of publishing lists of the Fasciculi published in Great Britain, should we at any time consider such a course desirable. This explanation is necessary in order that it may be understood by our correspondents abroad that the publication of British lists cannot be accepted as a precedent for the insertion of lists of the species contained in Fasciculi *not* issued in Great Britain.

RABENHORST'S LICHENES EUROPÆI EXSICCATI.—We would call attention to the publication of the xxxvth fasciculus of this work, which has recently appeared, and contains numbers 926 to 950.

REHM'S CLADONIEN, Fasc. ii., has also just appeared; and the Rev. W. A. Leighton informs us that the specimens are, as in the former fasciculus, exceedingly excellent, both in quantity and preservation, and are carefully mounted and named after the latest authorities and revisions. The reactions are noted as found. The fasciculus contains fifty specimens, from number 51 to 100.

PROF. OUDEMAN'S FUNGI NEERLANDICI, Cent. i., has appeared since our last issue, and is valuable as illustrating the Mycologic Flora of a portion of Europe, from whence no collection has previously issued.

SACCARDO'S MYCOTHECA VENETA, Cent. iv. to vii., have also been published, equalling the previous centuries in quality and quantity. Although we cannot agree with Professor Saccardo as to the advisability of adopting a host of the modern genera, and holding peculiar views as to the limits of some others, in such a work as the present, where he has no means of explaining his views, his collection will be acceptable. We need go no further for an illustration of our meaning than the first three specimens: No. 301, *Periconia chlorocephala*, Fres.; No. 302, *Periconia pycnospora*, Fres.; No. 303, *Sporocybe byssoïdes*, Bonord (non Berk.). It is not every mycologist who has so strong a faith in Bonorden's infallibility.

LECANORA ANGULOSA, (SCHREB.) ACH.

This lichen has lain hid amid *L. subfusca* and *L. albella*, but may be distinguished by the epithecium of the apothecia becoming of an opaque yellow with hydrate of potash, precisely similar to the reaction of *L. glaucoma*. This peculiar reaction in *L. angulosa* was pointed out by Dr. Nylander in his Lich. Pyren. Or. in the "Flora." It must, therefore, be separated from *L. subfusca* and *albella*, and rank as a distinct species in the section with *L. glaucoma*. Two varieties of it have been made by Acharius and others, distinguished by the apothecia being distinctly margined, or with the margin obliterated and the apothecia becoming convex or even hemispherical. But the original describer of the lichen (Schreber) in his "Spicilegium," p. 136, evidently includes both varieties as only states, and, indeed, the transition may be readily traced on many specimens. Mr. Roper sent me (Nov., 1874) a specimen gathered by him at Eastbourne, for determination, which proved on testing to be *L. angulosa*. This set me to an examination of my herbarium, and I discovered that I possessed specimens from Norway, Sweden, Lombardy, Eastern Pyrenees, Italy, and Tasmania. In "Exsiccata" it is represented by Sommerf. Crypt. Norv., 64; Anzi Langol., 103; Anzi Ital. Sup., 178 (left hand specimen) and 179; Cöemans, 322; Mudd. 114 and 115; Nyl. Pyren. Orient., 19; Borrer's Herb. at Kew has it from Sussex and United States of America, but, with these exceptions, it is absent from the "Hook. Herb." I gathered it in 1850 at Loppington, Shropshire, and in 1873 at Nesselcliffe Hill, Shropshire. Mr. W. Phillips collected it in 1875 at Westbury, in Shropshire. No doubt it will now be detected generally throughout England.—W. A. LEIGHTON.

NOTE UPON THE RIMULARIA LIMBORINA, NYL.

M. Leighton supposes, relying upon the authority of M. Th. Fries, that this lichen is only the *Lecidea troches*, Tayl., and that the *Lecidea inconcinna*, Nyl., also belongs to the same species. Having at hand the specimens upon which these two species and the genus *Rimularia* itself have been established by M. le Dr. Nylander, in the interest of truth I feel called upon to interfere, as M. Leighton contends with an opinion which I believe to be quite erroneous. Thus, as two cryptogamists, also versed in the study of the lichens, having committed this error, it must be admitted that the specimens submitted to their examination were not authentic, nor like mine, as I concluded immediately on the first look at the figure of a cut of the apothecia of *Rimularia limborina* given by M. Leighton; because in this genus the thalamium is completely enclosed in a conceptacle, the superior part of which is

cloven in an irregular manner, in place of opening by a rounded pore as in the *Verrucaria*, or by a radiated star, as in the genus *Limboraria*. But after the rimular dehiscence, the superior parts of the conceptacle, although divided into angles sometimes slightly regular, are none the less continued in a very evident manner, and without any line of demarcation with the inferior part of the same conceptacle. It is not, therefore, necessary, in order to explain the origin, to have recourse to a pretended epithecium which may be formed by the summits of the thecæ and of the paraphyses swelling, altering, and bleaching. A similar epithecium exists at times upon the disc of the apothecia of the *Lecidea inconcinna*, as M. Nylander has remarked, but not in the *Rimularia limborina*.

Bourges.

DR. RIPART.

FORM OF RHYNCOSTEGIUM.

A very beautiful form, not, I think, recorded as British, occurred in Derbyshire. *Rhyncostegium rusciforme*, var. *inundatum*, Bry. Eur. It is probably only a form of *Hypnum ruscifolium*, Dil. Right bank of the Wye, in a clear spring near Chee Tor; July, 1875.

H. H. HIGGINS.

STENOGRAMME INTERRUPTA, AG.

A note has been published by Dr. Perceval Wright, in correction of the notice of this species by E. M. Holmes, in "Grevillea" for December, 1874, on four points, (1) that the tetrasporic fruit had not been recorded as occurring in Britain; whereas in Harvey's "Nereis Bor. Amer." (part ii., Mar., 1853) it is described from specimens (*a*) from Somersetshire, (*b*) from Cork Harbour. (2) That it is not described in any recent works on Algæ in Britain; whereas a description will be found in Harvey's "Phycologia Australica," as well as the work above alluded to. (3) That no figure of the tetraspores had been published; whereas, in pl. ccxx., figs. 2, 3, 4, 5 of Vol. iv. of Harvey's "Australian Algæ," they will be found. (4) That no notice was taken by Dr. Harvey of specimens sent to him by Miss Gifford, in 1848; whereas the letter and specimens are in the Herbarium of Trinity College, Dublin, and the priority of Miss Gifford's discovery of the tetraspores is fully acknowledged at p. 169 of Part II. of the "Nereis Boreali-Americana." Finally, as the specimens figured in "Grevillea," pl. xxxvii. are stated to have been gathered in Scotland, it would be interesting to know from what part, as this would be the most northern habitat as yet known.

" FUNGI BRITANNICI. "

MEMORANDA ET CORRIGENDA.

18. **Diplodia Syringæ.** *Avd.* with *Sphaeria*.

Niessl remarks in Hedwigia (1876, p. 2), that this belongs to Fockel's genus *Othia*, one which we see no grounds for accepting as a tenable genus.

72. **Ustilago Candollei.** *Tul.*

This Niessl also states in Hedwigia (1876, p. 2), is *Ustilago Candollei*. The spores of *U. utriculosa* are rough, whilst those of *U. Candollei* are smooth, as in specimens published in No. 72.

133. **Puccinia amphibii.** *Fckl.*

There appears to be good grounds for the separation of the form of *Puccinia* which occurs on *Polygonum amphibium* from that which is found on *Polygonum convolvuli*, retaining for the latter the name of *Puccinia Polygonorum*.

141. **Trichobasis Primulæ.** (*Lev.*)142. **Trichobasis Iridis.** (*Lev.*)146. **Uromyces Ulmarie** (?).

This is clearly not an *Uromyces*. It requires examination in a fresh state, for which we have not yet had an opportunity, but suspect that it will be found to be a *Coleosporium*.

162. **Cercospora Resedæ.** *Fckl.*187. **Peziza hirta.** *Sch.*

Issued in error as *P. scutellata*, for which see "Mycographia," part ii.

200. **Lophium fusisporum.** *C.*

True *Lophium mytilinum*, *Fr.*, has quite different fruit.

206. **Physarum tussilaginis.** *B. & Br.*

Berkeley and Broome (Ann. Nat. Hist. xvii, (1876), p. 139), having found what they regard as the genuine *Badhamia capsulifera*, have applied to this species the above name.

323. **Uredo orchidis.** *A. & S.*

Clearly not the same species as the *Uredo confluens* which occurs on *Mercurialis*.

360. **Helminthosporium variabile.** *C.*

This is very closely allied to *Helminthosporium echinulatum*, *B. & Br.* The Rev. M. J. Berkeley regards it as the same species.

ATLAS DER DIATOMACEEN-KUNDE.

Since our last notice of this work, three more parts (6, 7, 8) have been published. Part 6 is occupied by various forms of *Surirella* (many of them new species), and as far as we have means of judging by comparison with our examples, they are accurately delineated, some of them particularly so. We especially note the following:—*S. elegans*, E. (*Campylodiscus elegans*, Ralfs = *S. slesvicensis*, Grunow, *S. alpina*, Donkin), *S. robusta* (*S. nobilis*, Smith), *S. cardinalis*, Kitton (this species is referred to *S. guatemalensis*, Ehr., by Professor H. L. Smith and Herr Grunow; according to the former authority this species is also identical with *S. limosa*, Bailey (not Brightwell).

S. pyriformis, n. sp., Kitton, is a British species, first detected in a gathering from the Firth of Tay, by Mr. Kattray, of Dundee.

S. hastata = *S. contorta*, Kitton. Several very curious and beautiful new forms, obtained from Demarara river mud, are figured on plate 23, figure x.; plate xxii. is not *S. turgida* of the Synopsis.

Plate xxiv. contains some excellent figures of *S. striatula* from various localities.

The total number of forms figured in the six parts is 872.

Part 7 contains 299 figures of *Amphora*, these, on the whole, are not satisfactory; they will, however, enable the student to identify many species of this genus.

Part 8, pl. xxix. is a continuation of Pl. 1, and contains the following figures of *Actinoptychi*:—*A. Pfitzeri*, *A. heterostrophus*, *A. areolatus*, *A. boliviensis*, *A. hexagonus*, *A. Simbirskianus*, *A. seductilis*, *A. campanulifer*. There are also several figures given, of what the author terms "Regeneration valves" (our secondary valves), he considers these to belong to *A. areolatus*. Mr. Roper originally described these valves as a new species under the name of *A. hircidiatus*, but a further examination of them, as occurring in a gathering from Gorleston, Suffolk (Herr Schmidt's drawings are made from specimens found in this material), satisfied him that they were portions of *A. undulatus*, of British observers. *A. areolatus*, as given in the "Atlas," seems to be only a more robust state of figure 8, which the author calls an inner valve.

In plates 30, 31, 32, we find 62 figures of species of that very beautiful genus *Auliscus*, many of them very characteristic, but the most skilful draughtsman is unable to do full justice to the exquisite sculpturing of these tiny discs. No drawing has ever represented faithfully the beautiful markings on *Auliscus racemosus*, or the parted appearance of *A. pruinus*. The former species was figured and described by Herr Janisch in his work on the microscopic forms in guanos, under the name of *A. Stöckhardtii*, and as this is the older name, it must be retained. A good figure is given of this species in the "Atlas," as is also of *A. Grevillei*, also figured and described in the before-mentioned work. Whether

this specifically is distinct from *A. Moronensis* is, perhaps, questionable.

Amongst the new species given is the very curious *A. Clevei*, and several figures of Grunnow's *A. confluens*, a form very near to *A. pruinosus*.

The author has constituted a new genus (*Pseudauliscus*) for the reception of those forms with the central smooth space ("zu *Pseudauliscus* rechne ich alle *Auliscen* ohne sculpturlose *Area*.") To this genus would therefore be referred the following forms:—

Auliscus Peruvianus,
 „ radiatus,
 „ notatus,
 „ ovalis,
 „ Ralfsianus,

and perhaps *Fenestrella Barbadosensis*.

F. KITTON, Norwich.

CARPOLOGY OF PEZIZA.

By M. C. COOKE.

[Plate LXV.]

- Fig. 275. *Peziza tuberosa*, Bull, Cooke Fungi Britt. ii. 183.
 „ 276. *P. ciborioides*, Fr., Rabh. Fungi Eur., 619.
 „ 277. *P. sclerotiorum*, Lib., Libert exs., 326.
 „ 278. *P. sclerotiacea*, Ces., Erb. Critt. Ital., 339.
 „ 279. *P. gracilipes*, Ellis, ex. herb. J. B. Ellis.
 „ 280. *P. Curreyana*, Berk., fide Currey.
 „ 281. *P. Fucheliana*, D'By., fide Dr. Bary.
 „ 282. *P. imberbis*, Bull, Fekl. Fungi Rhen., 1148.
 „ 283. *P. albumina*, C. & P., ex. herb. Peck., No. 292.
 „ 284. *P. hymenula*, Fekl., Fekl. Fungi Rhen., 2470.
 „ 285. *P. sepium*, Desm., Desm. exs., No. 2006.
 „ 286. *P. sordida*, Fekl., Fekl. F. R., 2078.
 „ 287. *P. echinophila*, Bull, Cooke Fungi Brit. ii., 367.
 „ 288. *P. pseudo-tuberosa*, Rehm., Rehm. Ascomy, 106.
 „ 289. *P. caucus*, Reb., Rabh. F. Eur., 1222.
 „ 290. *P. bulgarioides*, Rabh., Rabh. F. Eur., 1008.
 „ 291. *P. renispora*, Ellis, ex. herb. J. B. Ellis.
 „ 292. *P. luteo-virescens*, Desm., Desm. exs., 1541.
 „ 293. *P. cyathoidea*, Bull, Erb. Critt. Ital., 587.
 „ 294. *P. coronata*, Bull, Cooke Fungi Britt. ii., 379.
 „ 295. *P. campanula*, Nees, Rabh. H. M., 419.
 „ 296. *P. nana*, Sacc., ex. herb. Prof. Saccardo.
 „ 297. *P. albida*, Lesm., Desm. exs., 2004.
 „ 298. *P. Persoonii*, Mong., ex. herb. Greville.
 „ 299. *P. minutissima*, Blox., ex. herb. Bloxam.
 „ 300. *P. fucata*, C. & Ph., ex. herb. W. Phillips.
 „ 301. *P. denigrans*, Fekl., Fekl. F. Rhen., 2193.

MYCOGRAPHIA.

The second part of "Mycographia" is nearly ready, and will contain coloured figures and descriptions of and following species, viz. :—

81. <i>Peziza</i> (<i>Humaria</i>) <i>constellatio</i> , [<i>B. & Br.</i>]	119. <i>Peziza</i> (<i>Sarcoscypha</i>) <i>pellita</i> . [<i>C. & P.</i>]
82. " <i>var. Fuckelii, C.</i>	120. " <i>nigrella, P.</i>
83. " <i>violascens, C.</i>	121. " <i>arenosa, var.</i>
84. " <i>endocarpoides, B.</i>	" [<i>Bloxami, C.</i>]
85. " <i>hepatica, Batsch.</i>	122. " <i>flavovirens, Fckl.</i>
86. " <i>viridibrunnea, Ces.</i>	123. " <i>gregaria, Rehm.</i>
87. " <i>Jungermannia, Nees.</i>	124. " <i>confusa, C.</i>
88. " <i>Phillipsi, C.</i>	125. " <i>fuscoatra, Reb.</i>
89. " <i>lechithia, C.</i>	126. " <i>brunnea, A. & S.</i>
90. " <i>pluvialis, C.</i>	127. " <i>miniata, Fckl.</i>
91. " <i>axillaris, Nees.</i>	128. " <i>hirta, Schum.</i>
92. " <i>pilifera, C.</i>	129. " <i>trechispora, Curr.</i>
93. <i>Wynnea gigantea, B.</i>	130. " <i>geneospora, B.</i>
94. " <i>macrotis, B.</i>	131. " <i>scutellata, Linn.</i>
95. <i>Peziza</i> (<i>Sarcoscypha</i>) <i>coccinea</i> , [<i>Jacq.</i>]	132. " <i>Margaritacea, B.</i>
96. " <i>occidentalis, Schw.</i>	133. " <i>setosa, Nees.</i>
97. " <i>floccosa, Schw.</i>	134. " <i>Kerguelensis, B.</i>
98. " <i>mirabilis, Bors.</i>	135. " <i>stictica, B.</i>
99. " <i>radiculata, Sow.</i>	136. " <i>carneo sanguinea,</i> [<i>Fckl.</i>]
100. " <i>ammophila, D. R. &</i> [<i>Lev.</i>]	137. " <i>umbrata, Fr.</i>
101. " <i>alphitodes, B. & C.</i>	138. " <i>umbrorum, Fckl.</i>
102. " <i>tomentosa, Schw.</i>	139. " <i>livida, Schum.</i>
103. " <i>melastoma, Sow.</i>	140. " <i>erinaceus, Schw.</i>
104. " <i>hirtipes, C.</i>	141. " <i>albospadicea, Gräv.</i>
105. " <i>stygia, B. & C.</i>	142. " <i>olivascens, C.</i>
106. " <i>pusio, B. & C.</i>	143. " <i>vitellina, P.</i>
107. " <i>radiculosa,</i> [<i>B. & Br.</i>]	144. " <i>Cubensis, B.</i>
108. " <i>Colensoi, B.</i>	145. " <i>Texensis, B.</i>
109. " <i>semitosta, B. & C.</i>	146. " <i>Lusatia, C.</i>
110. " <i>pubida, B. & C.</i>	147. " <i>stercorea, P.</i>
111. " <i>lanuginosa, Bull. var.</i> [<i>Sumneri, B.</i>]	148. " <i>alpina, Fckl.</i>
112. " <i>sepulta, Fr.</i>	149. " <i>coprinaria, C.</i>
113. " <i>fusicarpa, Gerard.</i>	150. " <i>scubalonta, C.</i>
114. " <i>geaster, B. & Br.</i>	151. " <i>theleboides, A. & S.</i>
115. " <i>hemisphaerica, Wigg.</i>	152. " <i>rubra, C.</i>
116. " <i>tenuis, Fckl.</i>	153. " <i>Dalmeniensis, C.</i>
117. " <i>arenosa, Fckl.</i>	154. " <i>pulcherrima, Crouan.</i>
118. " <i>arenicola, Lev.</i>	155. " <i>albotecta, B. & C.</i>
	156. " <i>luteopallens, Nyl.</i>
	157. " <i>albocincta, B. & C.</i>
	158. " <i>monilifera, B.</i>

The third part is intended to be published about the first week in September next.

The following corrections should be made in Part i, fig. 68 :—

Page 38—for *Peziza Farnzoniana*, read *Peziza* (*Humaria*) *Franzoniana*.

Page 22—under *Peziza convexella*, for "glabra, convexiuscula," read "glabra, subcitrina, convexiuscula."

AFFINITIES OF PELLICULARIA.

In the present number (pp. 116) we have briefly characterised and described a new genus, and type species, of parasitic fungi, without any detailed account of either, or the reasons which have led to this step. The parasite in question is found on the under side of coffee leaves, and is known to natives as "Koleroga," or "black rot." It appears as an effused greyish-white patch or spot, often covering half the under surface of the leaf. When moistened the whole fungus may be removed by a knife, and stripped off like a thin film of goldbeater's skin. It consists of an interwoven layer of hyaline, branched, septate threads, on which are seated, at irregular intervals, globose, echinulate spores. The whole is invested with a kind of gelatinous medium, which compacts it into the above-mentioned film. The threads are from $\cdot 005$ to $\cdot 0075$ of a millimetre in diameter, and the spores are about equal in diameter to the threads on which they are borne. Owing to the investing medium, it is exceedingly difficult to separate one thread from another, or to obtain a free spore. By the use of a colouring medium they can be discerned *in situ*, and sometimes a thread may be disengaged so that the spores may be seen attached; but this is of rare occurrence. This constitutes a new form of Coffee Disease. The principal scientific question which presents itself in relation to this disease is the relationship and affinity of the fungus which we have described. Two or three suggestions have already been offered on the subject; although made without any microscopical examination of the plant itself, they are worthy of a passing notice. One suggestion is that the supposed fungus may be an imperfect condition of some Lichen. It may be true that low forms, or imperfect states, of Lichens are sometimes found on the living leaves of growing plants; yet the structure is hardly such as those Lichenoid bodies assume. Considerable emphasis is sometimes placed on the presence of gonidia in the lichen thallus as distinguishing it from fungi. There is no manifestation of such bodies in the present instance, and it would be more satisfactory for such an objection if a similar authentic instance could be adduced of a destructive leaf-parasite, which is an undoubted Lichen. Another suggestion has been offered, that it may be a low form of Hymenomycetous fungi. If so, it should at least give some indication of its relationship. As spores are undoubtedly present, there should also be basidia, bearing these spores in pairs or quarternate; at least, there should be some evidence of an approach to such low Hymenomycetal forms as *Exobasidium* or *Hymenula*. Probably it was some such organism as *Exobasidium* which was thought of when this suggestion was made, and, certainly, we can observe no relationship whatever between them.

The conclusion at which we have arrived, appears to us the most tenable one, that the fungus in question belongs to the *Hyphomy-*

etes or moulds. In habit, and external appearance, it strongly reminds one of the white mould which precedes many species of *Erysiphe*, such as the one so common on peas in the autumn, or that which precedes *Uncinula* on the leaves of the maple. Even under the microscope, there seems to be some kind of relationship; the interwoven, septate, colourless branched threads are present, but there is an addition of a somewhat gelatinous medium which binds the threads together into a pellicle. The spores and their mode of production is different, and this, in the *Hyphomyces*, is a most important distinction. In *Oidium* the spores are produced in chains, in the present species singly. It is very true that the structure, as seen in a drawing, resembles closely that of some species of *Zygodemus*, but there is a peculiarity in the threads of many of the species in that genus that the threads are cut, as it were, nearly through at short distances, or abruptly bent, of which there is not the slightest indication here. The spores are very similar in size and form, but there are two or three features, which appear to us conclusive for rejecting the coffee rot from this genus. In all the species of *Zygodemus* the threads are free from any investing medium, the spores are pulverulent, and, moreover, the threads are more or less coloured. Further than this, all the species occur on dead wood or leaves, and in no instance is a species parasitic on living leaves. Although too much reliance is not to be placed on this fact, it is nevertheless noteworthy that genera in which species are parasitic on living plants, there is seldom an exception to this rule, and so in genera which contain species found on dead substances, parasitic species are not found. In illustration of the former, we may cite *Peronospora*, *Ramularia*, and *Erysiphe*; and of the latter, *Dactylium*, *Sporotrichum*, and *Zygodemus*.

The presence of the gelatinous element which binds together the threads and spores into a thin pellicle, which is easily separable from the matrix when moist, is an important feature in determining the affinities of the "Coffee Rot." In the genus *Amphiblitrum* of Corda, there is said to be such a gelatinous medium. In many species of *Fusisporium* there is something of the same kind. In *Alytosporium*, as constituted by Link, and in some other genera, allied to *Sporotrichum*. Still from all these, there are such manifest points of divergence, that no one would venture to associate the present species with any of them. Hence no other course appeared to be open to us but to constitute *Pellicularia Koleroga* the type of a new genus allied to those just alluded to, but distinguished therefrom by its parasitic habit, sessile, echinulate, globose spores, and the freedom with which it separates from the matrix. Whether or not mycologists will accept this as a sufficient distinction, the present course has not been adopted without much consideration.

GERMINATION OF THE SPORES OF *HEMILEIA*
VASTABRIX.

The germination of this curious fungus has not as yet been observed in Europe; but Dr. G. H. K. Thwaites, of Ceylon, has given the results of his experiments on germination. He says that it is not difficult to induce germination. Mature spores removed from a diseased leaf, and laid upon charcoal, kept constantly moist, commence to germinate in a few days. This process consists in the spore becoming somewhat enlarged, and its contents converted into one or more globose translucent masses. From each of these a filament is developed, which grows very rapidly, and becomes more or less branched. At the termination of some of these branches secondary spores are produced in the form of radiating necklace-shaped strings of little spherical bodies of uniform size, and this form closely resembles the fructification of an *Aspergillus*. Another observer in Ceylon (Mr. Abbay) has seen another form of secondary spores arranged in simple rows of spherical bodies—a good deal larger than those radiately arranged, but still exceedingly minute. These inconceivably numerous secondary spores may be easily transported by the slightest breath of air from place to place, and from plantation to plantation. Messrs. Berkeley and Broome have intimated that this fungus seems to hold an intermediate place between Uredines and Moulds. The germination, as well as structure of the species, is thus seen to be very unique and interesting.

BOTANICAL YEARBOOK.

The issue of the commencement of the "Botanischer Jahresbericht" for its second year, offers an opportunity for calling attention to a work which combines an immense amount of labour in a most useful form for all botanists, but it is the Cryptogamical portion which it is our desire more especially to commend to the attention of our readers. The second volume before us is for the year 1874, containing the Botanical Literature for that year, arranged under different heads, each under the special direction of an expert. The first section, Algæ, consists of forty-one large octavo pages, containing an enumeration of works, papers, communications, and the names of species published during the year. The second section is devoted to Lichens, and consists of 143 pages, grouped under Literature, Systematic Lichenology, Lichenography grouped under countries, Morphology, and New Genera and Species. In fact a much more extended and complete subgrouping is adopted under these heads than we have space to enumerate. The third section is occupied with Fungi, extending to about 170 pages, with a similar sub-classification to that adopted with the Lichens,

and of this section more especially, as the one with which we are practically best acquainted, we must speak in terms of strong commendation. The fourth section includes Mosses, thirty pages; and the fifth section, the higher Cryptogams, completes 426 pages of compact information on the Cryptogamic Literature of the year.

It could hardly be expected that such a work could be produced within a less period than one year from the completion of the year included within its scope. The whole of the year 1874, for instance, has been put into shape, classified, arranged, analysed, tabulated and printed during 1875, so that it may be distributed to subscribers as early as possible in 1876. It is a book which no one, who would attempt to keep pace with the Literature of any group of Cryptogamia, could afford to do without, and a sovereign thus expended, would save a vast amount of individual labour, which it is presumed all specialists would employ, in keeping a record of such papers and communications as came to their knowledge, with the additional advantage of its being better done. It is under the general editorship of Professor Leopold Just, and is published in Berlin.

THREE FUNGI FROM KASHMIR.

By REV. M. J. BERKELEY, M.A.

The following three Fungi were sent to the Kew Museum by Dr. Aitcheson :—

1. **Russula alutacea**, *Fr. Ep. p. 362.*

Gulmarg, Kashmir. In the woods during the rains. August, 1875.

2. **Lentinus Lecomtei**, *Fr. Ep. p. 388 (Agaricus Lecomtei, Schwein. Car. No. 794.)*

On decomposed wood during rain. Eaten by the natives. Gulmarg.

The specimen sent in its dry state is about $2\frac{1}{2}$ inches across, but it is stated to grow in large masses, and is sometimes twenty times as large. The species occurs in the United States, and has been gathered by Léveillé in Hungary, who has described it under the name of *Agaricus Sainsonii* (Demid. Voy. tab. 1, fig. 3). I have a specimen gathered by my son in Hungary. The vernacular name is Silyh.

3. **Hydnum Aitchesoni**, *B.*—Pileis imbricatis pallidis subtiliter tomentosis glabratis; margine inflexis lobatis fissis; stipite communi centrali crassis, quandoque obsoletis; acutis tenuibus longis fuscescentibus, decurrentibus.

Gulmarg, 8500 feet. Sept., during the rains. Esulent. Vernacular name, Ryle-güb.

About three inches across when fresh, extremely polymorphous; pilei at first minutely tomentose, at length quite smooth, often much imbricated, with the margin inflexed and split; stem sometimes quite obsolete, sometimes distinct, $\frac{1}{2}$ - $\frac{3}{4}$ inch high, $\frac{1}{2}$ inch thick, pallid like the pileus; aculei $\frac{1}{3}$ inch long, acute and slender, somewhat decurrent when the stem is present. Not so common as the last.

It is curious that the *Russula* is not considered esculent, though an esteemed culinary species in Europe.

FAIRY RINGS.

In a recent communication to the Linnean Society Dr. J. H. Gilbert draws attention to the fact that, according to published analyses of various fungi, generally from one-fourth to one-third of their dry substance consists of nitrogenous matters. In fact, fungi would appear to be among the most highly nitrogenous of plants, and to be also very rich in potass. Yet the fungi have developed in "fairy rings" only on the plots *poorest* in nitrogen and potass in such conditions as to be available to most other plants. They flourish strikingly on two plots only, in neither of which either nitrogen or potass is applied as manure, on which the development of grasses is extremely restricted, and their limited growth is due to a deficient available supply of nitrogen, or of potass, or of both, and, where the completion of the Leguminosæ is also weak, in the absence of a more liberal supply of potass.

The questions obviously arise whether the greater prevalence of fungi under such conditions be due to the manurial conditions themselves being directly favourable for their growth, or whether other plants—especially grasses—growing so sluggishly under such conditions, the plants of the lower orders are the better able to overcome the competition and to assert themselves. On this point the further questions arise, whether the fungi prevail simply in virtue of the absence of adverse and vigorous competition, or whether to a greater or less extent as parasites, and so at the expense of the sluggish underground growth of the plants in association with them; or, lastly, have these plants the power of assimilating nitrogen in some form from the atmosphere, or in some form or condition of distribution within the soil not available (at least when in competition) to the plants growing in association with them.

NEW FORMS OF BRITISH LICHENS.

In the "Transactions of the Glasgow Society of Field Naturalists," Dr. James Stirton has described the following new species and varieties of British Lichens:—

- Physcia retrogressa.*
- Physcia tenella* var. *fimbriatula.*
- Lecanora atra* (*) *sub-byssoidea.*
- Lecanora mammillifera.*
- Lecidea aniptila.*
- Lecidea confertula.*
- Lecidea phyllodisca.*
- Lecidea asperella.*
- Lecidea Braedalbanensis.*
- Lecidea corollidia.*
- Lecidea calpodes.*
- Lecidea restricta.*
- Lecidea relictæ.*
- Lecidea hemipoliella* (Nyl.) *semialbula.*
- Opegrapha atricolor.*
- Arthonia insinuata.*

In addition to which are some extra-European species from Canada, Tasmania, Australia, &c.

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Grevillea,

A QUARTERLY RECORD OF CRYPTOGAMIC BOTANY
AND ITS LITERATURE.

NOTICES OF NORTH AMERICAN FUNGI.

By the REV. M. J. BERKELEY, M.A., F.L.S.

(Concluded from Vol. III., Page 108.)

* **Sphæria moriformis.** *Tode.*—New York, Sartwell. No. 2654.

903. **Sphæria segregata.** *B. & C.*—Peritheciis ovatis apice acutis sporidiis angustis elongato-biconicis.

On decayed wood. *Car. Sup.* No. 884.

Perithecia scattered over the bleached surface, free, ovate, acute at the apex; sporidia hyaline, narrow, uniseptate, elongato-biconical.

904. **Sphæria euomphala.** *B. & C.*—Peritheciis cupularibus congestis; ascis clavatis; sporidiis hyalinis subellipticis.

On fallen branches in damp places. *Car. Inf.* No. 1550. On ash. Ravenel. No. 1347.

Perithecia cup-shaped, rugose, crowded; asci clavate; sporidia biseriate, hyaline, subelliptic.

905. **Sphæria subconnata.** *B. & C.*—Peritheciis hemisphæricis depressis subconnatis; ascis clavatis faretis; sporidiis allantoideis.

On *Liquidambar.* *Car. Inf.* No. 2737.

Scattered over the bark, subconnate, hemispherical, depressed; asci clavate, stuffed with the minute sausage-shaped sporidia.

906. **Sphæria chiliopyxis.** *B. & C.*—Minutissima gregaria nitida globosa; sporidiis hyalinis leviter allantoideis.

On putrid logs. *Car. Inf.* Ravenel. No. 1705.

Extremely minute, gregarious, globose, bright; sporidia hyaline, slightly sausage-shaped.

907. **Sphæria rhodospila.** *B. & C.*—Peritheciis convexis in crustam nigram insidentibus, apice lateritibus; sporidiis oblique fusiformibus triseptatis.

On *Cyrrilla.* *Car. Inf.* No. 5026.

Perithecia convex, seated on a black crust, the apex brick-coloured; sporidia between cymbæform and fusiform, hyaline, tri-septate, .0008 long.

908. **Sphæria trames.** *B. & C.*—Peritheciis seriatis globosis subtiliter tomentosis; ascis clavatis; sporidiis cymbæformibus hyalinis.

On *Acer*. Car. Inf. No. 2787.

Perithecia arranged in lines, three inches or more long, globose, minute, obscurely tomentose; asci clavate; sporidia hyaline, cymbæform, resembling those of *Sphæria quercuum* and its close allies.

* **Sphæria mammæformis.** *P.*—On oak and beech. Car. Sup. No. 918, 945.

909. **Sphæria prinicola.** *B. & C.*—Erumpens subglobosa; peritheciis subtiliter granulatis perforatis; ascis linearibus; sporidiis oblongis fuscis.

On *Prinus verticellata*. Pennsylvania, Michener. No. 4239.

Perithecia erumpent, rather large, subglobose, very minutely granulated, very obtuse, pierced at the apex; asci linear; sporidia uniseriate, oblong, subcymbiform, .0005 long.

910. **Sphæria obtusissima.** *B. & C.*—Peritheciis ovatis; ostiolo papillæformi; ascis linearibus; sporidiis ellipticis obtusissimis fuscis.

On bleached rotten wood. Pennsylvania, Michener. No. 4198.

Perithecia ovate, with a papillæform orifice half buried amongst the fibres; asci linear; sporidia in a single row, brown, elliptic, very obtuse, .0005-.00057.

911. **Sphæria disseminata.** *B. & C.*—Minuta sparsa ovata semiimmersa; apice attenuata; sporidiis biserialibus breviter fusiformibus triseptatis apud septa constrictis, quandoque verticaliter divisis.

On bleached wood of *Liquidambar*. Car. Inf. No. 2149. Car. Sup. On oak posts. No. 837.

Minute, scattered, half immersed, when free ovate, attenuated above; sporidia biseriate, shortly fusiform, triseptate, constricted at the septa, sometimes divided vertically.

912. **Sphæria porothelia.** *B. & C.*—Peritheciis minutis sparsis in foveolo sitis; sporidiis uniserialibus oblongo-fusiformibus triseptatis.

On the hymenium of some *Stereum*. Car. Inf. No. 2379.

Perithecia minute, scattered, each seated in a little facette; sporidia uniseriate, shortly oblongo-fusiform, rather obtuse at either end, triseptate.

* **Sphæria obducens.** *Fr.*—Mountains of New York. On *Sassafras*. No. 4420. On alder. No. 4444.

* **Sphæria pulvis pyrius.** *P.*—On pear. Car. Inf. Rav. No. 1249. No. 3296, Virginian Mountains, on chesnut, is a small form.

* **Sphæria millegrana.** *Schwein.*—On *Liriodendron*. Car. Sup. No. 770, 797. Car. Inf. No. 397, 1118, 1878. Ravenel. On *Gossypium*, oak, and plane. No. 616, 1670, 1806. Pennsylvania, Michener. No. 6012, 6018.

Sporidia broadly elliptic, dark, .0006-.0005.

* **Sphæria myriocarpa.** *Fr.*—*Car. Sup.* On *Acer rubrum.* No. 397. Mountains of New York. No. 4442.

Sporidia narrow, shortly fusiform, triseptate, .0006-.00057 long.

913. **Sphæria leucoplaca.** *B. & Rav.*—Minuta in stratum album floccosum insidens; ascis linearibus; sporidiis ellipticis fuscis.

On cow dung. *Car. Inf.* No. 1800.

Minute, black, seated on a broad white floccose spot; asci linear; sporidia uniseriate elliptic.

914. **Sphæria multifera.** *B. & Rav.*—Minuta nigra subglobosa; ascis brevibus fartis; sporidiis subglobosis.

On cow dung. Pennsylvania, Michener. No. 3998.

Minute, black, subglobose; asci short, oblong, blunt, filled with numerous subglobose, brown sporidia, .00025 long.

* **Sphæria latericolla.** *DeC.*—*Car. Inf.* No. 3219. Pennsylvania, Michener. No. 3824.

Sporidia clavate, hyaline, .0013 long.

915. **Sphæria rhizophila.** *B. & C.*—Sparsa nigra ostiolo brevi lineari; sporidiis fusiformibus curvatis brevibus triseptatis demum fuscis.

On exposed roots. Pennsylvania, Michener. No. 4125.

Scattered, ovate; ostiolum short, transverse, linear; asci clavate; sporidia shortly fusiform, curved, pointed, .0006 long, triseptate, at length brown.

916. **Sphæria cyrillicola.** *B. & C.*—Sparsa nigra ovato-conica; ostiolo papillæformi; ascis linearibus; sporidiis lanceolatis leviter curvis 4-septatis.

On *Cyrilla.* *Car. Sup.* No. 4962.

Scattered, black, ovate, with an acute apex; asci elongated, linear; sporidia lanceolate, slightly curved, quadriseptate, .0008 long.

No. 3598, Pennsylvania, Michener, scarcely differs, except that the sporidia are a little stouter, but of the same length.

* **Sphæria putaminum.** *Schwein.*—On peach stones. *Car. Sup.* No. 387. Ohio.

Sporidia about two in an ascus biconical, .002 long, attenuated suddenly at either end.

* **Sphæria mycophila.** *Fr.*—On *Polypori.* *Car. Inf.* No. 1071, 2235. Pennsylvania, Michener. No. 4220.

Sporidia elliptici brown uniseriate.

917. **Sphæria Nyssæcola.** *B. & C.*—Semiimmersa; collo elongato; sporidiis ellipticis, vel brevissime cymbæformibus.

On *Nyssa.* Pennsylvania, Michener; half immersed, subglobose, with an abrupt at length elongated neck; spores elliptic or shortly cymbæform, .0003 long.

918. **Sphæria æthiops.** *B. & C.*—Nigerrima, peritheciis subgloboso ostiolo papillæform sporidiis biseriatis clavato-oblongis uniseptatis.

Mountains of New York. On old logs. No. 4414, 4455.

Jet black; perithecia subglobose, with a little nipple, asci clavate or oblong; sporidia clavato-oblong, uniseptate, sometimes with a gelatinous coat, $\cdot 001\frac{1}{2}$ long.

919. **Sphæria phellogena**. *B. & C.*—Peritheciis semiimmersis subglobois. Ostiolo minuto papillæformi; sporidiis biserialibus enestratis.

On corky bark of oak. No. 5895.

Half immersed, subglobose, with an obscure papillæform ostiolum; sporidia biseriate, shortly fusiform, fenestrate, $\cdot 001\frac{1}{2}$ long, nearly hyaline.

* **Sphæria papilla**. *Schwein.*—On bark which had been covered with earth. *Car. Sup.* No. 268.

Sporidia shortly fusiform, oblique, uniseptate, $\cdot 001\frac{1}{2}$ long.

* **Sphæria mastoidea**. *Fr.*—On ash. *Car. Sup.*

Sporidia shortly fusiform, triseptate, $\cdot 0006\text{--}\cdot 0005$ long.

* **Sphæria pericarpii**. *Schwein.*—On *Carya*. *Car. Inf.* No. 3702.

* **Sphæria caryophaga**. *Schwein.*—On *Carya*. *Car. Inf.* No. 6032.

* **Sphæria drupivora**. *Schwein.*—Pennsylvania, Michener. No. 3957. On hickory nuts.

* **Sphæria asseda**. *Schwein.*—*Car. Inf.* No. 4949. On *Cyrilla*. Asci scarcely $\cdot 002$ long; sporidia sausage-shaped, $\cdot 00025$ long.

920. **Sphæria microloncha**. *B. & C.*—Sparsa ovata echinata ostiolo brevi; ascis clavatis; sporidiis ellipticis 4-septatis, subdivisis.

On the inside of bark of *Liriodendron*. *Car. Inf.* No. 2459.

Scattered, superficial, ovate, with a short neck, sprinkled with short setæ; asci clavate; sporidia biseriate, with about four horizontal septa, and a few oblique or vertical.

921. **Sphæria fissurarum**. *B. & C.*—Peritheciis parvis globosis breviter villosis, collo crassiusculo sursum attenuato; ascis parvis, sporidiis minutis oblongis.

On pine rails. *Car. Inf.* No. 3708.

Perithecia globose, covered with short villosity; ostiolum rather thick, attenuated upwards; asci lanceolate, short, sporidia minute, oblong, hyaline.

* **Sphæria apiospora**. *Mont.*—On *Arundinaria*. *Car. Inf.* No. 2742. Alabama, Peters. No. 6076. Sporidia $\cdot 001$ long.

922. **Sphæria orthogrammi**. *B. & C.*—Uneata epidermide, nigrefacta ticta, sporidiis oblongo-fusiformibus triseptatis.

On *Tea*. Pennsylvania, Michener. No. 5151. On *Erianthus alopecuroides*. *Car. Inf.* No. 3748, 4979, 4999.

Forming parallel black lines surrounded on each side by the

cuticle ; asci clavate ; sporidia oblongo-fusiform, triseptate, the two middle articulations shorter than the two terminal ones. No. 3748, 4999. Car. Inf. On *Erianthus alopecurvides* appears to be the same, but it is without fruit.

923. **Sphæria eumorpha.** *B. & C.*—Linearis chidermide arcte cincta, rima angusta aperta ; ascis linearibus, sporidiis oblongis uniseptatis.

On *Arundinaria*. Car. Inf. No. 5014. Linear, closely surrounded by the cuticle, opening with a narrow slit ; asci linear ; sporidia uniseriate, shortly oblong or subcymbiform, .0005 long, uniseptate. A broader and stronger species than the last. There is another distinct species on *Arundinaria* from Alabama, but indescribable, without sporidia.

* **Sphæria arundinacea.** *Sow.*—On *Arundinaria*. Car. Inf. No. 493.

Sporidia biseriate, obliquely fusiform, 5-septata, .001 long.

* **Sphæria Zeæ.** *Schwein.*—On *Zea*. Car. Sup. No. 372.

Sporidia oblong or narrower below, uniseptate, .001 long.

924. **Sphæria Zizaniæcola.** *B. & C.*—On onenino sepulta leviter tumens ; ascis ellipticis, sporidiis linearibus rectis vel sigmoideis, 5-6-septatis. *S. rimosa*, *Schwein.* Herb.

On *Zizania*, forming little swollen patches, slightly discolouring the cuticle ; asci elliptic, containing four linear straight or sigmoid 5-6 septate sporidia, .0013-005 long.

925. **Sphæria Beaumontii.** *B. & C.*—Linearis brevis erumpens, axis elongatis clavatis, sporidiis biserialibus linearibus multiseptatis.

On stalks of some grass. Alabama, Beaumont. No. 5112.

Forming little short black lines, bursting through the cuticle ; asci elongated, clavate ; sporidia linear, sometimes oblique, with about nine septa, and a nucleus in each joint, .002 long.

926. **Sphæria Pteridicoli.** *B. & C.*—Linearis subcuticularis ascis clavatis, sporidiis oblongis curvulis uniseptatis.

On stalks of *Pteris*, forming little grey parallel lines, covered with the cuticle ; asci clavato ; sporidia oblong, slightly curved, obtuse at either end, uniseptate, .0006 long.

927. **Sphæria juncina.** *B. & R.*—Irregularis ostiolis punctata, sporidiis oblongis uniseptatis, medio subconstrictis.

On *Juncus*. Car. Inf. Ravenel. No. 1217.

Forming little discoloured patches, which are studded with the ostiola ; sporidia oblong, uniseptate, constricted slightly at the septum. Very different from *S. Junco*, with its elliptic binucleate sporidia, .0003-.0004 long.

* **Sphæria Junci.** *Fr.*—Car. Inf. No. 3061. *S. longissima*, *Fr.* On *Archemora ternata*. Car. Sup. No. 957, and *S. nebulosa*, *P.* On *Ambrosia tripida*. Car. Sup. No. 788, are apparently *Phomata*.

* **Sphæria pilifera.** *Fr.*—On pine rails. *Car. Inf.* No. 2317. On oak. Alabama, Peters. No. 5232. Pennsylvania, Michener. No. 4075. Sporidia sausage-shaped, .0002 long.

* **Sphæria rostrate.** *Fr.*—On *Acer*. *Car. Inf.* No. 2490.

928. **Sphæria sepelibilis.** *B. & C.*—Hysteriiformis cuticula nigrefacta tecta; sporidiis ellipticis, 1-2 nucleatis.

On *Smilax laurifolia*. *Car. Inf.* No. 4877.

Hysteriiform, covered by the blackened cuticle; sporidia elliptic, with one or sometimes two nuclei, .0005 long.

928* **Sphæria inordinata.** *B. & C.*—Epidermide tecta prominens; ascis clavatis sporidiis allantoideis.

On *Rosa laevigata*. *Car. Inf.* No. 2501.

Covered by the cuticle, which is raised by the subjacent perithecia into little prominences, which make the whole surface like a raspe; asci clavate; sporidia sausage-shaped.

929. **Sphæria brachytheca.** *B. & C.*—Peritheciis minutis cuticulâ circumdatis; ascis obovatis brevibus; sporidiis clavatis, 6-septatis.

On *Rosa*. New England, Russell. No. 5874.

Perithecia minute, surrounded by the cuticle; asci obovate, very short, sporidia clavate, with about 6 septa, .001 long, resembling those of *Patellaria atrata*.

* **Sphæria scoriadea.** *Fr.*—On bark of *Betula lenta*. Pennsylvania, Michener. No. 4091. Arctic America, Drummond.

930. **Sphæria celtidis.** *B. & C.*—Gregaria minuta, ostiolo prominulo; ascis brevibus; sporidiis oblongis uniseptatis.

On branches of *Celtis*. *Car. Inf.* (Ravenel, No. 1422).

Perithecia closely packed, but distinct, covered by the bark which is slightly raised, so that the whole looks like fine shagreen; ostiola rather prominent, asci short, with four sporidia which are oblong, obtuse, uniseptate. Allied to the last.

* **Sphæria livida.** *Fr.*—On bleached wood. Texas, C. Wright. No. 3781, 3902. Mountains of New York. No. 4469.

Sporidia oblong, elliptic, 5-septate, fenestrate, .001 long.

931. **Sphæria polynesia.** *B. & C.*—Oblonga peritheciis conditis; ascis filiformibus, sporidiis fuscis oblongis.

Mountains of Virginia. No. 3347.

Forming little oblong black spots, which are studded with the ostiola; asci very slender; sporidia oblong, brown, .00028 long.

* **Sphæria spiculosa.** *P.*—*Car. Sup.* No. 33.351. *Car. Inf.* No. 1406.

932. **Sphæria semiimmersa.** *B. & C.*—Deorsum immersa, sursum subcylindrica, sporidiis oblongis curvis quadrinucleatis.

On dead herbaceous stems. Connecticut, C. Wright. No. 5628.

Perithecia immersed below, above subcylindrical or subconical; sporidia linear, oblong curved, .0006 long.

933. **Sphæria closterium.** *B. & C.*—Minuta erumpens; sporidiis medio ellipticis utrinque appendice longa curvata.

On *Spiræa opulifolia*. Mountains of New York. No. 4428.

Bursting through the cuticle, which at first is closed and is black and shining; asci lanceolate; sporidia elliptic in the centre, with a long attenuated curved appendage at either end, .002 long. Sometimes the elliptic part is divided into two elliptic joints. A very curious species.

934. **Sphæria Murrayi.** *B. & C.*—Peritheciis epidermide tectis prominulis; ascis lanceolatis; sporidiis oblongis centro constrictis quadrinuclatis.

On apple. New England, Murray. No. 5706.

Perithecia covered by the cuticle, rather prominent; asci lanceolate; sporidia oblong, constricted in the middle with four nuclei, probably septate when older; each perithecium is surrounded externally with short white hairs, but it is uncertain whether they belong to the plant.

* **Sphæria salicella.** *Fr.*—Pennsylvania, Michener. No. 3487.

* **Sphæria palmarum.** *Mont.*—On *Sabal*. Alabama, Beaumont. No. 4645.

935. **Sphæria sabaligera.** *B. & C.*—Sparsa minuta epidermide nigrefacta tecta, ascis clavatis, sporidiis biseriatis.

On *Sabal*, with the former.

Scattered, minute, covered by the blackened cuticle; sporidia biseriate; sporidia fusiform, curved, triseptate, .001 long. No. 4889 on *Sabal*, is unfortunately without fruit.

* **Sphæria yuccæ.** *Schwein.*—On *Yucca aloifolia*. Santee River. No. 1588.

I find asci, but at present no certain sporidia.

936. **Sphæria combulliens.** *B. & C.*—Peritheciis ostiolo minuto excepto abditis; sporidiis oblongis uniseriatis uniseptatis.

On stems of *Arundinaria*, accompanied by some other seriate species; scattered, covered by the cuticle, with the exception of the minute ostiolum; sporidia uniseriate oblong, uniseptate.

* **Sphæria pruinosa.** *Fr.*—On *Fraxinus sambucifolia*. Pennsylvania, Dr. Michener. No. 3574. Car. Sup. No. 787.

Sporidia sausage-shaped.

937. **Sphæria semitecta.** *B. & C.*—Peritheciis semitectis; sporidiis clavatis, triseptatis.

On Plane. Virginian Mountains. No. 3340.

Perithecia raised, half covered by the cuticle, which forms a little ring to each perithecium, sporidia clavate, triseptate, slightly constricted at each septum, .0013 long, clothed at first with a thick gelatinous coat.

938. **Sphæria citrispora.** *B. & C.*—Omnino tecta; ascis clavatis, sporidiis hyalinis citriformibus.

On *Tilia glabra*, Virginian Mountains. No. 3356.

Quite covered by the cuticle, asci clavate; sporidia biseriate, either lemon-shaped or narrower, .0013 long.

* **Sphæria velata.** *P.*—Pennsylvania, Michener. No. 4052.

939. **Sphæria Eunotia.** *B. & C.*—Peritheciis erumpentibus; ascis clavatis; sporidiis oblongis utrinque medio tumidis hyalinis.

On stems of Ivy. Carolina. No. 6382.

Bursting through the cuticle; asci clavate, sporidia oblong, hyaline, swelling in the middle on either side like the frustules of *Eunotia*, .001-.0008 long.

940. **Sphæria cupressi.** *B. & C.*—Peritheciis epidermide tectis prominulis applanatis, ascis clavatis, sporidiis hyalinis clavatis vel breviter fusiformibus.

On *Cupressus thujoides*. Car. Inf. No. 3287.

Perithecia covered by the cuticle, but prominent, with a distinct ostiolum; asci clavate; sporidia hyaline, clavate or shortly fusiform.

941. **Sphæria griseo-tingens.** *B. & C.*—Minuta sublineari-prominula, ascis clavatis, sporidiis fusiformibus hyalinis.

On *Juniperus virginiana*. Pennsylvania, Michener. No. 6029.

Gregarious, forming little detached or continuous short linear prominences, marked with the ostiola; asci clavate; sporidia obliquely fusiform, .0008 long.

942. **Sphæria olivæspora.** *B. & C.*—Peritheciis epidermide tectis prominulis; ascis linearibus, sporidiis oblongis, utrinque subito angustatis triseptatis.

On *Cornus florida*. Car. Inf. No. 2078.

Perithecia covered by the cuticle, but rather prominent, marked in the centre with the black ostiola; asci linear, sporidia oblong, pointed at either extremity with three septa about four times longer than broad.

* **Sphæria nigro-annulata.** *B. & C.*—Journ. Linn. Soc., x. p. 388.

On *Yucca aloifolia*. Car. Sup. No. 4915. Cuba.

943. **Sphæria eliminata.** *B. & C.*—Peritheciis epidermide nigrefacta tectis; ostiolo albo; ascis linearibus; sporidiis anguste oblongis uninucleatis.

On *Smilax*. Alabama, Peters. No. 4570.

Perithecia covered by the jet black cuticle, which is the more conspicuous from the unoccupied parts being white, marked in the centre with white above the ostiolum; asci linear; sporidia uniseriate, oblong, .00057 long, from four to five times longer than broad.

* **Sphæria loniceræ.** *Sow.*—Car. Sup. No. 813.

* **Sphæria sepincola.** *Fr.*—On *Spiræa opulifolia*. Mountains of New York. No. 443.

Sporidia fusiform, triseptate, .0004 long.

On *Lonicera*. Car. Inf. No. 1269.

* **Sphæria syringæ.** *Fr.*—Car. Inf. No. 3756. On *Syringa vulgaris*.

Asci linear; sporidia uniseriate; sporidia oblong, .0002 long. The original specimens from Schweinitz and Fries are stylosporous.

944. **Sphæria stictoides.** *B. & C.*—Peritheciis applanatis depressis epidermide cinctis; sporidiis 5-septatis; apud medium septum constrictis subbiconicis.

On *Liriodendron*. Car. Sup. No. 72.

Forming little irregular depressed spicules surrounded by the cuticle; sporidia nearly biconical, one division larger than the other, 5-septate, constricted at the middle septum.

* **Sphæria subsimplex.** *Schwein.*—On *Rhus glabra*. Mountains of New York. No. 4425.

Sporidia elliptic, hyaline, .00057 long.

945. **Sphæria polysticta.** *B. & C.*—Ostiolo excepto cuticulâ tecta; ascis linearibus; sporidiis oblongis uniseptatis fuscis.

On *Smilax*. Beaumont. No. 4874.

Perithecia scarcely raising the cuticle, visible chiefly from the black dotlike ostiola; asci linear; sporidia oblong, uniseptate, .0003 long, rather more than twice as long as broad.

946. **Sphæria disrupta.** *B. & C.*—Peritheciis cuticula tectis tumetibus, ostiolo punctiformi; ascis obovatis; sporidiis biseriatis ellipticis hyalinis.

On *Smilax*. Car. Inf. No. 2141.

Perithecia causing little swellings in the unaltered cuticle, which are pierced in the centre by the ostiola; asci broad, obovate, with two rows of hyaline elliptic sporidia, accompanied by brown elliptic binucleate stylospores in different perithecia.

* **Sphæria cucurbitacearum.** *Schwein.*—On gourds. Car. Sup. No. 276. Car. Inf. No. 1731, 1733.

Sporidia oblong, .0003 long. I have not, however, seen asci.

* **Sphæria Ilicis.** *Schleich.*—On leaves of *Ilex opaca*. Car. Inf. No. 1084.

Sporidia biseriate, swollen on either side like the frustules of *Eunotia*.

947. **Sphæria hypercina.** *B. & C.*—Stictoidea epidermide cincta; ascis clavatis; sporidiis cymbæformibus hyalinis.

On *Hyperica*. Car. Inf. No. 3701.

Perithecia depressed, surrounded by the cuticle; asci clavate; sporidia cymbæform, hyaline, .001 long. Looking somewhat like *S. stictoides*, but with very different fruit.

* **Sphæria Kalmiarum.** *Schwein.*—On *Rhododendron arboreum* and *Kalmia latifolia*. Car. Sup. No. 420, 421.

* **Sphæria epidermidis.** *Fr.*—On *Sambucus*. Car. Sup. No. 923.

* **Sphæria acuta.** *Mong.*—Car. Sup. No. 17, 331, 356. Car. Inf. No. 6046. Virginian Mountains. No. 3315.

* **Sphæria acuminata.** *Sow.*—Car. Inf. No. 1888. Virginian Mountains. No. 3360. Pennsylvania, Michener. No. 4311. Alabama, Peters. No. 5237. No. 5631, Connecticut, Wright, is probably a young state, before one of the joints becomes swollen; sent out as *S. vibriospora*, B. & C.

* **Sphæria complanata.** *Tode.*—Virginian Mountains. No. 3300.

* **Sphæria herbarum.** *Fr.*—Car. Inf. No. 2518, 3710, 6174. Virginian Mountains. No. 3310. Alabama, Beaumont. No. 5080.

* **Sphæria Ogilviensis.** *B. & Br.*—On *Cimicifuga racemosa*. Virginian Mountains. No. 3293.

Sporidia biconical, 5-septate, constricted at the middle septum, .0015 long.

No. 3304, on *Eupatorium purpureum*, seems the same thing in a younger state, as also No. 3304.

* **Sphæria Doliolum.**—Car. Sup. No. 758, 896, 29.

* **Sphæria rubella.** *Fr.*—Car. Inf. No. 3232. Sporidia very long, filiform.

* **Sphæria phomatospora.** *B.* "Cooke Handbook," p. 884.—On *Andropogon*. Car. Inf. No. 4944, 4985.

Sporidia oblong, elliptic, .0004, binucleate.

* **Sphæria Dematium.** *P.*—Car. Inf. On *Phlox paniculata*. Car. Inf. No. 1759. On *Allium Cepa*. Car. Sup. No. 460.

More properly *Vermicularia Dematium*.

* **Sphæria Verbascicola.** *Schwein.*—Car. Inf. Ravenel.

* **Sphæria Brassicæ.** *Schwein.*—New England, Murray. No. 5370.

* **Sphæria tenebrosa.** *B. & Br.* "Cooke Handbook," p. 898.—On *Vernonia novæboracensis*. Pennsylvania, Michener. No. 4132.

* **Sphæria culmifraga.** *Fr.*—On *Panicum*. New England, Sprague. No. 5810. Scarcely mature.

* **Sphæria phæcomes.** *Reb.*—Car. Inf. No. 1413.

948. **Sphæria olericola.** *B. & C.*—Congregata; peritheciis conicis; sporidiis oblongis curvulis 3-septatis.

On stems of *Brassica*. New England, Murray. No. 5426.

Perithecia gregarious, conical; sporidia oblong, slightly curved, triseptate, .001 long. A curious diseased state occurs in which the sporidia turn black and lose all trace of septa.

949. **Sphæria ceratispora.** *B. & C.*—Congregata conica; sporidiis elongatis utrinque acuminatis pluriseptatis apud septa prominulis.

On some thick herbaceous stem, possibly *Zea*. Car. Inf. No. 2217.

Perithecia gregarious, conical; sporidia long, curved, acuminate

at both ends, with 12 or more septa, projecting at the septa like the horns of some antelopes.

950. **Sphæria incommiscibilis.** *B. & C.*—Minuta epidermide tecta; ostiolis papillæformibus; ascis linearibus; sporidiis fusiformibus angustis demum uniseptatis.

On stalks of some herbaceous plant. Virginian Mountains. No. 3313.

Minute, covered with the cuticle; ostiola projecting, papillæform; ascis linear; sporidia shortly fusiform, acuminate at either end, at length uniseptate, .0008 long.

951. **Sphæria stictostoma.** *B. & C.*—Peritheciis epidermide tectis tumidulis demum liberatis subconicis; ascis oblongis; sporidiis biseriatis cymbæformibus 5-septatis apud septa constrictis.

On some herbaceous plant. Connecticut, C. Wright. No. 4655.

Perithecia covered by the cuticle forming little corresponding prominences pierced by the ostiola, at length free, subconical; ascis oblong; sporidia biseriata, cymbæform, 5-septate, constricted at the commissures, .0008 long. No. 916, on inflorescence of *Plantago*, scarcely differs.

952. **Sphæria œnothæræ.** *B. & C.*—Minutissima; ostiolo punctiformi prominulo; ascis clavatis; sporidiis hyalinis breviter fusiformibus obtusis.

On *œnothæræ sinuata*. Car. Inf. No. 2243.

Very minute, black; ostiola rather prominent; ascis clavate; sporidia shortly fusiform, obtuse at either end, hyaline.

953. **Sphæria phlyctanoides.** *B. & C.*—Irregularis fusca deplanata; ascis late lanceolatis brevibus; sporidiis biseriatis cymbæformibus endochromate utrinque retracto.

On stems of *Dolichos*. Alabama, Beaumont. No. 4858.

Forming little brown irregular specks on a white ground; ascis short, broadly lanceolate; sporidia cymbæform, with the endochrome retracted at either end, .0005-.00057 long.

* **Sphæria Berkeleyi.** *Desm.*—On *Phytolacca*.

954. **Sphæria sepulta.** *B. & C.*—Peritheciis sepultis ostiolo emergente; sporidiis allantoides.

On *Smilax*. Car. Inf. No. 1882.

Perithecia buried as in *Sphæria Berkeleyi*; sporidia minute sausage-shaped.

955. **Sphæria mesœdema.** *B. & C.*—Peritheciis demum nudatis conicis; sporidiis utrinque acuminatis, 8-septatis articulo medio tumido colorato.

On *Eupatorium coronopifolium*. Car. Inf. No. 3727. On *Cirsium muticum*. Ravenel. No. 640.

Perithecia at length liberated, conical; sporidia elongated, acuminate at either end with about 8-septa, the central joint swelling, .0025 long.

956. **Sphæria Lophanthi.** *B. & C.*—Minuta epidermide tecta; ascis oblongis; sporidiis fusiformibus, 6-septatis.

On *Lophanthus*. Pennsylvania, Michener. No. 4013.

Perithecia minute, covered by the cuticle; asci oblong; sporidia fusiform, slightly curved, 6-septate, .002 long.

957. **Sphæria glomus.** *B. & C.*—Convexa medio perforata; sporidiis linearibus sigmoideis; stylosporibus obovatis primum per paria connatis.

On *Ambrosia*. Alabama, Beaumont. No. 4612.

Perithecia convex, perforated; sporidia linear, sigmoid, .001-.002 long. Stylospores are produced within flat dark specks, seated on forked threads, and at first joined in pairs so as to make an obovate mass, then separating and still obovate, but narrow, .001 long.

958. **Sphæria Dioscoreæ.** *B. & C.*—Minutissima; ascibus brevibus; sporidiis oblongis uniseptatis paucis.

On stems of *Dioscorea*. Car. Inf. No. 5041.

Very minute; asci short, with few sporidia, which are oblong and uniseptate, about three times longer than broad, .0008 long.

959. **Sphæria lathyrina.** *B. & C.*—Minutissima; ascibus oblongis; sporidiis octonis oblongis uniseptatis, apud septum constrictis.

On *Lathyrus latifolia*. Pennsylvania, Michener. No. 4247.

Very minute; asci oblong; sporidia biseriata, oblong, uniseptate, constricted at the septum, .0003 long.

960. **Sphæria incarcerationa.** *B. & C.*—Abdita, rima longitudinali aperta; sporidiis torulosis 5-septatis.

On stems of *Spartina*. Car. Inf. No. 6176.

Perithecia under a little clouded speck of the cuticle opening by a little longitudinal fissure; sporidia torulose, straight, with 5 septa, .002 long.

961. **Sphæria sarcocystis.** *B. & C.*—Brevis convexa; peritheciis parietibus carnosius conjunctis; ascibus oblongo-tumidis; sporidiis quarternis triseptatis, articulis demum longitudinaliter divisis.

On wheat. Carolina. No. 6358.

Forming little oblong prominent black bodies, which consist of a few closely joined perithecia with fleshy walls; asci rather short, oblong, but tumid, containing four oblong obtuse sometimes clavate sporidia, with three horizontal articulations and a few vertical, .002 long. Perhaps more properly placed in *Dothidea*.

962. **Sphæria ulmaticolor.** *B. & C.*—Maculis effusis umbrinis; ascibus linearibus; sporidiis ellipticis fuscis.

On decorticated smooth branches. Car. Inf. No. 4982.

Effused, continuous, umber-brown; perithecia minute; asci linear; sporidia uniseriate, elliptic, brown, .0003-.00314.

963. **Sphæria umbrinella.** *B. & C.*—Peritheciis umbrinis, ostiolo papillæformi nigro; ascibus linearibus; sporidiis ellipticis fuscis.

On *Eupatorium coronopifolium*. Car. Inf. No. 4959.

Perithecia umber, with a black papillæform ostiolum; asci linear; sporidia uniseriate, brown, elliptic, binucleate.

* **Sphæria dendroides**. Schwein.—Car. Sup. No. 690. On leaves of *Quercus alba*.

* **Sphæria myriadea**. D.C.—On leaves of *Uvaria triloba*. Ohio. No. 162. On oak leaves. Car. Sup. No. 39.

* **Sphæria maculæformis**. P.—On beech leaves and *Fraxinus Epipterus*. Car. Sup. No. 95. Car. Inf. On various leaves, 3225, 3736, 3836. Texas, Lindheimer. No. 3642.

* **Sphæria punctiformis**. P.—On *Quercus aquatica*, *obtusiloba*, *Carya*, *Lyonia ligustrina*. Car. Sup. No. 91. Car. Inf. *Cornus florida*. No. 689, 3695. Ravenel. No. 1616, 1603, 813.

* **Sphæria orbicula**. Schwein.—On *Quercus tinctoria*. Car. Sup. No. 677.

964. **Sphæria leucospila**. B. & C.—Peritheciis in maculas nervis parallelas; ascis linearibus; sporidiis filiformibus.

On leaves of *Platanus*. Car. Inf. No. 1957.

On narrow pallid spots parallel with the nerves on the under side of the leaves; asci linear; sporidia filiform.

965. **Sphæria carectorum**. B. & C.—Minuta punctiformis sparsa prominula; ascis clavatis; sporidiis breviter fusiformibus quadrinucleatis.

On leaves of *Carex folliculata*. Car. Inf. No. 2153.

Minute, dotlike, scattered, rather prominent; asci clavate; sporidia shortly fusiform, quadrinucleate.

966. **Sphæria intercellularis**. B. & C.—Peritheciis in cellulis dilatatis, basi radiatis; ascis brevibus sursum angustioribus; sporidiis breviter cymbiformibus uniseptatis.

On *Typha*. Massachusetts, Russell. No. 5438.

Perithecia contained in the larger or dilated cells, about 002 in. diameter, with a few radiating threads; asci short, thicker at the base; sporidia shortly cymbæform, uniseptate, .0005 long.

967. **Sphæria appendiculosa**. B. & C.—Perithecia hic illic congestis, basi epidermide arcte cinctis; ascis oblongis; sporidiis biseriatis fusiformibus utrinque appendiculatis.

On leaves of *Sapinda*. Texas, C. Wright. No. 3887.

Perithecia collected two or three together, closely surrounded at the base by the cuticle; asci oblong; sporidia biseriate, fusiform, quadrinucleate, with a filiform straight hyaline appendage at either end, .0005 long without the appendages.

* **Sphæria Andromedæ**. Schwein.—On leaves of *Andromeda nitida*. Car. Sup. No. 718.

* **Sphæria Sarraceniæ**. Schwein.—On *Sarracenia rubra*. Car. Inf. No. 1192. On *S. flava*. No. 1216.

Asci very short, obovate; sporidia oblong, uniseptate, .0004 long.

* **Sphæria Solidaginum.** *Schwein.*—On *Solidago Canadensis*. Car. Sup. No. 582, 601.

* **Sphæria Potentillæ.** *Schwein.*—Cotoosa Springs, Georgia (Ravenel. No. 1723).

* **Sphæria petiolorum.** *Schwein.*—On petioles of *Liquidambar*. Car. Inf. No. 1120.

Clearly the same as *S. amœna*, Nees.

968. **Sphæria Janus.** *B. & C.*—Peritheciis in maculas orbiculares congestis, folia ad superficiem alteram penetrantibus; ascis brevibus oblongis; sporidiis breviter fusiformibus angustis 4-septatis.

On leaves of *Quercus virens*. Texas, C. Wright. No. 3908.

Perithecia collected in orbicular spots on the under side of the leaf, and penetrating to the upper surface; asci short, oblong; sporidia narrow, shortly fusiform, with 4-septa.

969. **Sphæria Nebraskæ.** *B. & C.*—Minuta; subhysteriiformis, ascis oblongis, sporidiis ellipticis uniseptatis.

On leaves of grass. Nebraska, Hayden. No. 6405.

Minute, shortly hysterioriform; asci oblong, slightly swollen; sporidia in two rows, elliptic, uniseptate, .00057 long, hyaline.

970. **Sphæria Wrightii.** *B. & C.*—Subcuticularis cupulari-collapsa; ascis lanceolatis, sporidiis biseriatis oblongis curvulis.

On leaves of *Statice limonium*. California, C. Wright. No. 5456.

Covered with the cuticle collapsing, and then cup-shaped; asci lanceolate obtuse; sporidia biseriata; sporidia oblong, slightly curved, .001-.0013 long hyaline, with a narrow gelatinous border.

* **Sphæria plantaginicola.** *Schwein.*—On *Plantago lanceolata*. Pennsylvania.

* **Sphæria ulmea.** *Schwein.*—Michener. No. 4107. Car. Sup. On *Ulmus americana*. No. 571, 2213. Car. Inf. Montreal, Dr. MacLagan. No. 548. Canada, Poe. No. 6142.

* **Sphæria coryli.** *Batsch.*—Carolina, Buckley.

* **Sphæria fimbriata.** *P.*—On Hornbeam. Rhode Island, Olney. No. 1840

* **Sphæria fraxinicola.**—*Schwein.*—Car. Inf. No. 4939.

* **Sphæria convexula.** *Schwein.*—On leaves of *Carya*. Car. Inf. Ravenel. No. 813.

971. **Sphæria philoprina.** *B. & C.*—Peritheciis nitidis centro e cuticula albis; ascis oblongis; sporidiis biseriatis cymbæformibus hyalinis.

On leaves of *Ilex*. Car. Sup. No. 327.

Perithecia shining black, white in the centre from the cuticle; asci oblong, short; sporidia biseriata, hyaline, cymbæform.

972. *Sphaeria nigrotecta*. *B. & Rev.*—Peritheciis nitidis centro e cuticula albis; ascis linearibus, sporidiis ellipticis fuscis.

On leaves of *Ilex*. *Car. Inf.* (Ravenel, No. 1243.)

Externally like the last but smaller, asci linear, sporidia in a single row, brown, elliptic.

973. *Sphaeria Lycopodii*. *B. & C.*—Punctiformis epidermide condita; ascis clavatis, sporidiis biseriatis, breviter fusiformibus biseptatis.

On *Lycopodium*. New Jersey. No. 4686.

Punctiform, quite covered by the cuticle, not the least projecting; asci clavate; sporidia biseriata, shortly fusiform, hyaline, biseptate.

* *Depazea cruenta*. *Kze.*—On *Smilacina*. Rhode Island. *Car. Inf.* No. 1744g.

* *Depazea kalmicola*. *Schwein.*—*Car. Inf.* *Car. Sup.* No. 89.

974. *Depazea brunnea*. *B. & C.*—Maculis orbicularibus brunneis; ascis clavatis; sporidiis angustis fusiformibus quadrinucleatis.

On leaves of *Acer rubrum*. *Car. Inf.* No. 2260.

Spots dark brown, orbicular, about $\frac{1}{4}$ inch across; asci clavate, sporidia biseriata, narrow, fusiform, sometimes slightly curved, with four nuclei.

975. *Depazea concentrica*. *B. & C.*—Maculis annulis concentricis albis brunneisque variegata, peritheciis in annulis pallidis sitis.

On leaves of *Asarum virginicum*. Alabama. No. 3987.

Spots more than an inch in diameter, orbicular, consisting of about seven alternate white and brown rings; perithecia numerous, situated on the fallen rings. Unfortunately I could not find perfect fruit.

* *Depazea smilacicola*. *Schwein.*—*Car. Sup.* No. 253. *Car. Inf.* No. 1514.

976. *Massaria seiridia*. *B. & C.*—Peritheciis paucis, in pustulis parvis conditis; ascis tetrasporis; sporidiis oblongis utrinque obtusis triseptatis; endochromatibus connexis.

On *Robinia*. New England, Russell. No. 5871. Sartwell. No. 3073. On Peach. New York, Sartwell. No. 2620. Mountains of Virginia, on *Robinia*. No. 3353. *Car. Inf.* On *Acer*, 1789, 2783.

Perithecia few, hidden by the bark; disc small, pulverulent; asci containing four sporidia, which in the three first numbers are oblong, obtuse at either end, in the three latter more spindle-shaped, in all about .005 long, triseptate, with the endochromes united by a little cylindrical process. *Sphaeria ocellata*, Schwein. Herb.

977. *Massaria vomitoria*. *B. & C.*—Peritheciis ostiolo excepto abditis; ascis octosporis; sporidiis oblongis magnis obliquis, 3-septatis.

On *Acer* and *Robinia*. *Car. Inf.* No. 1789, 2342. Virginian

Mountains. No. 3325. New York, Sartwell. No. 2656. New England, Sprague. No. 5306.

Perithecia covered by the cuticle, with the exception of the ostiolum, which pours out the dark oblong or cymbiform triseptate sporidia, with connected endochromes, .003 long; nearly related to the last, but with eight sporidia, which are longer.

978. **Massaria atroinquinans.** *B. & C.*—Peritheciis abditis ostiolo punctiformi tantum erumpente; sporidiis oblongo-ellipticis 3-6-septatis.

On *Platanus*. Car. Inf. No. 1897. Ravenel. 544. Pennsylvania, Michener. No. 5169.

Entirely concealed by the bark, with the exception of the minute ostiolum; sporidia oblong-elliptic, sometimes attenuated below with from three to six septa, at first surrounded by a gelatinous border, .002 long.

979. **Massaria epileuca.** *B. & C.*—Peritheciis depressis tomentosis, in stratum album insidentibus; ostiolo demum insigniter perforato; sporidiis cymbiformibus triseptatis, apud septa constrictis.

On *Morus rubra*. Car. Sup. No. 31. Car. Inf. No. 1146, 2212, 3591. Pennsylvania, Michener. No. 3524.

Perithecia depressed, tomentose, ostiolum at first papillæform, then opening widely; sporidia large, cymbiform, triseptate, constricted at the septa, at first surrounded by a gelatinous border.

* **Massaria gigaspora.** *Desm.*—On *Viburnum prunifolium*. Pennsylvania, Michener. No. 4126. On *Viburnum dentatum*. No. 4067. In 4128 I find the sporidia .003 long, with connected endochromes.

980. **Massaria sudans.** *B. & C.*—Omnino tecta; peritheciis circinantibus; ascis linearibus, sporidiis oblongis uniseptatis.

On bark of *Acer*. Car. Inf. No. 3866.

Perithecia circinating, covered by the bark, pouring out the dark oblong uniseptate obtuse sporidia, .0016 long.

* **Capnodium elongatum.** *B. & Desm.*—On *Alnus serrulata*. Car. Inf. No. 3803. On Peaches. No. 4030. On *Smilax*. Ravenel. No. 1659. On *Populus angulata*. On *Liriodendron*. Pennsylvania, Michener. No. 3579. On *Bignonia*. Alabama, Peters. No. 6335. On *Rubus*. New England, Sprague. No. 5779.

981. **Capnodium pelliculosum.** *B. & Rav.*—Floccis mycelii erectis apice trifidis; peritheciis elongatis brevioribus.

On leaves of *Prunus*. Car. Inf. Ravenel. No. 1345.

Threads of the mycelium erect, trifid at the apex, after the fashion of *Tripodosporium*, shorter than the oblong constricted perithecia.

* **Capnodium quercinum.** *B. & Desm.*—On *Quercus obtusiloba*. Car. Inf. No. 2051.

* **Capnodium avellanum.** *B. & Desm.*—On *Populus angulata*. Car. Inf. No. 1639.

982. **Capnodium pini.** *B. & C.*—Mycelio laxo floccis in perithecia repentibus et cum iis conjunctis, sporidiis oblongis quadri-septatis.

On pine bark. Maine. No. 5689.

Mycelium loose, the threads running up the perithecia, and at length connate with them; sporidia oblong, quadrisepate, with occasional vertical septa.

983. **Capnodium pomorum.** *B. & C.*—Mycelio obsoleto; peritheciis levibus variis ovato-lanceolatis vel obovatis furcatisve pedicellatis.

On decayed apples. Car. Inf. No. 3274.

Mycelium obsolete; perithecia various, smooth, sometimes ovato-lanceolate and divided at the base, sometimes obovate or saddle-shaped, with a cylindrical dark pedicel.

984. **Isothea nyssæ.** *B. & C.*—Nitida in maculam vix latiore sita; ascis oblongis, sporidiis breviter fusiformibus, demum fenestratis.

On leaves of *Nyssa aquatica*. Shining, penetrating the leaf, seated on a little brown spot not much wider; asci oblong; sporidia shortly fusiform, not three times longer than broad, at length fenestrate.

985. **Perisporium fimeti.** *B. & C.*—Minutum sparsum, ascis ellipticis; sporidiis oblongis ellipticisque plurimis.

On rabbits' dung. Car. Inf. No. 2318, 2318 bis.; very minute, scattered; asci broadly elliptic, sporidia numerous, oblong or shortly elliptic, brown.

986. **Perisporium Zeæ.** *B. & C.*—Peritheciis seriatis basi subtiliter tomentosa, ascis lanceolatis, sporidiis breviter fusiformibus angustis triseptatis.

On *Zea*. Car. Inf. No. 3030.

Forming short black lines; perithecia surrounded by short villous hairs; asci lanceolate; sporidia shortly fusiform, triseptate, slightly constricted at the septa.

987. **Perisporium Wrightii.** *B. & C.*—Congestum nigerrimum, ascis brevibus obovatis; sporidiis subglobosis.

On *Opuntia macrorhiza*. Texas, Wright. No. 3783.

Perithecia crowded into suborbicular patches, jet black; granulated; asci short, obovate; sporidia subglobose; endochrome lilac, forming a cloud at the edge of the water.

* **Microthyrium smilacis.** *D'Not.*—On *Smilax rotundifolia*. Pennsylvania, Michener. No. 4130. Car. Inf. No. 2365, 2104, 1562.

* **Microthyrium microscopicum.** *Desm.*—Pennsylvania, Michener. No. 3946. On *Symphoricarpus*. No. 3567. On *Chelone glabra*. No. 3559.

On *Rhus glabra*. Michener. No. 3497. Sporidia narrow,

oblong, triseptate, .001 long. There are several other species in the collection but without fruit.

* **Dichæna faginea.** *Fr.*—On bark of beech. Car. Sup. No. 939. Ohio.

* **Dichæna quercina.** *Fr.*—On oak bark. Car. Inf. No. 2360 (Ravenel. N. 1607). There is also a *Dichæna* on *Cyrtilla racemiflora* and *Vaccinium*. Car. Inf. No. 1108 (Ravenel. No. 1601), and a very similar one, Alabama, Peters, No. 4006, on oak, which I take to be a form of *D. quercina*. No. 4854, Alabama, Beaumont, on *Magnolia*, is *Strigula Feei*, Mont. Nicaragua, Wright, No. 5478, some species in an incipient condition.

* **Meliola amphitricha.** *Fr.*—On *Rhyncospora miliacea*. Car. Inf. No. 982, 1636. Nicaragua, Wright. No. 5480. On *Garrya*. Texas, Lindheimer. No. 3644. On *Sabal*. Alabama, Beaumont. No. 4618, 4875bis. 4875.

* **Meliola furcata.** *Lér.*—On leaves. Nicaragua, Wright. No. 5486.

988. **Meliola Baccharidis.** *B. & Rar.*—Peritheciis globosis lævibus floccis flexuosis quandoque furcatis; sporidiis oblongis angustis uniseptatis.

On leaves of *Baccharis*. Car. Inf. (Ravenel. No. 1355).

Perithecia globose, even; threads waved, sometimes forked; sporidia oblong, narrow, uniseptate.

There are several other numbers which cannot be exactly defined. No. 6365, on *Galax rotundifolia*, without perithecia. On *Arundinaria*, Car. Inf. No. 1804, Ravenel, No. 675, with *Puccinia Arundinaria*, Schwein. On *Laurus Caroliniensis*. Car. Inf. No. 2069, 1028, 1189. On *Mitchella repens*. No. 1614.

* **Phyllactinia guttata.** *Lér.*—On *Grossularia*. Car. Sup. No. 4458. On *Barberry*. New England, Russell. No. 5969. Pennsylvania, Michener. No. 3474. On chesnut. No. 3473. On *Cornus florida*. No. 3472. On *Celastrus scandens*. Pennsylvania, Michener. No. 3484. Amherstberg, Dr. Maclagan. No. 433. On beech. Alabama, Beaumont. No. 5088.

* **Phyllactinia Candollei.** *Lér.*—Canada, Poe. No. 6164.

* **Podosphæra Kunzei.** *Lév.*—On *Cerasus*. Dr. Maclagan. No. 256. Alabama, Peters. No. 4556.

* **Sphærotheca Mors Uvæ.** (*Schwein.*)—On grapes. No. 5416. Sporidia .0006 long.

* **Erysiphe graminis.** *D.C.*—On wheat. Car. Inf. No. 3083.

* **Erysiphe Martii.** *Lév.*—On *Eupatorium Ageratoideum*. Car. Sup. No. 4427. Canada, Poe. No. 6151. On pea leaves. Massachusetts. No. 3383. Pennsylvania, Michener. No. 3569.

* **Erysiphe Montagnei.** *Lév.*—On *Xanthium strumarium*. Car. Inf. Ravenel. No. 1136.

* **Erysiphe communis.** *Lk.*—Canada, Poe. No. 6147, 6150, 6156. On apple leaves. No. 6148. On *Cratægus*. Alabama, Peters. No. 4540. On *Galium*. Mountains of Virginia. No. 3334. On *Ranunculus acris*. Massachusetts. No. 2390. On *Senecio hieraciifolia*. Pennsylvania, Michener. No. 3522. On *Clematis Virginica*. No. 3528. On *Senecio auriculata*. Car. Inf. No. 3400. On *Scutellaria lateriflora*. Pennsylvania, Michener. No. 3550. On *Verbena urticifolia*. No. 3289.

989. **Erysiphe spadicea.** *B. & C.*—Peritheciis spadiceis, appendicibus flexuosis; sporidiis quaternis.

On leaves of *Xanthium*. Car. Inf. No. 2984.

Perithecia scattered, rich brown, appendages flexuous, three times longer than their diameter; sporidia four.

990. **Erysiphe polychæta.** *B. & C.*—Maculis orbicularibus; appendicibus brevibus plurimus rectis; ascis elongatis clavatis.

On leaves of *Celtis*. Alabama, Peters. No. 3876.

Spots orbicular, yellow-brown in the centre from the young perithecia; appendages about equal to their diameter, straight; asci elongated, clavate.

* **Erysiphe horridula.** *Lév.*—On leaves of *Xanthium*. Pennsylvania, Michener. No. 3471. Car. Inf. No. 3231.

* **Erysiphe Phlogis.** *Schwein.*—Massachusetts, No. 3684.

* **Erysiphe Chelones.** *Schwein.*—Pennsylvania, Michener. No. 3498.

991. **Erysiphe fuscata.** *B. & C.*—Tota fusca; appendicibus quandoque furcatis; sporidiis octonis.

On leaves of *Bidens frondosa*. Pennsylvania, Michener. No. 3526.

Perithecia bright brown, appendages dark, sometimes forked at the apex; sporidia eight.

* **Uncinula adunca.** *Lév.*—On *Populus*. Canada, Poe. No. 6152, 6166. On *Æsculus Pavia*. Car. Inf. No. 4035. On elm. Alabama, Peters. No. 4597.

992. **Uncinula spiralis.** *B. & C.*—Appendicibus longis flexuosis apice spiralibus.

On leaves of *Vitis Labrusca*. Pennsylvania, Michener. No. 3610.

Forming thin white patches, in which the younger perithecia are pale, the older dark brown; appendages long, flexuous, with two spiral turns at the apex; sporidia about six, rather narrow, elliptic.

993. **Uncinula polychæta.** *B. & C.*—Peritheciis sparsis; appendicibus multis.

On leaves of *Celtis occidentalis*. Car. No. 5619.

Perithecia scattered; appendages about 28, $1\frac{1}{2}$ longer than the diameter of the perithecia, hyaline.

994. **Uncinula subfusca.** *B. & C.*—Peritheciis in maculas albas farinaceas insidentibus; appendicibus longioribus basi subfuscis.

On leaves of *Ampelopsis quinquefolia*.

Perithecia seated on mealy spots, smaller than in the last; appendages more than twice as long as their diameter, brownish below, almost spirally twisted at the apex, about 16; asci short; sporidia about six.

995. **Uncinula intermedia.** *B. & C.*—Peritheciis in maculam latam candidam insidentibus; appendicibus plurimis; sporidiis majoribus.

On leaves of elm. Alabama, Beaumont. No. 4853.

Spots broad, white; perithecia black, surrounded by numerous appendages (more than 30), spiral at the apices; sporidia three, elliptic.

* **Microsphæria Grossulariæ.** *Lév.*—On *Sambucus Canadensis*. Pennsylvania, Michener. No. 3482.

* **Microsphæria Friesii.** *Lév.*—On lilac leaves. Car. Inf. No. 3208. Missouri, Engelman.

* **Microsphæria Mougeotii.** *Lév.*—On leaves of *Desmodium Dillenii*. Pennsylvania, Michener. No. 3517.

996. **Microsphæria semitosta.** *B. & C.*—Mycelio parco; peritheciis sparsis; appendicibus deorsum abrupte fuscis; sporidiis quaternis.

On leaves of *Cephalanthus*. Car. Sup.

Mycelium sparing; appendage forked three times, more than twice as long as the diameter of the perithecia; abruptly brown at the base; sporidia four.

997. **Microsphæria Euphorbiæ.** *B. & C.*—Mycelio effuso; appendicibus longissimis furcatis apicibus furcato-lobatis.

On leaves of *Euphorbia*. Car. Inf. No. 2983. Ravenel. No. 1125.

Mycelium ample; appendages many times longer than the diameter of the perithecia, once or twice forked, then lobed at the tips.

* **Microsphæria penicillata.** *Lév.*—On oak leaves. Car. Inf. No. 3745. Sporidia from four to eight. On *Quercus nigra* with *Cronartium*. Car. Inf. No. 3078. Ravenel. No. 1324. On *Quercus aquatica*. On *Lonicera sempervirens*. Pennsylvania. No. 3423. On *Andromeda ligustrina*. Car. Inf. No. 2985. On *Viburnum acerifolium*. Pennsylvania, Michener. No. 3476.

998. **Microsphæria Ravenelii:** *B.*—Mycelio effuso albido; appendicibus pluries furcatis.

On leaves of *Gleditschia*.

Mycelium effused, dirty white; appendages repeatedly forked towards the apex, much more so than in the last.

* **Microsphaeria Hedwigii.** *Lév.*—On oak leaves. Alabama, Beaumont. No. 5105.

* **Acrospermum compressum.** *Tode.*—On cow pea. Car. Inf. No. 6179.

999. **Acrospermum Ravenelii.** *B. & C.*—Clavatum breve ascis elongatis; sporidiis filiformibus.

On leaves of *Cercis*, *Vitis* and *Fraxinus*. Car. Inf. No. 1928, 2021.

Minute, short, slightly attenuated downwards, at length somewhat clavate; asci long, linear, flexuous; sporidia long, filiform.

1000. **Acrospermum foliicolum.** *B.*—Elongatum clavatum pulverulentum, ascis elongatis; sporidiis filiformibus.

On fallen leaves of elm. Car. Sup. No. 1786. Car. Inf. On *Celtis*. No. 1957. Ravenel.

Much larger than the last, distinctly clavate, slender below, pulverulent; asci and sporidia the same.

1001. **Acrospermum viridulum.** *B. & C.*—Breve, virescens obtusum; ascis brevioribus.

On decayed herbaceous stems. Car. Inf. No. 1135.

Very short and obtuse, greenish; fruit as in the neighbouring species, but the asci are shorter.

* **Eurotium herbariorum.** *Lk.*—On Wood. Pennsylvania, Michener. No. 4360. On *Polyporus*. Massachusetts, C. J. Sprague. No. 4896.

* **Chaetomium elatum.** *Kze.*—On herbaceous decayed stems. Car. Inf. No. 5022. On *Carex*. Sartwell. No. 3260.

* **Chaetomium chartarum.** *Ehrb.*—On damp paper. Car. Inf. No. 3712.

Glenspora. *B. & Curt.*—Flocci fastigiati fasciculati parce articulati, hic illic sporangia globosa sessilia vel pedicellata ferentibus.

1002. **Glenspora Curtisii.** *B. & Desm.*—On *Nyssa*, *Quercus*, and *Cyrilla*. Car. Inf. No. 2088, 2776, 3059, 3060.

Forming black hispid patches, consisting of fascicles of fastigate threads, which bear here and there globose sporangia.

* **Antennaria semiovata.** *B. & Br.*—On leaves of *Kalmia latifolia*. Car. Inf. No. 2032. Ravenel. No. 844.

The sporangia are more free than in the British specimens, but there seems to be no essential difference.

On *Magnolia glauca*. Alabama, Beaumont. No. 4017, is another form.

A D D E N D A .

1003. **Lenzites Cookeii.** *Berk.*

Pileo duro tenui, cervino zonato lineato-rugosulo; margine tenui; contextu ex albo subcervino; hymenio albido; poris elongatis radiantibus.

In truncos emortuos *Salicis* et *Betulae*.

New York, Aug., Oct. (Peck, 391.)

1004. **Lenzites proxima.** *Berk.*

Pileo tenui applanato, subtiliter tomentello umbrino; contextu molli concolore; hymenio pallido; poris elongatis radiantibus.

New York, Sartwell. No. 5176. Same size as the last.

1005. **Hymenochæte Ellisii.** *B. & Cooke.*

Tennis papyracea, a matrice separabilis, primum pallida, dein centro cinnamomeo; margine tenerrimo.

On pine boards. New Jersey, U.S. (J. B. Ellis.)

[NOTE.—A larger amount of space than usual has been devoted to these descriptions of North American Fungi in order to complete the series in the present volume of *Grevillea*, which has now been accomplished. To the Rev. M. J. Berkeley our thanks are due, for undertaking the large amount of labour involved in the description of upwards of 1000 species, many of which have borne their MSS. names for years.—ED. *Grevillea*.]

ON THE SPERMATIA OF THE ASCOMYCETES.

By M. MAX. CORNU.

(Translated from "*Comptes Rendus de l'Académie des Sciences*,"
3rd April, 1876.)

The polymorphism of Fungi has hitherto been considered an indisputable fact; the magnificent works of M. Tulasne have established this upon such solid bases that no one has since been able to shake it. The splendid work which includes these researches, extending through several years, is the "*Selecta Fungorum Carpologia*."

We see here that the *Ascomycetes* possess four modes of reproduction; 1st, by the asci, containing spores, generally eight in number; 2nd, by the stylospores; 3rd, by the spermatia; 4th, by the conidia.

The spermatia have been regarded by M. Tulasne as fecundative corpuscles; their immense number, their small size, the presence of other spores which germinate with rapidity, the facility with which water dissolves the gum which unites them, and allows of their separation, the necessity of a fecundatory act, evident for the formation of the perithecia, have caused this hypothesis. That which supported this view was principally their refusal to germinate, under conditions where the three other sorts of spores were easily developed.

A work submitted, three years ago, to the judgment of the

Academy,* showed that this theory might be combatted by some solid reasons. M. Tulasne, likewise overthrew it, so to say, with his own hands, by showing the development of *Pyronema confluens* and other *Discomycètes*, a development due to the conjugation of two sorts of organs, the one male and the other female.

I have been able to obtain, in a very complete manner, in certain cases, the germination of the spermatia, hitherto considered devoid of the germinative faculty; in other cases, the considerable modification of these small bodies under the action of water and warmth united to that of the oxygen in the air, although these agents were reputed as without effect, showed that the spermatia are probably capable of producing a mycelium, like the other spores. At times, the action of pure water sufficed to make them vegetate; in other cases, and more often, it is necessary to add some nutritive element. In studying the *Carpologia* with care, it is easy to see that the author had already sometimes obtained this germination (*Dothidea melanops*, *Cenangium Ribis*, &c.) ; whence some terms are derived which represent it, called by the names of *microstylospores*, *microconidia* or spermatiform *stylospores*. In many genera, spermatiform stylospores exist among certain species, whilst among other allied species they are exclusively veritable spermatia; I am attacking myself in this last case, and I have been able (*Valsa ambiens*, *V. salicina*) to obtain a development of these small bodies which ought therefore to be considered as of the same order as the others. When the stylospores are not enclosed in cavities, their homologous form takes the name of *chlamydo*spores or *macroconidia*; the *microstylospores* are designated simply under the name of *conidia*. In support of what has been said above, one sees that the conidia are the representatives of the spermatia which would be free and not contained in a special cavity. If one studies with care the different forms of conidiferous or spermatiferous apparatus, one sees that they present a great number of forms which pass from one to the other in an insensible manner. The more important transitions are furnished by the genus *Hypomyces*, which leads from a form imitating the dendritic spermatiphores to the complicated form of the Mucedines (*Selenosporium* and *Fusisporium*): it suffices to study *H. ochraceus* and *H. rosellus* in order to be easily convinced. These conclusions will be demonstrated in detail, with figures, in a special Memoir which will soon be published. It is to the spermatiferous form that the conidia of *Verticillium*, *Acrostalugmus*, *Penicillium*, *Acremonium*, *Cylindrophora*, etc., apply; which are probably not all forms of *Ascomycetes*, as some have stated. It is also as spermatia that the conidia of *Nectria*, *Nummularia*, *Torrubia*, *Xylaria*, *Poronia*, etc., may be considered.

The germination of the spermatia permits the formation of two interesting conclusions: the first is relative to the old theory of fecundation, which ought now to be abandoned; the second is more

* "Comptes Rendus," 21 June, 1875, p. 1468.

important. It allows us, in fact, to adopt a considerable simplification of the study of the great group of *Ascomycetes*; it unites into one two reproductive forms, rather alike in appearance, but which, physiologically, would not be compared: they may be so now. These are two homologous forms, and a crowd of intermediary ones uniting them. That which distinguishes the *true* spermatia, is their smallness: they appear to have been caused by a reserve of nourishment, which the whole spore bears in general with it in order to provide for its first development in the humid air. They ought to fall upon an appropriate substratum, without which they would not develop. The conidia, on the contrary, easily germinate; but what unites them to the preceding, is their acrogenous production, their slight and simple envelope, the immense profusion with which they are produced, their rôle of dissemination, so evident among the mucedinous forms of the *Ascomycètes*, a dissemination which, as to the conidia, may be accomplished by the aid of the wind, as are the true spermatia by water and birds.

This simplification of the number of reproductive organs gives a great unity to the polymorphism of the *Ascomycetes*; it will be henceforth possible to compare the asexual forms with them. Useless for classification and the allying of genera and species (which was united hitherto, in general, uniquely by the opening or the disposition of the ascophorous conceptacles), the conidia or spermatia will give some valuable indications in certain cases; the morphological studies will furnish many data for the *Mucedines* which will cause them to be ranged among the *Ascomycetes*, and to quit their heterogenous group, which still contains too great a number of representatives. It was singular, in the hypothesis of a fecundative rôle, to see the spermatia wanting in many of the genera, and notably among the more numerous species, *Hypocrea*, *Xylaria*, *Torrubia*, etc.; the spermatia and the conidia are morphologically identical, these are two homologous forms having the same rôle, and scarcely differing from one another: these two terms ought to be held as synonyms.

With this explanation, the word *spermatia* can, and ought, to subsist in this part of the science which M. Tulasne has enriched with such remarkable discoveries.

[We think that had M. Cornu at once discarded the term "spermatia," when convinced that they had no fecundative function, his communication would have been more lucid. We cannot agree with him that the term should be retained with a *new* interpretation, which is only likely to create confusion. If *spermatia* do not possess the function usually attributed to spermatia it is better not to call them by that name.—ED. *Grevillea*.]

NEW BRITISH FUNGI.

(Continued from p. 114.)

The following enumeration will include the species recently published by Messrs. Berkeley and Broome:—

Agaricus (Armillaria) bulbiger. *A. & S. Fries Epic. p. 40.†*

Pileus fleshy, convex, then expanded, obtuse, even; stem stuffed, equal, marginate bulbous, pallid, fibrillose, ring oblique, fugacious, gills emarginate, pallid.—*Fries Icon. t. 26, f. 2. Klotsch, Flor. Bor., t. 373. Berk. & Br. Ann. N.H., No. 1501.*

In pine woods. Hereford. Oct.

Bulb very distinct. Pileus grey, rufescent, or pallid, at first fibrillose, then naked, soft.

Agaricus (Armillaria) robustus. *A. & S. Fries Epic., 41.*

Pileus fleshy, compact, convexo-plane, unequal, smooth, margin and stem solid, short, attenuated downwards, rooting, fibrillose above the ring, white below, gills emarginate, attached, whitish.—*Berk. & Br. Ann. No. 1502.*

In woods. Rannoch.

Flesh very firm. Taste and smell exactly that of *Polyporus squamosus*.

Agaricus (Tricholoma) loricatus. *Fries. Ep. p. 60.*

Cartilaginous, tough; pileus campanulate, then convex, somewhat undulated, rather inclined to be viscid when moist, subpapillose, cuticle distinct, horny, stem somewhat hollow, equal, rooting, striato-fibrillose; gills attenuated, then free, crowded, pallid.—*Fries Icon. t. 35, f. 2. Berk. & Br. Ann., N.H. No. 1503.*

In woods. Glamis.

Viscid. Remarkable for the thick coat of the pileus. Pileus 1-2 in. broad; stem 2-3 in. long. Odour nauseous.

Agaricus (Tricholoma) virgatus. *Fries Ep. p. 62. Icon. t. 34, f. 1.*

Rigid; pileus fleshy, convexo-plane, somewhat umbonate, very dry, becoming smooth, streaked with innate black lines and scales, margin at first naked; stem solid, stout, striate, smooth, white; gills emarginate, crowded, becoming greyish.—*Berk. & Br. Ann. N. H., No. 1504.*

In woods. Forres.

Solitary, large. Pileus cinereous.

Agaricus (Tricholoma) leucocephalus. *Fr. Ep. p. 71. Icon. t. 43., f. 2.*

Wholly white; pileus fleshy, thin, convex, then plane, even, moist, veil silky, evanescent, smooth, margin patent, naked; stem hollow, cartilaginous, tough, rooting, even, smooth; gills rounded behind, free, crowded.—*Berk. & Br. An. N. H., No. 1505.*

On the ground. Bowood. Oct.

Odour strong of fresh meal.

Agaricus (Tricholoma) militaris. *Lasch. Fr. Ep. p. 71.*

Pileus compact, flexuous, becoming smooth, viscid, cinnamon; margin even; stem solid, squamulose, fibrillose, pallid, rather bulbous at the base; gills emarginate, somewhat crowded, whitish, at length with lurid spots and lacerated.—*Berk. & Br. Ann., N. H., 1506.*

In woody places. Glamis.

Stem $4\frac{1}{2}$ in. long. Pileus 4-7 in. broad. Odour and taste unpleasant.

Agaricus (Tricholoma) civilis. *Fr. Ep. p. 71.*

Pileus fleshy, soft, convex, then plane, smooth, moist, ash-coloured, becoming pallid; cuticle separable; stem solid, soft, fragile, fibrillose or squamulose, whitish; gills deeply emarginate, crowded, white then yellowish, not spotted.—*Fries Icon. t. 42, f. 1. Berk. & Br. Ann., N. H., No. 1507.*

In pine woods. Epping. Oct.

Agaricus (Clitocybe) subalutaceus. *Batsch. Fr. Ep. p. 84.*

Yellowish, growing pallid; pileus fleshy, soft, convexo-plane or depressed, obtuse, unequal, smooth; stem stuffed, firm, elastic, naked; gills adnato-decurrent, broad, rather distant, becoming whiter. *Batsch, fig. 194.—Berk. & Br. Ann. N. H., No. 1509.*

Under *Ilex*. Oxtou. Exeter. Nov.

Smell like that of *A. putridus* and *A. rancidus*, peculiar.

Agaricus (Clitocybe) gilvus. *P. Fr. Ep. p. 95.*

Pileus fleshy, compact, convex, then depressed, obtuse, smooth, moist; stem fleshy, solid, stout, smooth, nearly equal; gills decurrent, very much crowded, thin, branched, and as well as the flesh pallid, then ochraceous.—*Fl. Dan. t. 1011. Berk. & Br. Ann. N. H., No. 1508.*

In pine woods. West Farleigh.

Pileus scarcely infundibuliform.

Agaricus (Clitocybe) splendens. *Fr. Ep. 96, p. Icon. t. 44, f. 1.*

Solitary. Pileus somewhat fleshy, flatly infundibuliform, smooth, shining, ash-coloured, becoming yellowish; stem solid, smooth, of the same colour; gills deeply decurrent, crowded, simple, white.—*Berk. & Br. Ann. N. H., No. 1510.*

In woods. Reading.

Agaricus (Clitocybe) expallens. *Fr. Ep. p. 100.*

Pileus between fleshy and membranaceous, flatly infundibuliform, even, smooth, becoming tawny, when dry clay-coloured, then whitish; margin scarcely expanded; stem stuffed, then hollow, equal, whitish, silky above; gills decurrent, rather distant, whitish grey.—*Berk. & Br. Ann. N. H. No. 1511.*

In woods. Glamis.

Smaller and paler than *Ag. cyathiformis*.

Agaricus (Clitocybe) concavus. *Scop. Fr. El. p. 102. Icon. t. 57, f. 2.*

Pileus submembranaceous, broadly and deeply umbilicate, even, flaccid, naked, hygrophanous, edge convexo-plane, undulated;

stem stuffed, equal, smooth, grey; gills decurrent, crowded, narrow, fuliginous.—*Berk. & Br. Ann. N.H., No. 1512.*

In pastures. Batheaston.

Pileus 1-2 in. long; stem 1-2 in. long, 1-2 lines thick, wholly soft, fibrous.

Agaricus (Collybia) rancidus. *Fr. Ep. p. 125.*

Strong scented. Pileus rather fleshy, convex, then plane, umbonate, even, tough, whitish, silky; stem fistulose, straight, rigid, rooting, smooth; gills free, crowded, narrow, cinereous.—*Fries Icon. t. 69, f. 1. Katchbr. t. 6, f. 4. Berk. & Br. Ann. N.H., No. 1513.*

Under cedars. Burnham Beeches. Nov.

The smell is very peculiar; the gills very dark so as to be easily mistaken for those of a *Hebeloma*.

Agaricus (Collybia) ventricosus. *Bull. t. 411, f. 1. Fr. Ep. p. 120.*

Pileus rather fleshy, campanulate-convex, umbonate, smooth; stem fistulose, even, naked, becoming rufescent, ventricose at the base, rooting; gills arcuate, affixed, ventricose, broad, rather crowded, undulated, rufescent.—*Berk. & Br. Ann. N.H., No. 1514.*

In woods. Bathford. Oct.

Agaricus (Omphalia) maurus. *Fr. Ep. p. 156.*

Pileus somewhat membranaceous, convex, deeply umbilicate, smooth, striate, hygrophaneous, even when dry, silky, shining; stem somewhat fistulose, thin, rigid, straight; gills truly decurrent, arcuate, very much crowded, white.—*Fries Icon. t. 73, f. 2. Berk. & Br. Ann. N.H., No. 1515.*

On lawns. Coed Coch.

Agaricus (Mycena) aurantio marginatus. *Fr. Ep. p. 131.*

Pileus rather fleshy, campanulate, expanded, subumbonate, even; stem even, smooth, ventricose, strigose; gills attenuated behind, adnexed, greenish pallid, edge fringed with orange flocci.—*Flor. Dan. t. 1292, f. 2. Berk. & Br. N.H., No. 1516.*

In pine woods. Perth. Nov.

Has a peculiar aspect, looking more like a *Marasmius* than a *Mycena*. Stem very brittle, fistulose; smell strong; margin striate.

Agaricus (Mycena) excisus. *Lasch. Fr. Icon. t. 81, f. 1.*

Pileus campanulate-convex; disc rather fleshy, subumbonate, rugulose; stem firm, tough, rooting, even, becoming tawny; gills ventricose, thick, distant, connected by veins, narrowed and incised behind, nearly free.—*Fries Epic. p. 138. Berk. & Br. N.H., No. 1517.*

On trunks or on the ground. Glamis.

Agaricus (Mycena) psammicola. *B. & Br. Ann. N.H., No. 1518.*

Pileus subhemispherical, hygrophaneous, sprinkled with minute particles; margin striate; stem short, solid, rooting, umber below, white above, wholly whitish-pulverulent; gills segmentoid, shortly adnate, sinuated behind; odour strong, but not nitrous.

On a sand bank, amongst moss. Addington. Sept.

Pileus 3 lines across, stem not 6 lines high, about $\frac{1}{2}$ a line thick, firm; pileus brown, becoming paler towards the margin. A small but well-marked species.—*B. & Br.*

Agaricus (*Mycena*) metatus. *Fr. Ep.* 142.

Soft, strong-smelling; pileus submembranaceous, obtuse, striate, hygrophanous, even when dry, opaque, whitish; stem firm, even smooth, fibrillose at the base; gills adnate, thin, distinct, linear, whitish.—*Paul t.* 99, *f.* 8. *Berk. & Br. Ann. N.H., No.* 1519.

Amongst moss. Forres. Oct.

Agaricus (*Mycena*) collariatus. *Fr. Ep. p.* 146. *Icon. t.* 82, *f.* 5.

Pileus membranaceous, campanulate-convex, subumbonate, striate, becoming pale, smooth; stem filiform, thin, smooth, shining; gills adnate, with a collar, thin, crowded, distinct, whitish, or pale flesh-coloured.—*Berk. & Br. Ann. N.H., No.* 1520.

Amongst grass. Glamis. Addington.

Pileus $\frac{1}{2}$ inch or more broad, tawny, or greyish.

Agaricus (*Mycena*) debilis. *Fr. Ep. p.* 145.

Tender. Pileus membranaceous, campanulate, convex, obtuse, striate, becoming even when dry, rugulose, brownish, opaque; stem filiform, capillary, lax, flaccid, fibrillose at the base; gills broadly adnate, distinct, whitish.—*Fries Icon. t.* 82, *f.* 4. *Bull.* 518, *f.* P. *Berk. & Br. Ann. N.H., No.* 1521.

In a chestnut wood. Wrotham. Oct.

Colour whitish, flesh-coloured, livid, or tawny.

Agaricus (*Pleurotus*) pulmonarius. *Fr. Ep. p.* 176.

Horizontal. Pileus fleshy, soft, rather convex, obovate, or reniform, smooth; stem lateral, straight, very short, villous; gills plano-decurrent, simple, whitish, becoming livid.—*Fries Icon. t.* 87, *f.* 2. *Berk. & Br. Ann. N.H., No.* 1522. *Paulet. t.* 21.

On trunks. Aberdeen.

Pileus from greyish to tan-colour.

CARPOLOGY OF PEZIZA.

[Plate LXIX.]

ALEURIA.

- Fig. 302. *Peziza dochmia*, *B. & C.*, ex. herb. M. J. B.
 „ 303. *P. euplecta*, *C.* (*P. phlebophora*, *B. & C.* var.) ex. herb., M. J. B.
 „ 304. *P. cœlopus*, *Mont.*, in herb. Paris.
 „ 305. *P. Valenzuelæ*, *B. & C.*, ex. herb. M. J. B.
 „ 306. *P. inæqualis*, *B. & C.*, ex. herb. M. J. B.
 „ 307. *P. catinus*, *Holms.*, in herb. Paris.
 „ 308. *P. micropus*, *P.*, ex. herb. M. J. B.
 „ 309. *P. rapulum*, *Bull.*, ex. herb. M. J. B.
 „ 310. *P. ciborium*, *Vahl.*, ex. *Fries* in herb. Berk.
 „ 311. *P. lechria*, *B. & Br.*, ex. herb. M. J. B.
 „ 312. *P. Valenzueliana*, *Mont.*, in herb. Paris.
 „ 313. *P. chrysopela*, *C.*, *Rav.*, No. 1492.
 „ 314. *P. nebulosa*, *C.*, *Rav.*, No. 812.

NOTE ON *PEZIZA CALYCINA*. SCHUM.

By DR. REHM.

Haec, ut videtur, optime nota et distincta species, tamen microscopice et chemice examinata iterum in duas species separanda est, extus sane simillimas.

a. Peziza calycina. (Schum.) Rehm.

Exs: Cooke, f. brit. I., 474. II. 369, A. B.

Sporidia elliptica, long. 0,015-18, lat. 0,005. Asci tenues. Apex ascorum ope solutionis aquosæ Iodii non coerulescit.

b. Peziza laricis. (Cooke.) Rehm.

Syn: *Peziza calycina* γ . *laricis*, Cooke Hdb. p. 685. *Exs*: Fuckel f. rhen. i. 206. Rehm ascomyc., 62. Thümen hb. myc. oec. 191 (sub. *P. Wilkomii* Hartig.) Cooke f. britt. II. 370.

Sporidia obtuso-elliptica, long. 0,016-18, lat. 0,006-7. Apex ascorum crassorum ope solutionis aquosæ Iodii coerulescit.

Crescit in ramis emortuis Pini Laricis eamque his arboribus valde nosci am fieri dicitur (cf. *Sorauer*. Pflanzenkrankheiten, p. 389.)

Quæ a Nylander in "*Pezizæ* Fen. p. 24," de *Peziza calycina* dicuntur, propter parvitatem sporarum cum una alterave specie supra notata non congruunt. Neque exemplaria nuper sub. "*P. calycina*" a cl. Ellis ex Amerika septentrionali communicata hanc speciem sistunt.

Sit—

Peziza Ellisiana. Rehm. nov. spec.

Apothecia sparsa, primitus hemisphærica, dein breviter stipitata atque dilatata, c. 1-2 mm lato, luteo-villosa, epithecio aurantiaco-concavinsculo. Sporæ fusiformes, utrinque acuminatæ, simplices, hyalinæ, long. 0,018, lat. 0,0025; biseriatae in ascis clavatis sessilibus, long. 0,045-60, lat. 0,006-7.

Paraphyses filiformes, ascos superantes, septatæ, c. 0,002 crass.

Pili perithecii dilute viridi-lutescentes, obtusi, simplices, scabri, c. 0,006 crass.

Apex ascorum Iodii ope coerulescit.

DR. MED. REHM.

Lohr a Main (Bayern).

OBSERVATIONS ON *PEZIZA CALYCINA*.

By M. C. COOKE.

The foregoing note by Dr. Rehm necessitates a few observations from us, *apropos* of the two species which he proposes to recognise, based on the variability of *Peziza calycina*.

It must be premised that extensive examinations have convinced

us that some species of *Peziza* are much more variable than others, such for instance as *Peziza scutellata* and *Peziza calycina*. This, however, should cause us hesitation in constructing or accepting new species based on such variability.

Dr. Rehm proposes *Peziza laricis*, on what we consider an untenable basis, for reasons which we will presently detail. The grounds on which Dr. Rehm's proposition rests, are apparently three, viz.:—

1. Size and form of sporidia.
2. Texture of the asci.
3. Reaction with tincture of iodine.

First.—As to the size and form of the sporidia. However much a difference in size and form of sporidia may be valued in the determination of the limits of species, it is clear that these differences must be constant, and confined to the forms separated. In the two species indicated by our correspondent he describes the sporidia thus—

P. calycina. Sporidia elliptic, $\cdot 015\text{--}018 \times \cdot 005$ m.m.

P. laricis. Sporidia obtuse-elliptic, $\cdot 016\text{--}018 \times \cdot 006\text{--}007$ m.m.

The differences, therefore, are simply that the sporidia in *P. laricis* are more obtuse, and broader than in *P. calycina*. If we accept the types of the two species which he gives, these will lead us to estimate the value of this distinction. These are—

P. calycina. Fungi Britt. i., 474, ii., 369, A. B.

P. laricis. Fekl. F. Rhen., 1206. Rehm Asc., 62. Thumen H. C. Myc., 191, Fungi Britt., ii., 370.

Attention must now be directed to our plate 66, containing figures of sporidia derived from these published specimens.

Fig. *a*, is from Fungi Britt., i., 474.

„ *d*, is from Fungi Britt., ii., 369 A.

„ *e*, is from Fungi Britt., ii., 369 B.

all of these are referred to *P. calycina*.

Fig. *b*, is from Fungi Britt., ii., 370.

We have no copy of Thumen's "Herb. Myc. Œcon.," hence have been unable to figure the sporidia in his No. 191.

In our specimens of Rehm's "Ascomyceten," the sporidia unfortunately are mostly granular, and unformed in the asci, being immature, so that we could obtain no figures of the mature sporidia, which appeared to be similar to those figured at *b*.

These figures are drawn by camera lucida from the sporidia, and represent, in all cases, such free sporidia as presented themselves at the same time on the field of the microscope. These drawings have been reproduced by photo-lithography, on the plate, so that it may fairly be presumed that they are accurate delineations of the objects themselves.

From these figures it is evident that, as to width of the sporidia, there is no distinctive feature of difference between fig. *b* and the

rest, nor in the obtusity of the extremities. The length of the sporidia are not taken into account in the characteristics of the proposed species.

We would contend that there is a much greater probability in favour of the form represented at fig. *c* being accepted as a distinct species than that at fig. *b*. The figure *c* is derived from the specimens mentioned in "Grevillea," iii., p. 121, as *P. calycina* var. *Trevelyani*. The division of the endochrome is a much more noteworthy feature in sporidia where nuclei are seldom observed, than difference in length or breadth, or obtusity of sporidia, when so great variability prevails.

The extreme variability in the length of the sporidia is remarkable in all forms of *Peziza calycina*. In fig. *a* we measured them respectively at $\cdot 014$, $\cdot 015$, $\cdot 02$, $\cdot 023$, $\cdot 025$, $\cdot 026$, $\cdot 028$. In fig. *b*, $\cdot 015$, $\cdot 016$, $\cdot 018$, $\cdot 022$, $\cdot 024$, $\cdot 026$, $\cdot 028$. In fig. *c*, $\cdot 018$, $\cdot 02$, $\cdot 022$, $\cdot 024$, $\cdot 028$, $\cdot 03$, $\cdot 032$. It may be remarked here, that in all instances only one cup from the specimen named is concerned in the figures represented, so that there can be no admixture of sporidia from other and more or less matured cups.

For further comparison we have also given the following additional figures:—

Fig. *f*, from specimen collected at Ken Wood, near London, in which the sporidia are uniformly smaller.

Fig. *g* is from another of the specimens published in "Fungi Britannici" (ii., 370), regarded by Dr. Rehm as *Peziza laricis*.

Fig. *h*, two of the most mature asci in the only developed cup to be found on our specimen of *Peziza calycina*, in Fuckel's "Fungi Rhenani," No. 1206.

Fig. *i*, is from specimen named *P. calycina*, received from the late Dr. Curtis, of S. Carolina (U.S.), and which seems to be *P. lachnoderma*, Berk.

It may be remarked here, that a great number of the specimens referred to *P. calycina*, in Herbaria, are *P. subtilissima*, Cooke ("Grevillea," iii., fig. 167), as for instance, specimens we have received from Dr. Geo. Winter (Leipzig), H. W. Ravenel (S. Carolina), Prof. Hazslinszky (Eperies), A. Jerdon (Scotland), Fries's "Scler. Suec.," No. 360, Mõngeot (in "Herb. Berk."), and *Peziza pulchella*, Grev., in "Herb. Edinensis." The *Peziza calycina*, of Nylander ("Obs.," p. 24) and of Karsten ("Myc. Fenn.," p. 154), is clearly the same species.

If it were admitted that the difference in width and obtusity of sporidia existed in the forms indicated by Dr. Rehm, to the extent alleged, we do not consider such difference to be of specific value in a species where so much variation, even beyond the limits which he assigns, is manifest.

Second.—The texture of the asci is noted. In

P. calycina. "Asci tenues."

P. laricis. "Apex ascorum crassorum."

We must state that we fail to recognize this difference in the specimens examined.

Third.—Reaction with tincture of iodine.

P. calycina—not becoming blue.

P. laricis—becoming blue.

Whether this be so or not in fresh specimens, and under peculiar circumstances, we do not care to enquire, but, we contend that the iodine test is not trustworthy. We have found by experience that the same specimen which becomes tinted blue by iodine when in a fresh state, if allowed to dry for some time, and is again moistened, affords no appreciable change; that all cups manifestly belonging to the same species, such as *P. coccinea*, of which there can be no doubt, do not behave themselves in the same manner under treatment by iodine. And that change of colour produced by iodine is not infallible evidence of difference in species, but merely of different conditions under which certain individuals may have been developed. That, in fact, the conditions which induce change of colour on the application of solution of iodine to the asci, are the result of what may be termed accidental circumstances, and are not absolutely characteristic of specific forms.

Our friend, Mr. Phillips, who was at one time an advocate for iodine tests, has, we believe, lost faith in them entirely, as affording reliable evidence of identity or difference of species. We know of no one in this country who is in the habit of examining a larger number of specimens of *Peziza* than ourselves and Mr. Phillips, amounting to some hundreds of specimens in the year. We have been constantly in the habit of availing ourselves of his services to check and verify our own observations on the minute differences of closely allied species, in preparation of the figures for "Mycographia," and yet he never appeals to the iodine test as any conclusive argument in favour of any of his views.

Under all these circumstances, and for these reasons, we have thought it desirable at once to state our objections to Dr. Rehm's proposal, and at the same time, incidentally, to indicate what we do not regard as safe bases for specific distinctions.*

Not having seen the species described as *P. Ellisiana*, we are unable to express an opinion, and it would be unfair to do so under these circumstances. The colour of the hairs of the cup, and their scabrous character, in addition to the features of the fructification, indicate specific differences, which do not come under the restrictions made with regard to the two other forms.

* Undoubtedly, if a case can be made out for the recognition of Dr. Rehm's species, and this be identical with *Peziza Willkomii* of Thumen, which Dr. Rehm admits, then Thumen's name has priority, and no new name can be received. There is no direct evidence that *Peziza Willkomii*, Hart., is different from Thumen's plant, with which the published figures of *Peziza calycina*, Willkom, will accord equally well as any other form of *P. calycina*.

THE CONIDIA OF FISTULINA.

By M. J. DE SEYNES.

[The work from which the following observations are translated appears to be too little known in this country, hence we have selected M. de Seynes's remarks on the conidia which he finds in *Fistulina hepatica*, as a means of introducing our readers to this valuable work.*]

One of the more curious points in the structure of *Fistulina hepatica* is the formation of the conidia, developed, like the spores of the Gasteromycetes, in the interior of the parenchym of the receptacle. I have previously had occasion to mention this fact, but I have since had the good fortune of following the advancement of the *Fistulina* from its very young state up to the complete development of the receptacle. I have had, therefore, much to determine, and certain details to modify on this subject. In the *Fistulinas* which have arrived at their complete development, one can determine a region which occupies the subjacent part of the superior surface of the pileus, and which, at the point which corresponds to the superior extremity of the pedicel, and which extends to a greater depth than the peripheric margin of the pileus. If one makes a cut following the axis of the pileus and of the pedicel, one can see that this region is enlarged both before and behind, the pedicel being supposed to represent the posterior part, which is in effect its natural position when one regards a *Fistulina* fixed to its support; and it reaches, in the part where it is the more developed, up to more than a centimeter in depth in the tissue of the receptacle. It is not prolonged up to the margin of the pileus, but terminates always at 1, 2, or 3 centimeters from this margin, and sometimes more; so that one never finds any conidia in the neighbourhood of the hymenophore tubes: the external margin of the pileus marks, in fact, the limit between the supero-lateral exterior region and the inferior or tubular region.

If one dries with care some receptacles of *Fistulina*, without breaking them before complete dessication, and then makes a cut which includes the pileus and the pedicel passing by the middle of both, one sees that the tissue is of a clear colour at the central part; whilst it is strongly coloured, if one makes the cut in the fresh state and dries it afterwards. The region in question is clearly distinguished by a reddish coloration, which marks the limits of the more intense production of the conidia; it is terminated at the superior part by a blackish band about half a millimeter in thickness, which exists all round the cut, except at the point where the hymenophore tubes are found. If one takes any particle whatever of this zone, and places it under the microscope,

* Recherches des Végétaux inférieurs. Pte. 1. Des *Fistulines*. Par J. de Seynes.

one sees that it contains an innumerable quantity of small, rounded, ovoid bodies, more or less elongated. On examining them singly, one sees that these small bodies are cells presenting a slightly accentuated envelope, tinted with a brick or salmon colour like the spores. It is difficult, by a casual glance, to recognise whether this envelope is simple or double; but, at the moment of germination, it is very slightly denuded of its lining, and the external membrane is broken and separated. The contents are composed of a rather large oily clot and often of a smaller one, and of a transparent liquid which separates them from the membranous envelope. These cells are reproductive organs, so as to give birth to some germinative filaments; I have on account of this given them the name of conidia, to which the only signification attributed by me is that of secondary organs of reproduction, whatever may be the rest of their form, structure, or evolution. The conidia of *F. hepatica* have a rather variable form, which is always approaching to an oval, more or less elongated, or to a truncate ovoid towards the more narrow extremity. Their dimensions is from .007 mm. to .009 mm. at their greatest diameter, and from .004 mm. to .006 mm. in the lesser breadth; more frequently are .008 mm. upon .004 mm. One finds also, but rarely, some conidia irregular, claviform, baculoid, straight or curved, presenting from .010 mm. up to .019 mm. of length.

The resemblance of the conidia with their mother cells, and of these with the cells of the receptacle, are easy to follow upon dried specimens; on studying them upon fresh specimens, of small size, young and not damaged, one may be easily convinced, at the first sight, that these small organs have no power at all to penetrate from the outside into the interior of the tissue of the *Fistulina*. The anatomic study which follows—that of individuals exclusively gemmiparous and that of the development of the receptacle which we shall make further on—will leave, I am convinced, no doubt on the mind of anyone.

The conidia, such as I have described, are disposed upon long or short cells, but narrow, fine, and with a granular protoplasm, which divides into short branches, at the extremity at which is found a conidium. The branches are often numerous, and thus form some rather elegant bouquets of conidia; at other times one conidium only detaches itself upon the passage of a cell, and appears almost sessile; it has still at times a short pedicel. Sometimes the conidiophore cells present some partitions at the level of the divisions in fertile branches, sometimes they do not. Sometimes the bouquet of conidia is elongated, and the conidiophore cell giving birth to some conidia, alternated upon two rows, takes the appearance of a rachis of grass. There have been noted a crowd of varieties, but it is difficult to decide if these differences of insertion of the conidia upon the conidiophore cell are, if I might say, congenital, or whether some of them are the result of the successive genesis of the conidia. The conidiophore cells belong to

the type described previously. Still they are sometimes of a stronger calibre, and do not distinguish themselves from the cells of all varieties of the second type, or narrow cells, but they never proceed from chromogenous cells, or from reservoirs with a proper juice. One sees that they proceed more often from narrow cells, but more rarely still from cells more narrow than themselves; often they take birth from cells of the tremelloid tissue. I have not contented myself by having proved the connection of the conidiophore cells with the filamentous cells of the receptacle; in the belief that these ought not yet to be accused of belonging to a foreign mycelium, I have tried to find the point where the narrow filamentous cell bearing a conidiophore cell was the same at all as a cell of great calibre. This search has often succeeded, above all in the points where the narrow conidiferous zone was found to be allied with the more profound system of the great cells—in the pedicel, for example, a little beneath its summit.

One can prove from the figures given, and I have many other similar designs taken at different points, that there is a complete continuity between the cells of great calibre of the receptacle, and those with a narrow calibre, bearing some conidiophore cells. In reality, one might say that the difficulty is not in recognising these connections so distinct, but rather to find any part in the tissue in its normal state and its depth, a fragment of foreign mycelium. I cannot help believing that in insisting upon the differences that there are between the conidiophore cells and cells of the tissue of the *Fistulina*, M. de Bary has encountered some conidia carried, as frequently happens, upon the cells of the tremelloid tissue, which, while presenting frequent modifications which ally them with the cells of the other types, still differ rather notably, and may lead one into error, if one does not know the relations of these cells with the other cells of the receptacle.

In order to give birth to conidia, the mother cell, or conidiophore cell, divides, as I have said, and each division swells at its extremity. This swelling increases, and, in the interior, appears an oily clot bigger than the granulations of the protoplasm which fills the rest of the mother cell; at other times, at the under part, appears one or more clots of similar dimensions, which deviate from the centre of the conidia which form themselves successively at the underside of the first. The clot, like the central nucleole of the spore of the *Peziza*, is enclosed in a hyaline liquid containing fine granulations. This peripheric portion of the protoplasm without doubt serves to form the internal membrane of the conidia, the development of which is only sensible by the aspect of its contour, being more acute than in that of the primitive cul-de-sac of the mother cell, and by the formation of a partition at the point where the conidium is separated from the mother cell; at this moment the conidium only contains one refringent nucleole, at other times two, and a hyaline liquid all round. Sometimes, but exceptionally, it becomes granular a little before germination. In seizing all these

periods of formation, one may presume upon the endogenous formation of the conidium, although the immediate soldering of its envelope with the membrane of the mother cell, checks the belief in a direct manner. This genesis is almost as clear as that of the chlamydo-spores of *Mucor*; only it is terminated, in place of operating upon the passage of a filament; it is sometimes so in the chlamydo-spores, and if one only had observed this last variety, I cannot say if one should have admitted without contest their endogenous formation. Nevertheless, I still leave here a point of interrogation, and I cannot give to the conidia of *Fistulinas* the name of chlamydo-spores; I have shown elsewhere that the spores called acrogenous have in reality an endosporic development, they also ought to be called chlamydo-spores. One has sometimes called them conidia, notably among the *Aspergillus*, when one has discovered among them another mode of reproduction of the theca-sporic form. One sees the confusion created by this application of different names to the same bodies; thus we prefer to see the ancient denominations prevail, and the chlamydo-spores of the *Mucor*, for example, called intra-mycelian conidia, until the time when one can make a rigorous classification of these different terms.

Perhaps, if we desired more exactly to characterise the conidia of the *Fistulinas*, their totally new angiocarpous development, the analogy of the mother cell and the basidia, of the conidia and the spore would lead to calling them *pseudospores*; but it appears to us that a denomination besides, which can flatter the *amour-propre* of the inventor, far from conveying precision and clearness, only causes a greater confusion in a subject already sufficiently embroiled, in completely losing sight of the general likeness of similar organs in different plants. This is my motive in preserving to the *Fistulinas* the name of conidia; which does not at all interfere in the exposition of the development, with the entirely special characters which they may present.

When the conidium is formed, it detaches itself from the conidiophore cell, which is very attenuated at the point which supports it, and it forms on the under side another conidium in the same manner, destined to detach itself in its turn; sometimes also the second is formed before the first is detached, and it is often then deformed; this second conidium having both its extremities truncated, has moreover the form of a tipcat, or is slightly elbowed, if it is developed at a point near the bifurcation of the conidiophore cell. In any case, this basipetal development continues, may amend, one understands, little by little, the destruction of the conidiophore cell, which does not elongate in a measure as it gives birth to some new reproductive bodies, as is the case in *Penicillium*. Thus two consequences. On one part, the case in which we see only one conidium, carried upon a short pedicel, emerge from the cell of the parenchyma might really be the result of the successive reduction of the conidiophore cell; nevertheless, as I

have observed among the *Fistulinas*, I do not believe that this is always the case. Secondly, in old examples, I have encountered some gaps, in which all the conidiophore cells have been employed in the fabrication of the conidia, and one only finds it upon the borders of the conidia attached to their mother cells.

Such a phenomenon might lead one to believe in the destruction of the tissue of the fungus by a foreign parasite; but, when one has gathered individuals in which the conidial development has had less intensity, or is less advanced, on the contrary it is seen upon a cut, either by the naked eye, or with a lens, the perfect homogeneity of the tissue of the receptacle, to comprise the conidial zone, of which one only sees another transition of slight degradations of tints. This exterior homogeneity is hardly the case, it may be granted, of the tissues invaded by a foreign parasite.

In the great number of examples that I have hitherto examined I have not encountered one that did not present the conidia here described. Not only for more than ten years have I examined it every year in different parts of France, but I have examined it in the herbaria, notably in the Collection Desmazières (2nd ser.), mounted in 1855; another of Maille dated 1825. I have searched in different countries; and although the *Fistulina hepatica* is neither rare in England nor in America, I have never been able to procure it in these countries. I have been in Germany. I have examined an example in the Montagne Herbarium, coming from Sikkim, in the Himalayas; this example is abundantly provided with conidia of similar form, having the same similarity of position as those which the *Fistulinas* of France have offered me.

The germination of the conidia is difficult to obtain, and it is only after some fruitless attempts that I have been able to see them germinate; this result has been arrived at by conidia which were more than four years old. I have uselessly attempted some substratum more allied to the natural state, like the infusions of chestnut wood and different other liquid combinations. It is simply water very slightly sweetened that suffices for it. Some conidia, placed in this vehicle between two glasses on the 26th April, 1870, showed me the successive phases of their germination in the latter days of May and the first days of June of the same year; some days after, some foreign mycelia were insinuated by the borders of my small apparatus, and, having penetrated to the interior, caused me to stop my observations. This is what I observed in the interval; after an absolute repose of about a month longer for a certain number of conidia which had not yet germinated on the 3rd June, the internal membrane swelled out, burst the external envelope, freeing itself from its débris by the considerable increase of its size; it then becomes regularly spherical and presents a diameter of $\cdot 006$ mm. to $\cdot 009$ mm. The oily clots, one or two, which existed in the conidee before the opening of the external membrane, are always visible, and do not appear to

have augmented; when there are two, one of them is always smaller than the other. The rest of the protoplasm is hyaline or very finely granulated; then the entire protoplasm presents a mass of greasy granulations smaller than the primitive clots which have disappeared, and the conidium gives birth to a germinative filament, more rarely at the opposed poles. Often it appears that it gives birth to a secondary conidium, the budding produced by it swells, and is slightly constricted at the point where it emerged from the mother conidium, but before it detaches itself, the spherical budding gives birth to the germinative filament. I cannot follow its length beyond $\cdot 120$ mm. At this moment, it has only once presented to me a partition; the protoplasm which fills it is granular, but does not appear very rich, which may be perhaps attributed to the artificial medium in which the conidia germinated; its medium diameter is $\cdot 003$ mm.

[The excellent plates which accompany this work are almost necessary to understand the text; this also depends very much on the context for complete lucidity. The whole work will amply repay a careful perusal.]

SOME NEW JERSEY FUNGI.

By M. C. COOKE and J. B. ELLIS.

(Plate 68.)

2297. **Hypoxyton serpens.** *Fries.*—On *Acer rubrum*, Newfield, New Jersey, as also the following are all from the same locality.

2298. **Hysterium Mori.** *Schwz.*—On wood of *Morus*. Apparently the species of Schweinitz.

2299. **Hysterium Viticolum.** *C. & P.*—On *Rubus*. This appears to be the same species as that found in New York on *Vitis* (fig. 9).

2300. **Peziza virginella.** *C.* (No. 2152).—On leaves of *Vaccinium*.

2301. **Patellaria atrata.** *Fr.*—Fruit not mature. On oak limbs.

2302. **Sporidesmium Peziza.** *C. & E.*—On decorticated oak.

Cupulæformis, flavo-viridis, margine atris. Sporis ovatis, oblongis, vel pyriformibus, atro-brunneis. (Fig. 5—*a*, natural size; *b*, section; *c*, spores.)

Resembling a minute *Peziza*, scarce 1 m.m. broad, greenish-yellow and barren in the centre, with a black margin of ovate, oblong, or pear-shaped, multicellular spores, on short articulated pedicels.

In company with the above was the following singular and interesting fungus, which clearly belongs to the Discomycetes, and is referred, with some hesitation, to the genus *Hæmatomyces* :—

Hæmatomyces vinosus. *C. & E.*—On decorticated oak.

Sparsus, subglobosus, demum depressus, sinuato-gyrosus, subcerebrinus, immarginatus, atro-vinosus; ascis late clavatis; sporidiis biseriatis, elongato-ellipticis, multiseptatis, muriformibus, fuscis. (Fig. 10—*a*, individual magnified; *b*, section; *c*, asci and sporidia.)

Not more than a line broad; when dry resembling a rugose *Patellaria*, when moist sub-tremelloid, globoso-depressed, marked with gyrose furrows, dark-vinous. Asci broadly clavate; sporidia elongated-elliptic, biseriate, multiseptate, and muriform, brown ($\cdot045\text{-}\cdot05 \times \cdot018$ m.m.)

2304. **Diplodia longispora.** *C. & E.*—In company with an immature *Sphæria* on decorticated oak (*Quercus coccinea*).

Sub-gregaria, semi-immersa, atra; sporis elongatis, uniseptatis, brunneis.

Perithecia rather small, and semi-immersed; spores unusually long and narrow ($\cdot03\text{-}\cdot035 \times \cdot007$ m.m.)—fig. 7.

2305. **Sphæria botryosa.** *Fries.*—On oak wood.

2306. **Aspergillus maximus.** *Link.*—On dead twigs, running for several inches, and forming a dense brown woolly stratum.

2307. **Excipula hispidula** (*Peziza hispidula*, Schrad.)—On wood of *Morus*.

2308. **Sphæria (Immersæ) pachyascus.** *C. & E.*—On decorticated oak.

Immersa, sparsa; peritheciis minutis, subglobosis, nigris, ostiolo brevi; ascis late clavatis; sporidiis congestis, subfusiformibus, 5-7 septatis, constrictis, rectis vel curvulis, brunneis (fig. 1).

Immersed in the wood, with the punctiform ostiola alone visible; asci broadly clavate; sporidia fusiform, 5-7 septate, straight, or curved, brown ($\cdot04\text{-}\cdot045 \times \cdot008$ m.m.)

2309. **Hendersonia sarmentorum**, var. **Rubi.** *West.*—On *Rubus*.

2311. **Diatrype Duriei.** *Mont.*—On maple twigs. Differing from Thumen's *Myc. Un. No. 275*, which is not the species of Montagne or Berkeley and Curtis (fig. 8).

2312. **Diatrype Duriei.** *Mont.*—On *Nyssa*.

2313. **Sphæria melanotes.** *B. & Br.*—On oak wood.

2314. **Eutypa lata.** *Tul.*—In bad condition. On oak.

2315. **Peziza (Patellea) macrospora.** *Fckl.*—On oak chips.

2316. **Lophiostoma microstoma.** *C. & E.*—On maple wood.

Immersa, sparsa. Peritheciis minimis, ostiolo brevi, compresso, minutis; ascis clavatis; sporidiis lanceolatis, 7-septatis, vix centro constrictis, brunneis.

Ostiola small, with a short compressed mouth; sporidia lanceolate, brown, scarcely constricted in the middle, paler towards each end, central cells broadest diminishing towards the poles ($\cdot 04\text{--}\cdot 05 \times \cdot 01$ m.m.), fig. 2.

2317. **Agyrium rufum.** Pers.—On decorticated maple.

2318. **Phoma consorta.** C. & E.—On decorticated maple.

Cæspitosa, atra. Peritheciis superficialibus globosis; sporis linearibus, truncatis, nucleatis (fig. 6).

Forming small tufts of 3-4 perithecia, which are small, black, smooth, and shining. Spores linear, truncate, with a nucleus at each end, and sometimes one in the centre ($\cdot 014$ m.m. long).

Figures are also given on the same plate of two species of *Lophiostoma*, found in the United States.

Fig. 3.—*Lophiostoma turrita*, C. & P.

Fig. 4.—*Lophiostoma magnata*, C. & P.

NEW BRITISH LICHENS.

By THE REV. J. M. CROMBIE, F.L.S.

Since my last notice in "Grevillea," Vol. iii., pp. 190-1, the following new species, recently detected in Britain, have been recorded by Nylander in the "Flora" for 1875:—

1. **Calicium elassosporum.** Nyl.—Subsimilar to *C. brunneolum* (more robust), but with smaller spores and gonidia. Thallus glaucescent or glaucous-green; gonidia conglomerated in deformed syngonidia; spores globose, $\cdot 0,0025$ m.m. in diameter.

On putrid trunks of decorticated alder. Glen Lockay, Perthshire (Crombie, August, 1875).

2. **Ramalina Curnowii.** Cromb. in litt.—Thallus pale-glaucous, slender, fruticulose, rounded or somewhat compressed (but with some of the laciniae broader and planer), sparingly branched and intricate, subrigid; apothecia pale, convex, geniculato-adnate; spores ellipsoid, straight, $\cdot 0,011\text{--}15$ m.m. long, $\cdot 0,004\text{--}6$ m.m. thick.

Thallus K \times yellowish, blackish at the base; spermogones externally black, with spermatia $\cdot 0,003$ m.m. long, $\cdot 0,001$ m.m. thick. It is, perhaps, nearest to *R. cuspidata*, though from the spermogones it would belong to the section of *R. carpathica*.

On maritime rocks, near Penzance and the Lizard, Cornwall (W. Curnow).

3. **Flacodium dissidens.** Nyl.—Perhaps a subspecies of *Pl. murorum*, to which it is sufficiently similar, but the laciniae are more discrete and subfree. From *Pl. elegans* it differs in the vitelline colour of the thallus and the planer laciniae; spores $\cdot 0,009\text{--}16$ m.m. long, $\cdot 0,005\text{--}7$ m.m. thick.

On the slate roof of houses, near Cirencester, Gloucestershire (W. Joshua).

4. *Lecanora jejuna*. *Nyl.*—Thallus greyish or leaden-greyish, thin, subsmooth, at length rimose; hypothallus black, everywhere visible; apothecia testaceo-reddish, small, slightly prominent, the thalline margin thin, at length excluded; spores 8 næ, colourless, ellipsoid, 1-septate, $\cdot 0,018-23$ m.m. long, $\cdot 0,007-9$ m.m. thick; paraphyses slender, epithecium yellow; hymenial gelatine bluish, and then violet with iodine.

In the general appearance of the thallus, this species approaches to *Lecanora gibbosa* or *L. lavata*, in that of the apothecia to *Lecidea coarctata*; but in reality it belongs to the section of *Lecanora disparata*. This is shown by the spermogones, which have shortly-articulated sterigmata, with the spermatia ellipsoideo-oblong, $\cdot 0,002$ m.m. long, scarcely $\cdot 0,001$ m.m. thick.

On siliceous rocks. Boulay Bay, Jersey (Larbalestier).

5. *Opegrapha areniseda*. *Nyl.*—Thallus scarcely any or obsolete; apothecia black, linear, subgyrosely conglomerated in pulvinate, deformed acervuli; epithecium narrow; spores colourless, fusiform, 3-5 septate, $\cdot 0,014-16$ m.m. long, $\cdot 0,004$ m.m. thick; hypothecium black; hymenial gelatine, reddish wine-coloured, with iodine; spermogones congested in small black glomeruli; spermatia straight, $\cdot 0,0035-0,0045$ m.m. long, $\cdot 0,0010$ m.m. thick.

On sandy soil. St. John's, Jersey (Larbalestier).

NOTE ON "GILLET'S CHAMPIGNONS."

By PROF. FRIES.

Cel. C. GILLETII opus *Champignons qui croissent en France*, cujus partem priorem (p. 1-272) nuper recepinus, vastum evadere videtur et plure continet species, quam pollicetur. Nam præter species ab Auctore in Normandia tectus et plene descriptus, receptæ sunt fere omnes in Epicr. 1 descriptæ. Editio vero altera Epicriseos Auctori ignota videtur, quare nonnullæ species l.c. descriptæ sub novis nominibus in Gilletii opere insertæ. Sic e depictis.

Amanita murina = *Am. urceolata*, Ep. 2.

Lepiota Brebissoni = *Agar. serenus*, Ep. 2.

„ *Morieri* = *A. sistratus*, Ep. 1.

Tricholoma saevum ex habitu, var. *Agarico personati*.

Trichol. imbricatum melius refert, *Agaricum furvum*.

Clitocybe insignis, optime sistit, *Agaricum Veneris*.

Lepista Alexandri = *Paxillus Alexandri*, Ep. 2.

Lactarius torminosus ad *Agaricum Cilicioidem* propius accedit.

Prima pars continet tertiam partem Agaricorum et 50 tabulas, in quibus plures nobiles species bene pictæ. *Lepiota mastoidea* vix mea. *Lepiota granulosa* formæ graciliores, quam vidi.

E. FRIES.

LECANORA ANGULOSA.

On perusing my notes on *Lecanora angulosa*, in "Grevillea" (p. 128), I observe that a strange mistake has been committed, which I can only account for having been overlooked, when I had the proof, by my serious attack of bronchitis and lumbago, which confined me to my bed all February. The mistake is this: the chemical reagent used was not hydrate of potash (K), but *hypochlorate of lime* (C). There is another error; the date of Mr. Roper's sending should be *November*, 1875.

W. A. LEIGHTON.

 TRIBLIDIUM.

(Plate 67.)

The illustrations of the fruit of one species of *Ostreichnion* and nine species of *Triblidium* are given to the same scale as the figures in "Carpology of Peziza," and may be measured by the same means:—

1. **Ostreichnion Americanum.** *Duby*—from Ravenel. No. 1456.
2. **Triblidium caliciiforme.** *Reb.*—Rabh. *Fungi Eur.*, 231.
3. **Triblidium hysterinum.** *Duf.* (*Hyst. elevatum*, Pers.)—Moug. & Nest., 1070.
4. **Triblidium insculptum.** *Cooke.*—J. B. Ellis. No. 2111.
5. **Triblidium rufulum.** *Spr.* (*Trib. confluens*, DeNot. *Hyst. rufulum*, Fries).—Ravenel.
6. **Triblidium hiascens** (*Hyst. hiascens*, B. & C.)—ex. W. R. Gerard.
7. **Triblidium Carestiaë.** *C. C.* (*Blitridium Carestiaë*).—Erb. Critt. Ital. ii. 92.
8. **Triblidium pinicolum** (*Hysterium pinicolum*, Rehent.)—Rehm. *Ascomy.* No. 24.
9. **Triblidium minor.** *Cooke.*—ex. herb. J. B. Ellis.
10. **Triblidium Syringæ** (*Hysterium Syringæ*, Schwz. *Triblidium dealbatum*, Gerard).—ex. herb. W. R. Gerard.

M. C. COOKE.

 PERONOSPORA INFESTANS.

(RESTING SPORES.)

During the past winter a warm controversy has been carried on, relative to the resting spores of the Potato Disease. Many years ago, it will be remembered, that Mons. Montagne discovered certain spherical bodies in association with the Potato fungus, which he did not fully comprehend, and to these he gave the name of *Artotrogus*. Afterwards the Rev. M. J. Berkeley expressed

the opinion that these might ultimately be found to be the resting spores of the Potato *Peronospora*. Last year Mr. Worthington Smith detailed his examinations of diseased potato leaves from Chiswick, in which he found spherical bodies precisely like those described and figured by Montagne, associated with, and, as he believed, continuous with the mycelium of *Peronospora*. Other bodies were found, having apparently the function of antheridia, and these he saw applied to the surface of the globose bodies. Under these circumstances Mr. Smith considered himself justified in regarding the globose bodies not only as the *Artotrogus* of Montagne, but also as the resting spores of *Peronospora*.

Subsequently Dr. de Bary investigated the same subject, at the instigation of the Royal Agricultural Society, and published his conclusions, that the mould (*Peronospora*) possessed distinct features as regards successive production of conidia so as to merit distinction as a new genus under the name of *Phytophthora*. That the globose bodies in question did not belong to this mould, but were a species of *Pythium*, which he named *Pythium vexans*, and, that the resting spores of the potato disease had not been discovered. Here, then, he joined issue with Mr. Smith, and probably the succeeding controversy would not have brought us nearer the truth had it not been associated with new and searching examinations, which now promise to set the matter finally at rest. We cannot enter upon the details of this discussion here, but we may indicate how far the missing link is being supplied. The "resting spores" of Mr. Smith have been placed under favourable conditions, and at once produced zoospores. This, however, was insufficient evidence, for *Pythium* likewise develops zoospores under similar conditions. Nevertheless, the experiments have been carried further, the zoospores have germinated, and the mode of growth, and branching of the threads, seem to be not those of a *Pythium*, but of a *Peronospora*. It may be that whilst these pages are passing through the press the evidence has been completed by the production of veritable conidia of *Peronospora* on the threads developed from zoospores of the globose bodies called "resting spores" by Mr. Smith. The presumption is now strongly in favour of Mr. W. Smith's view being indisputably established, and the controversy set at rest.

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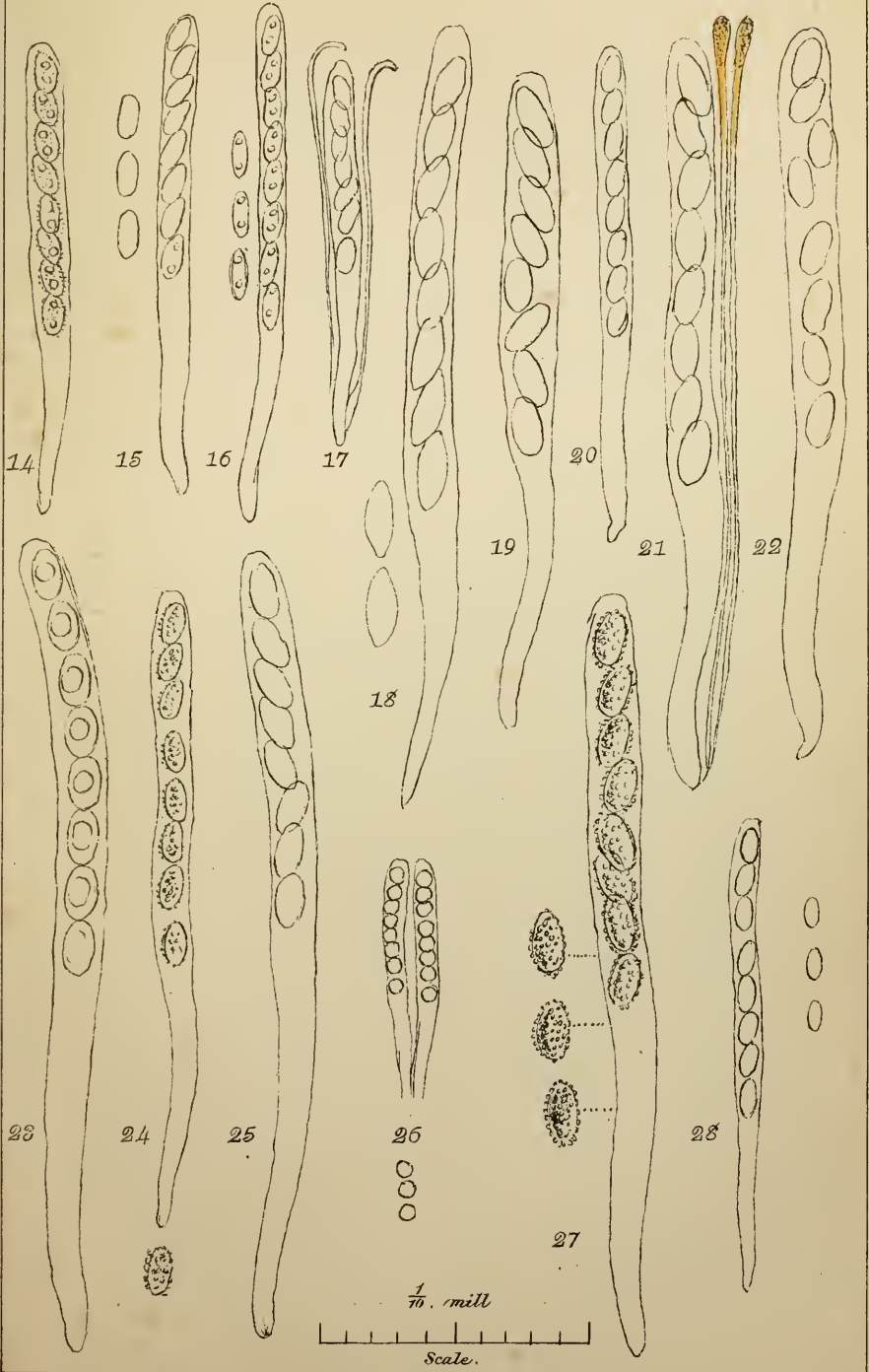
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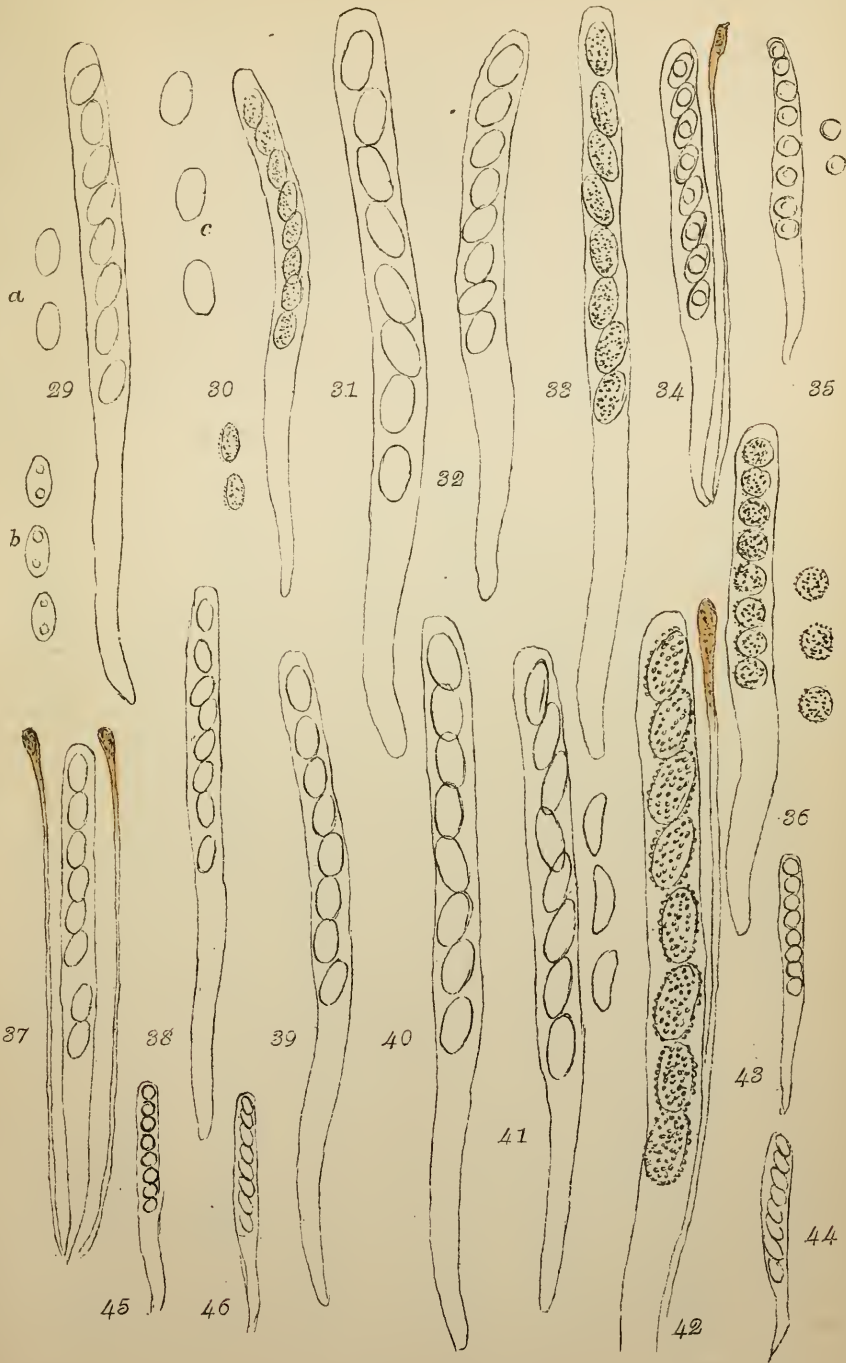
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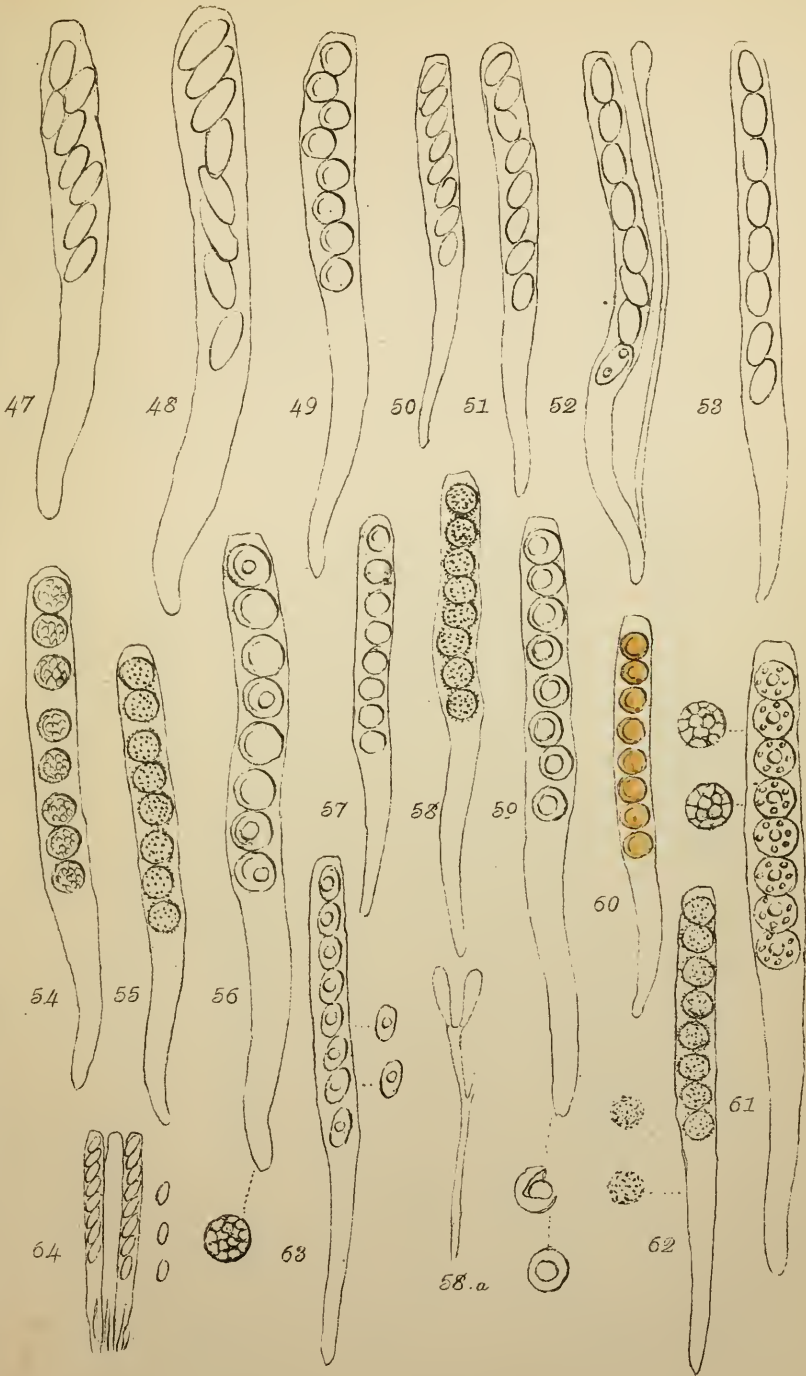
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 ,, "Sulle *Erysiphe graminis* e sulla *Septoria tritici*, funghi parassiti, infesti alle piante del granno," in "Rendiconti del R. Inst. Lombardo," ii., t. viii.



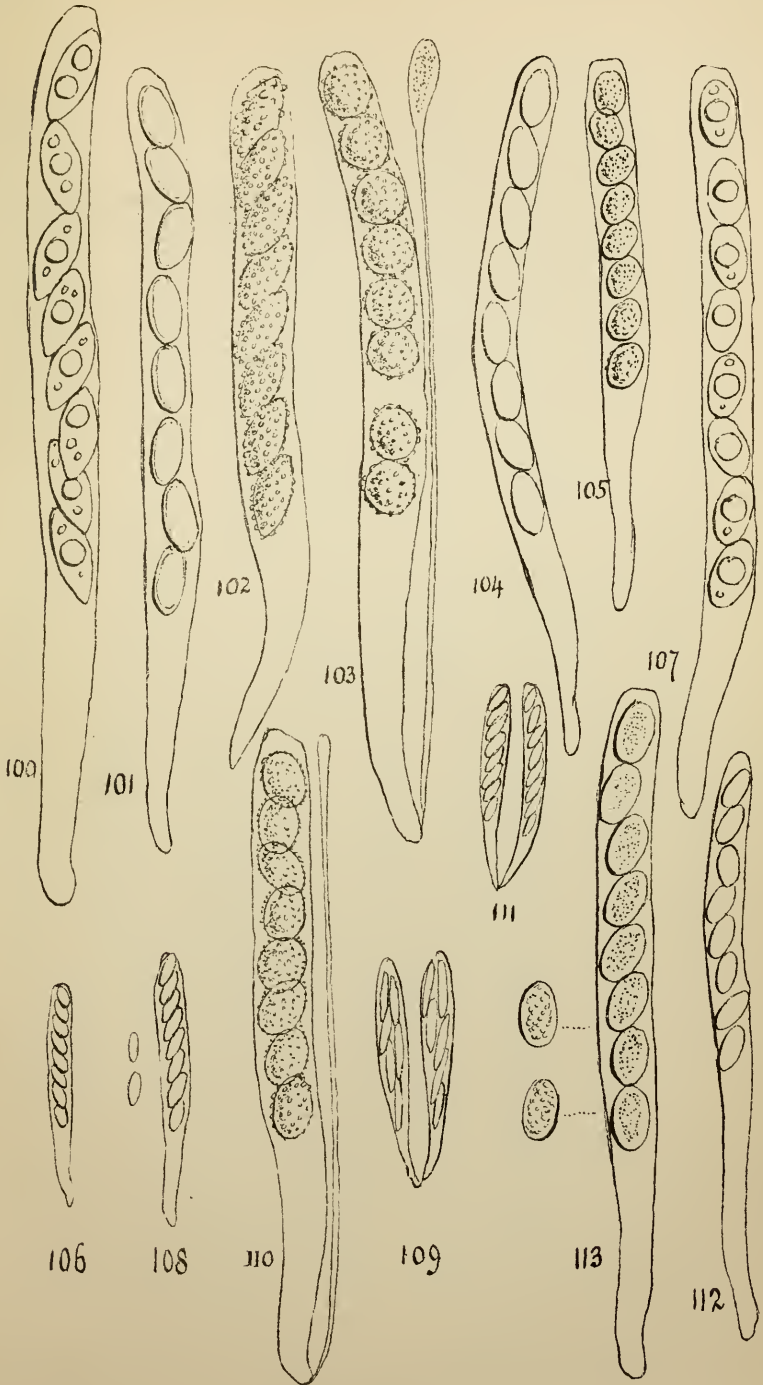




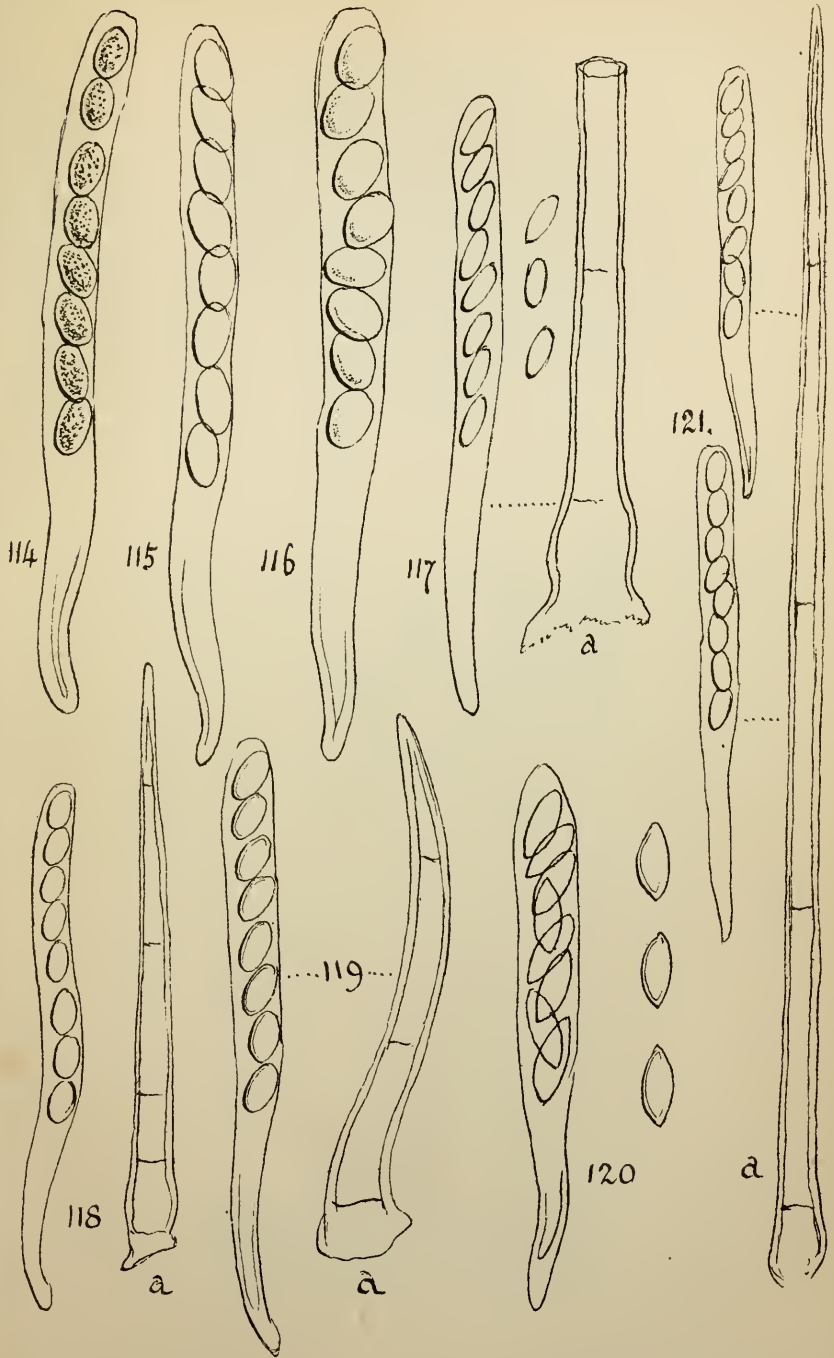








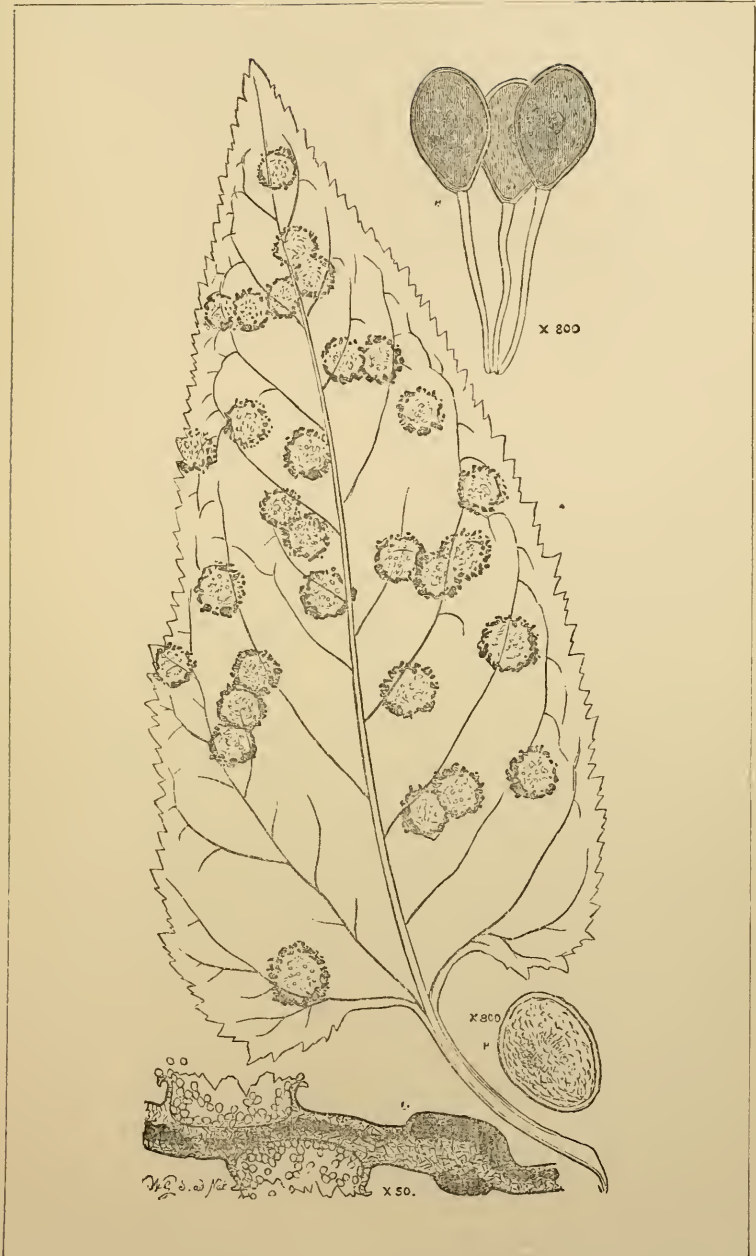






Puccinia malvacearum. Corda.

- a. Leaf with parasite natural size.
- b. Portion of leaf with hairs and Puccinia X 300.



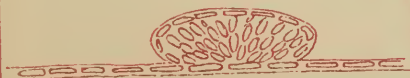
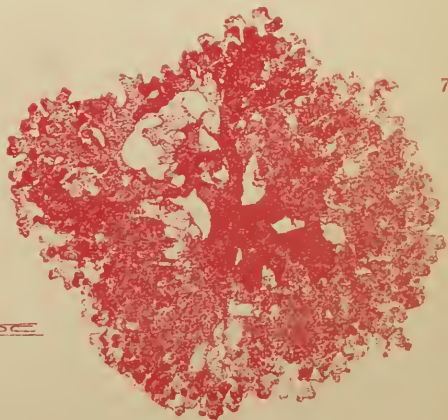
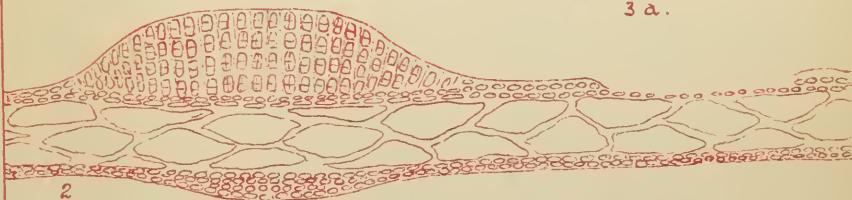
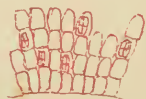
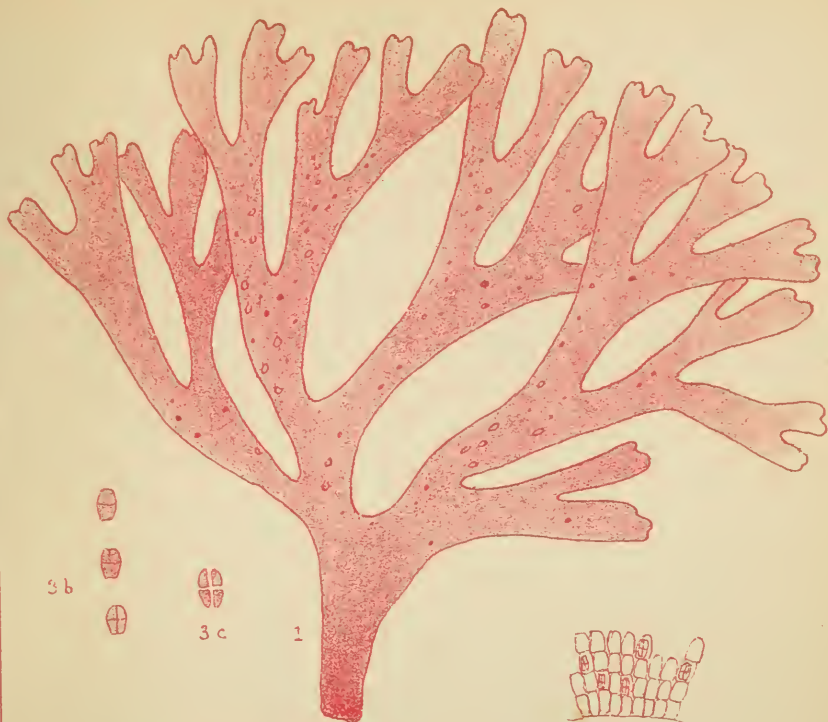
ÆCIDIIUM SCROPHULARIÆ. D.C.

in company with

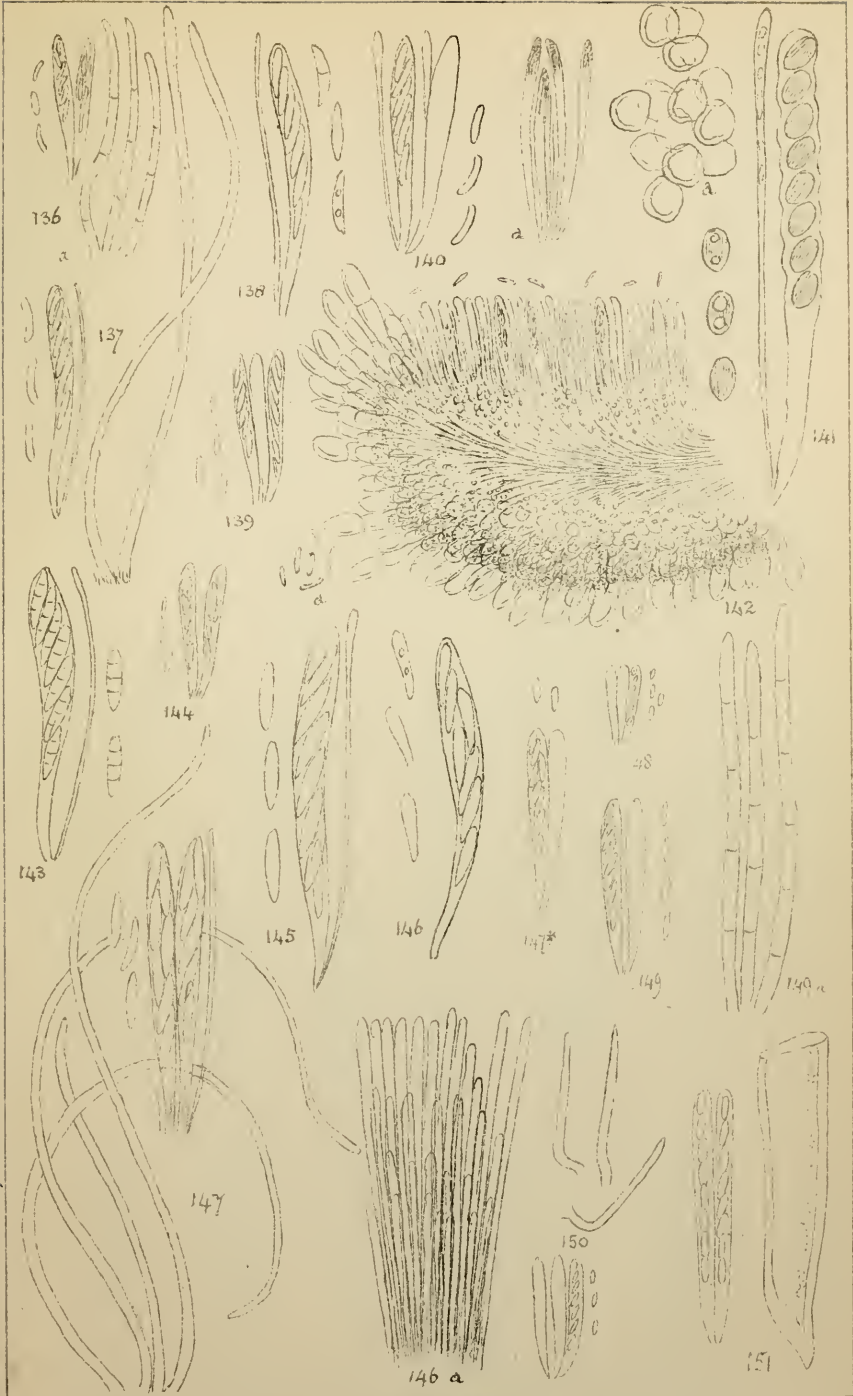
UROMYCES CONCOMITANS. Berk.

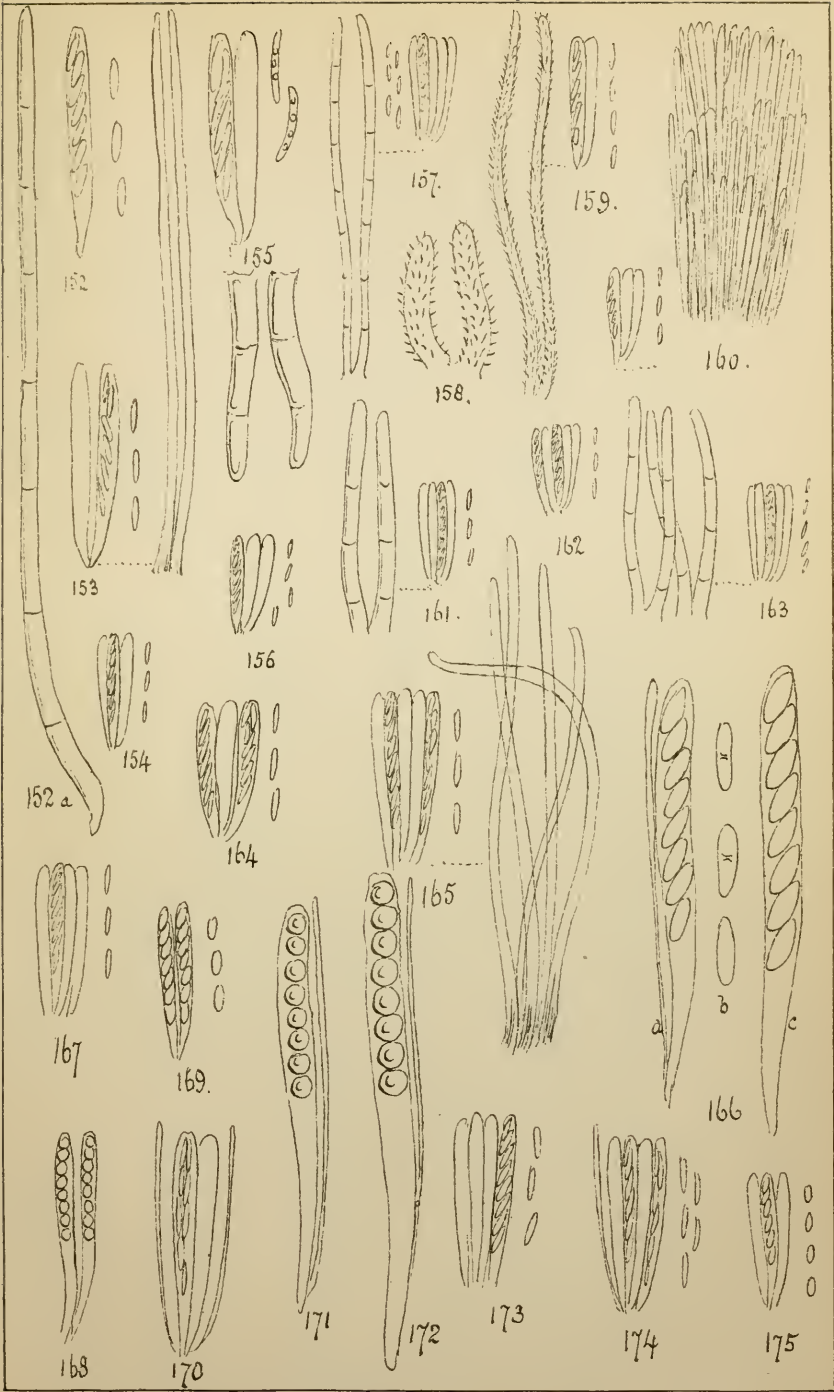
D. Section of leaf $\times 50$. F. Spore of *Æcidium* $\times 300$.

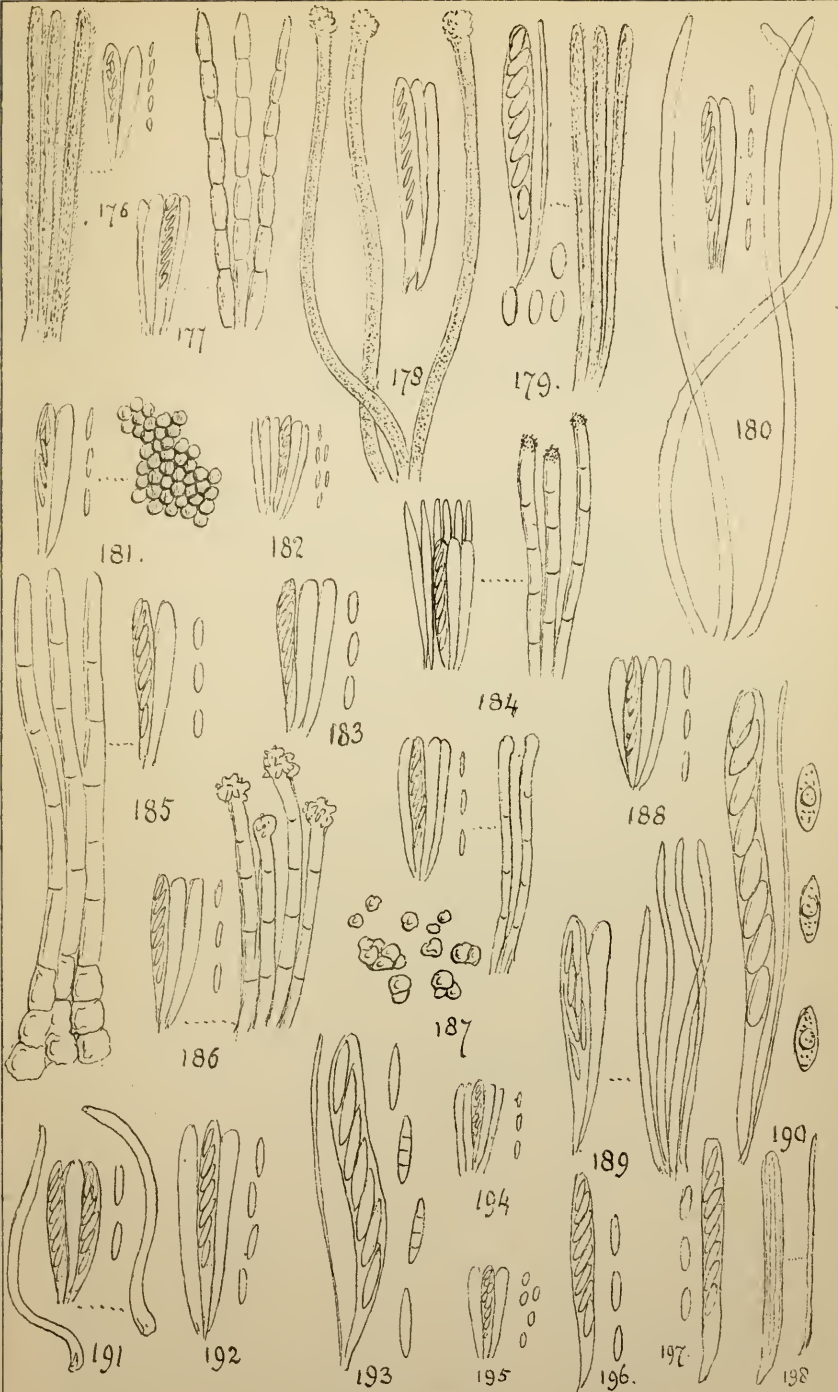
H. Spores of *Uromyces* $\times 300$.

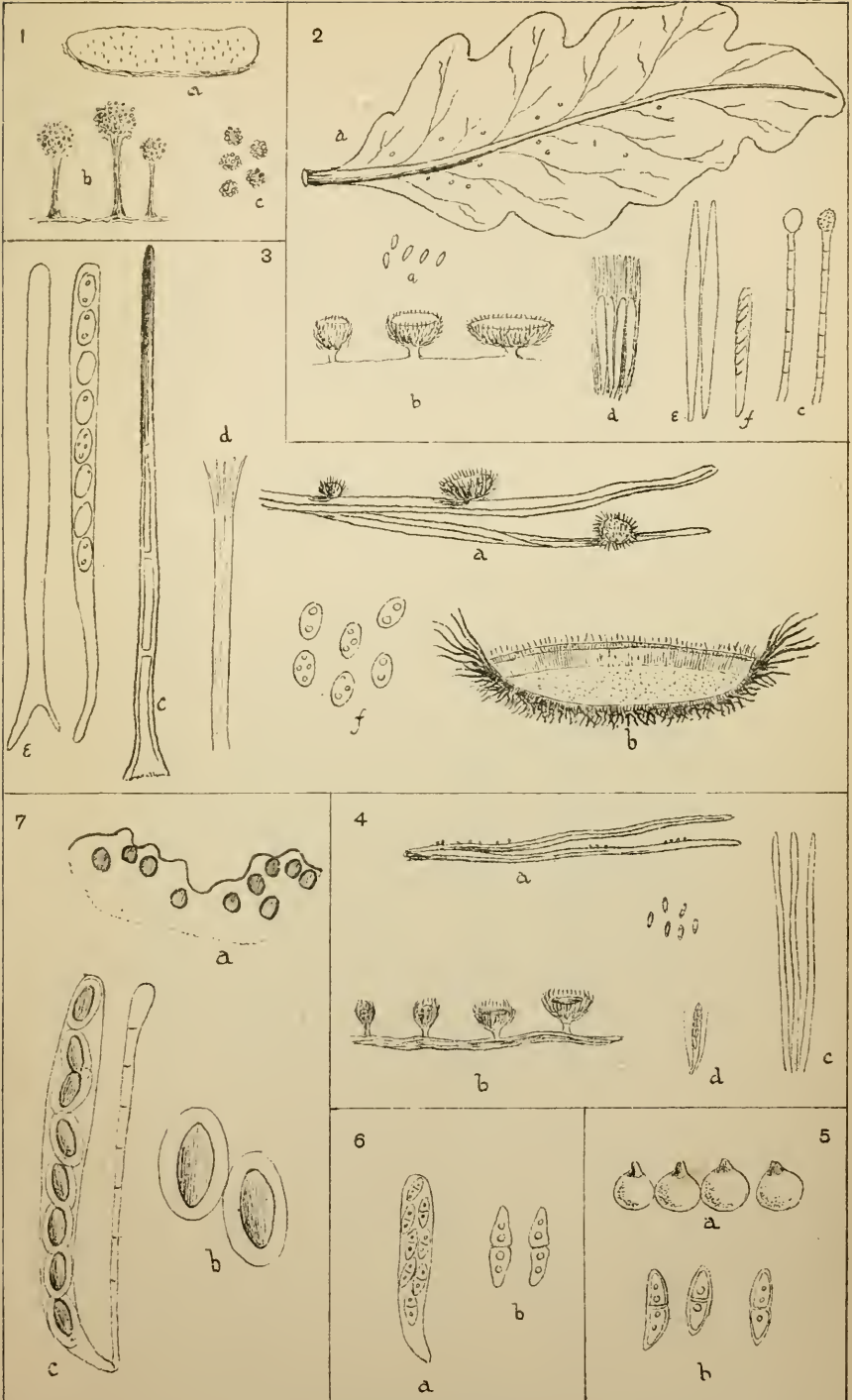


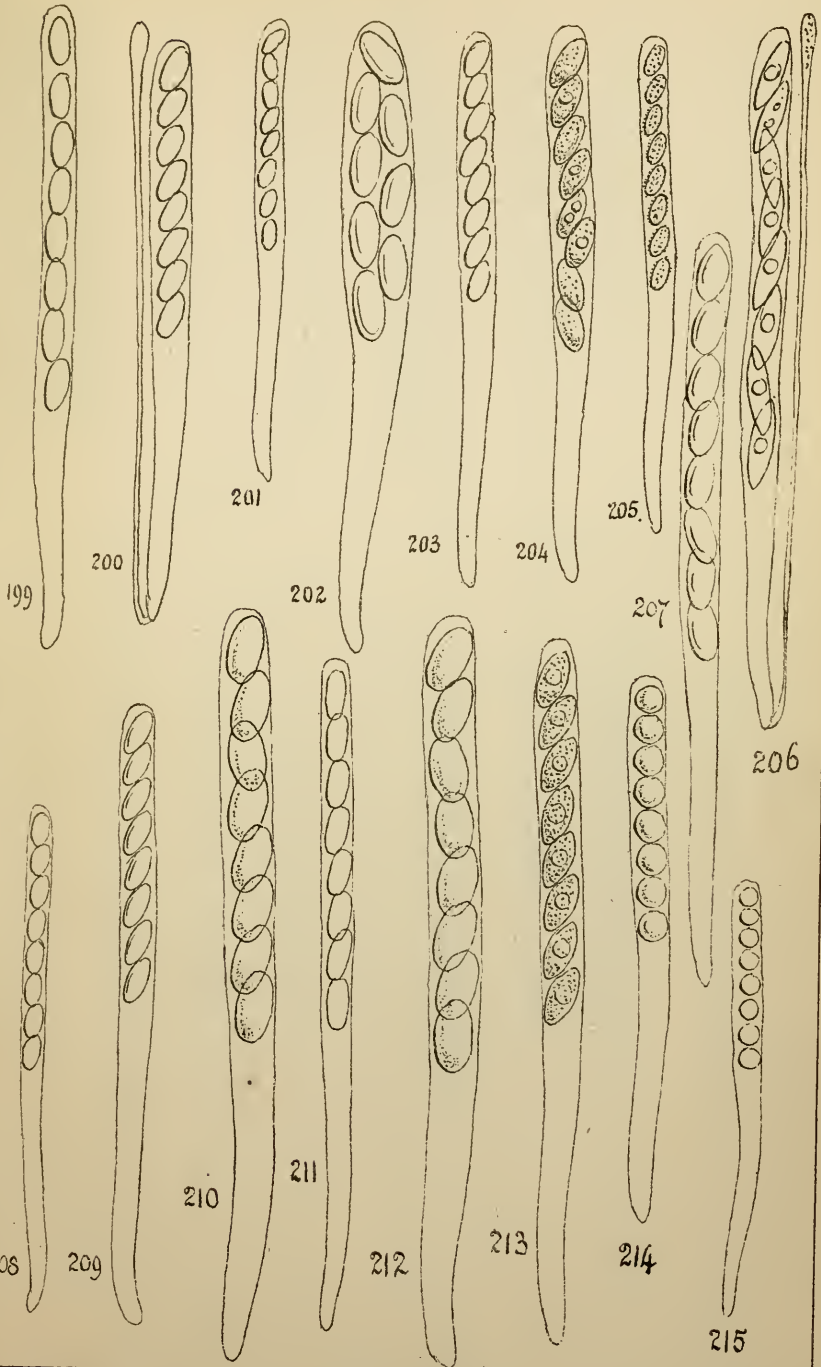








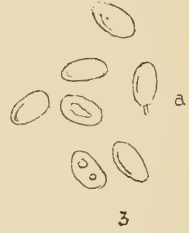
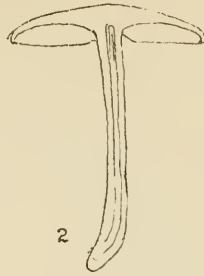






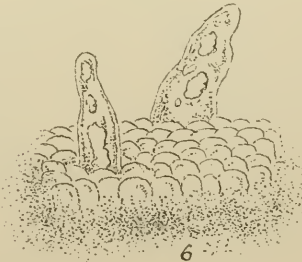


PHRAGMIDIUM.



4

5



6

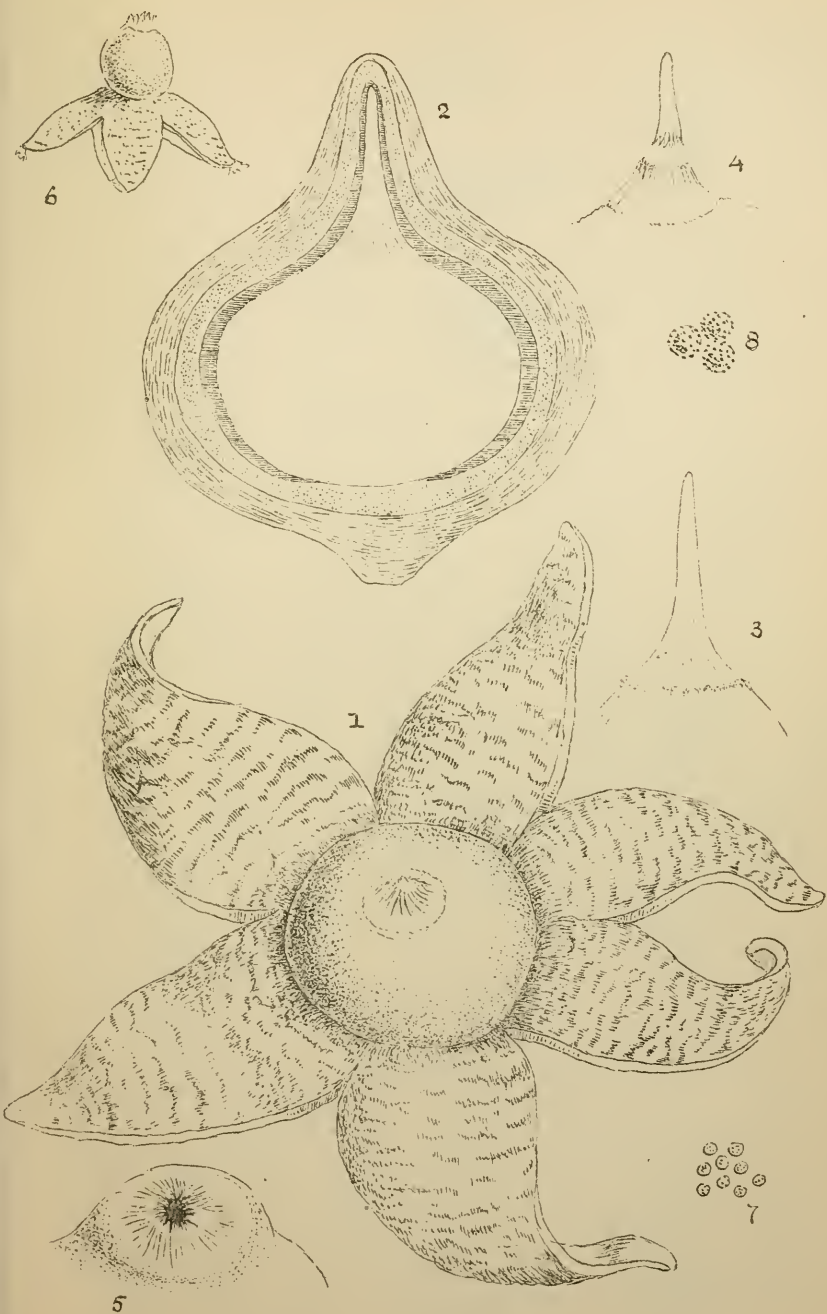


7



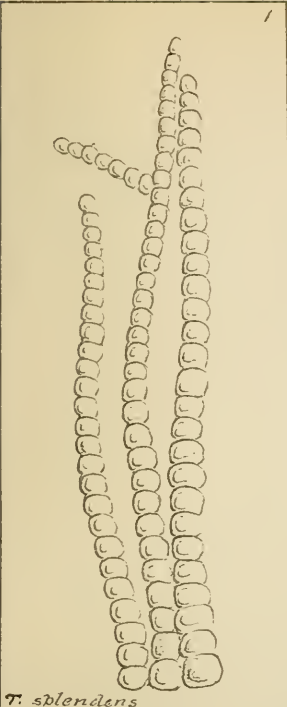
8.

J. de Snyes.

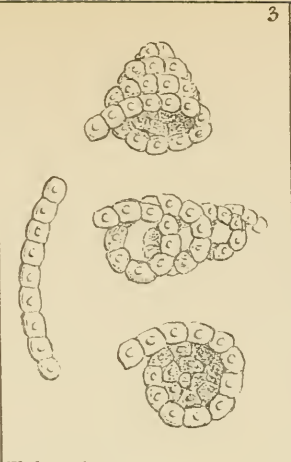


F. Hazslinszky

GEASTER CRYPTORHYNCHUS.



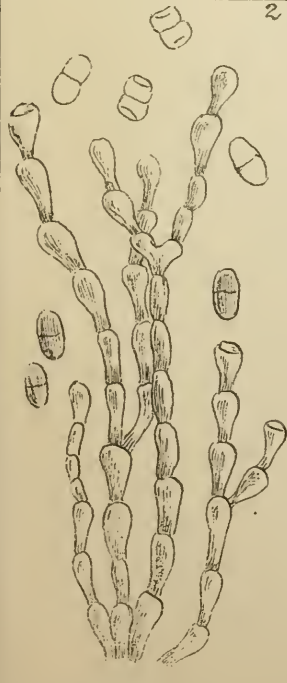
T. splendens



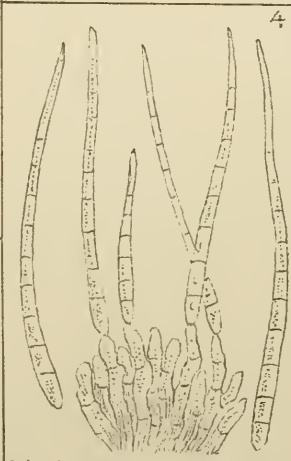
H. tubulosus



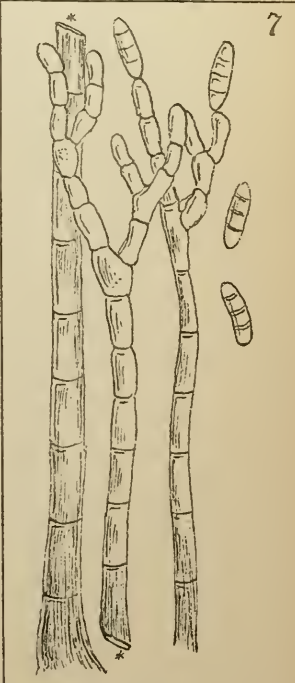
Botrydium argillicola



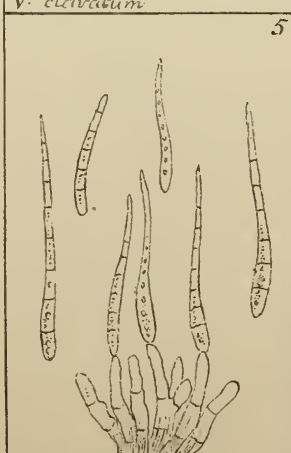
C. uniseptatum



V. clavatum

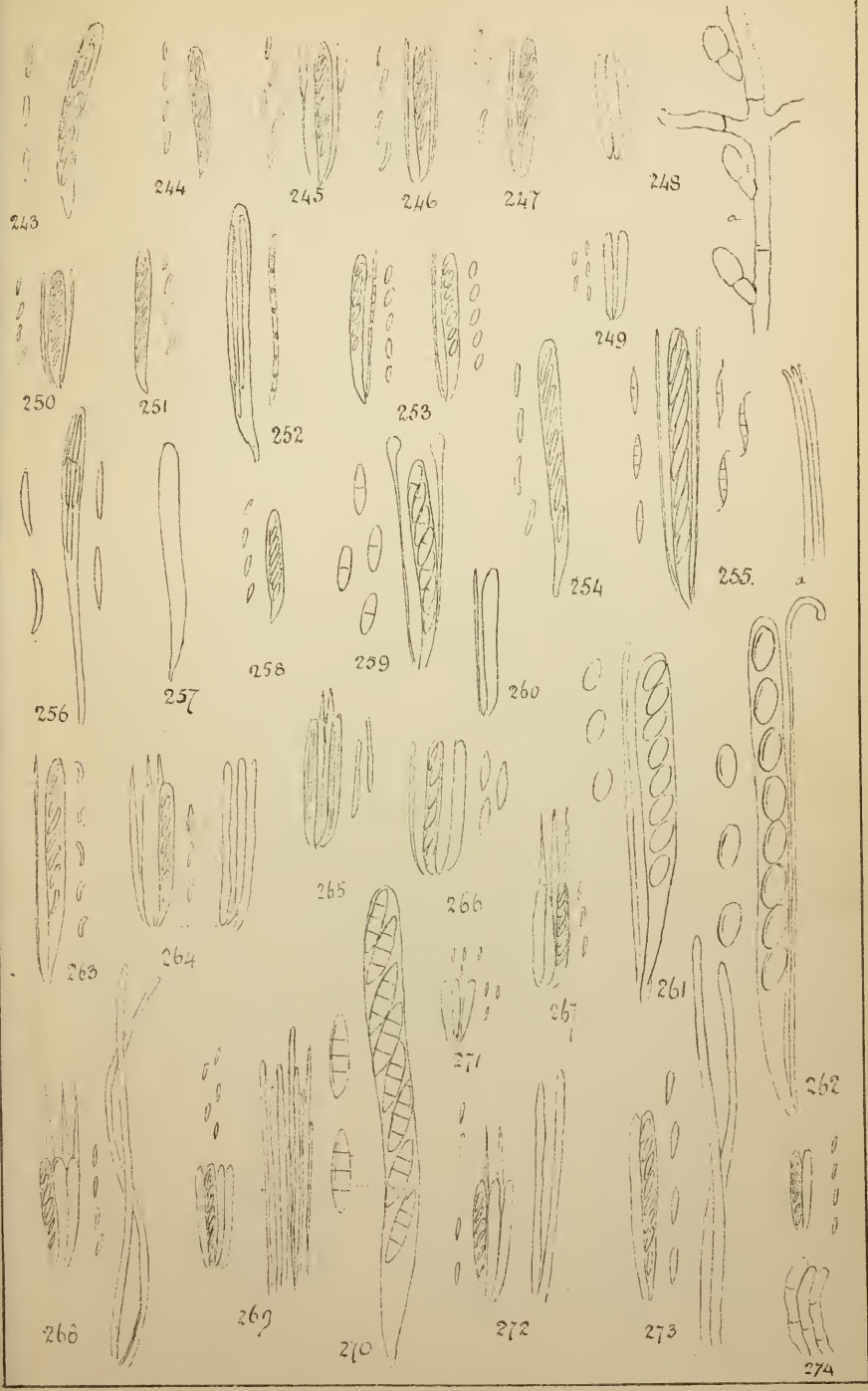


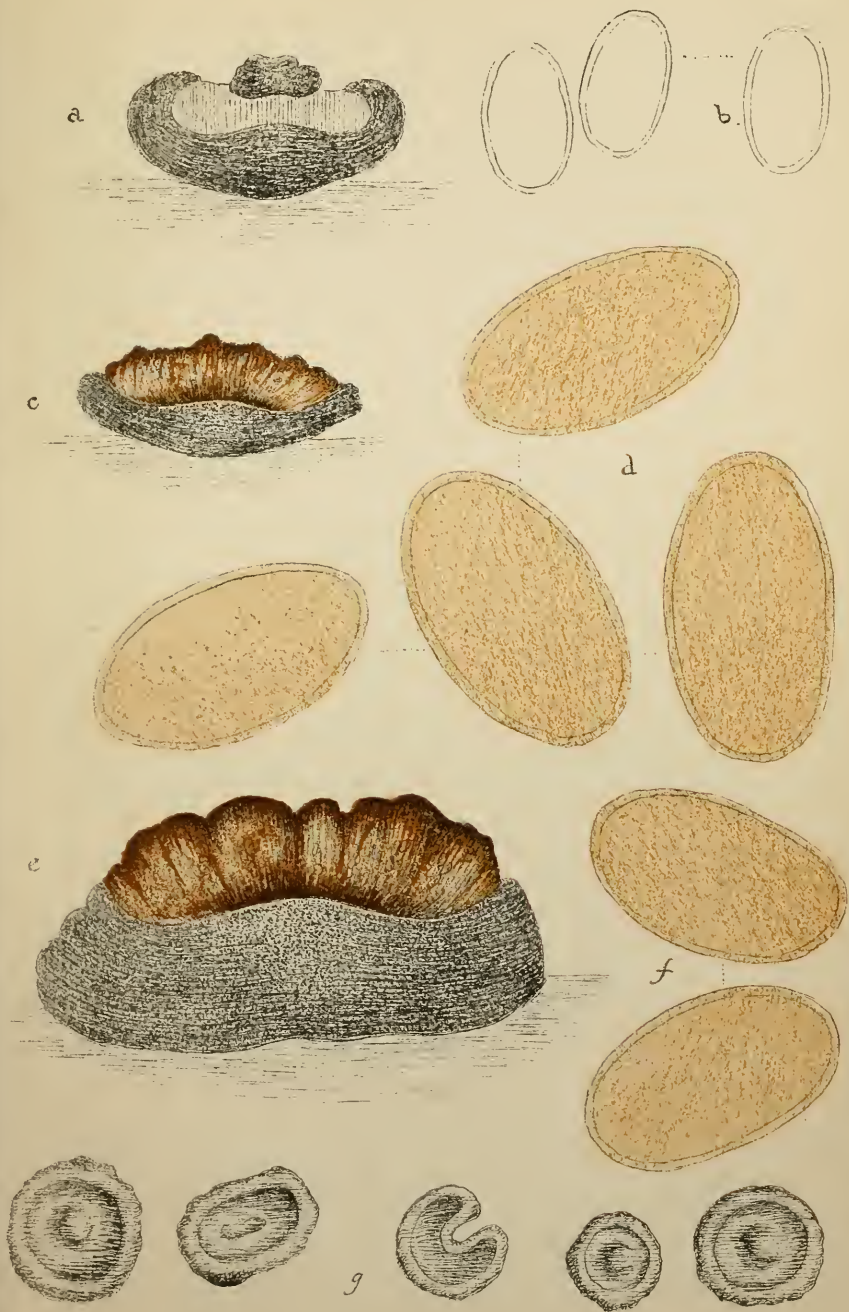
D. ramosum



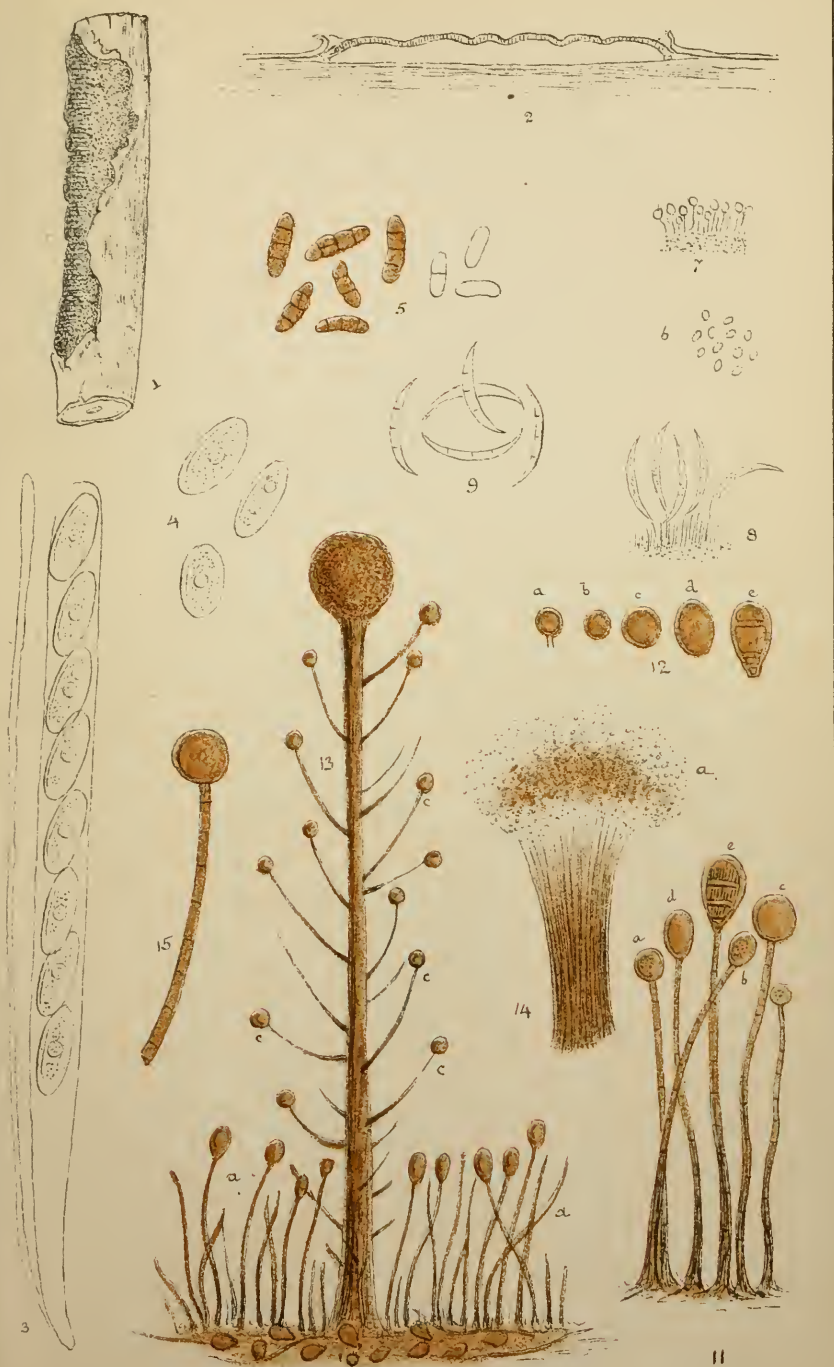
V. maculatum



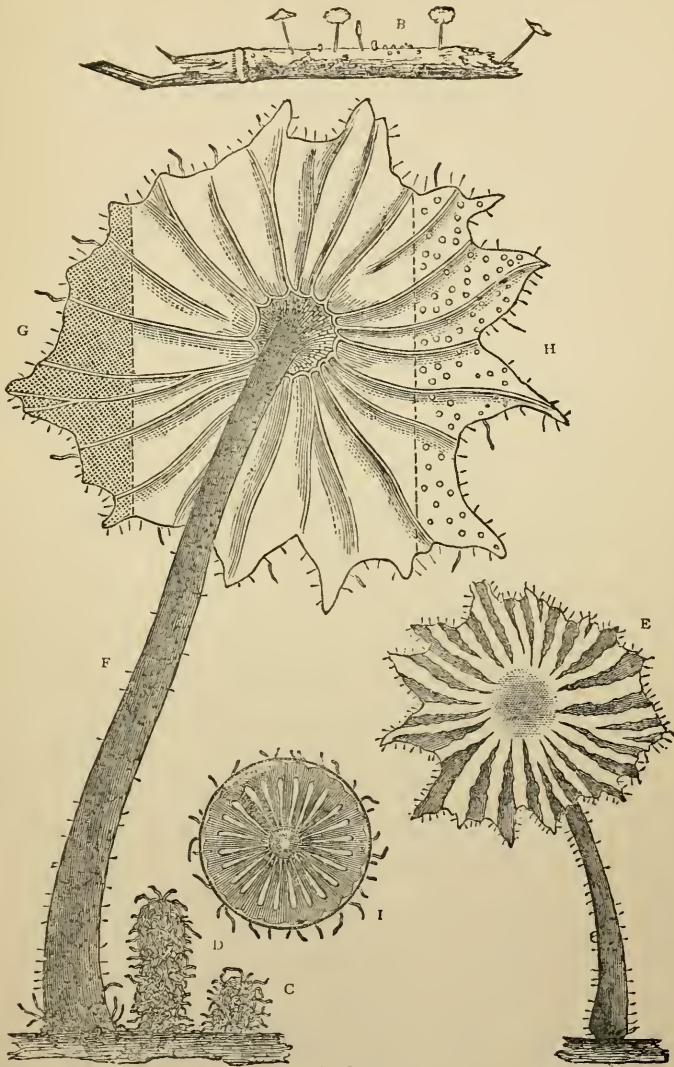




H. S. L.



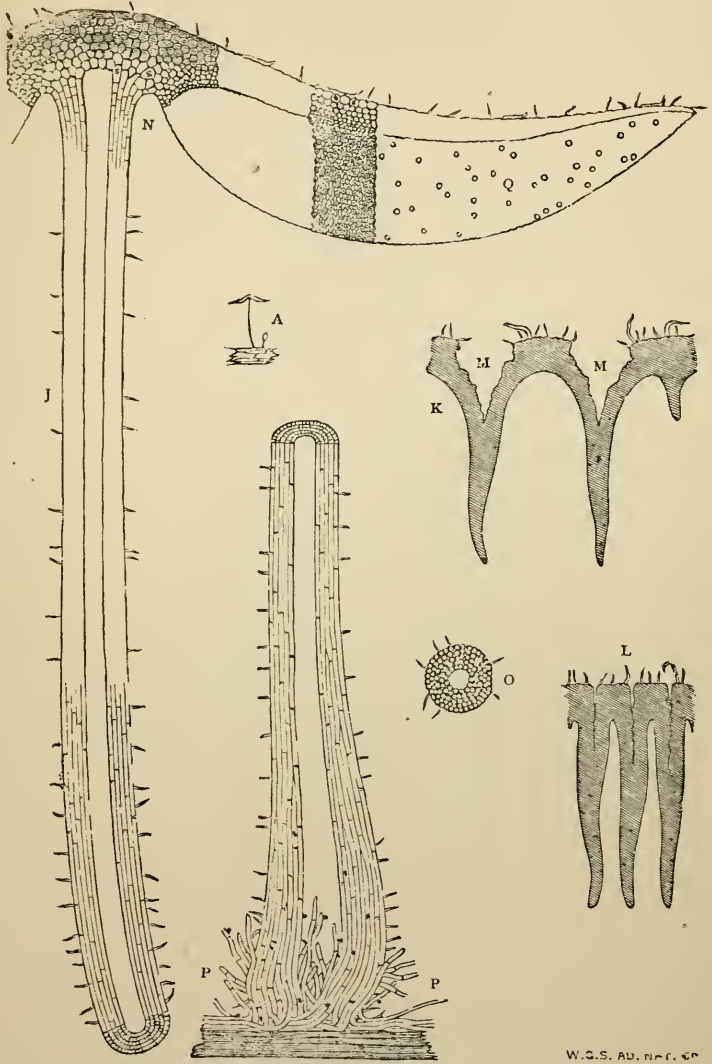
RHYTISMA. &C.



W.G.S. AD. NAT. SC.

COPRINUS RADIATUS, FR.

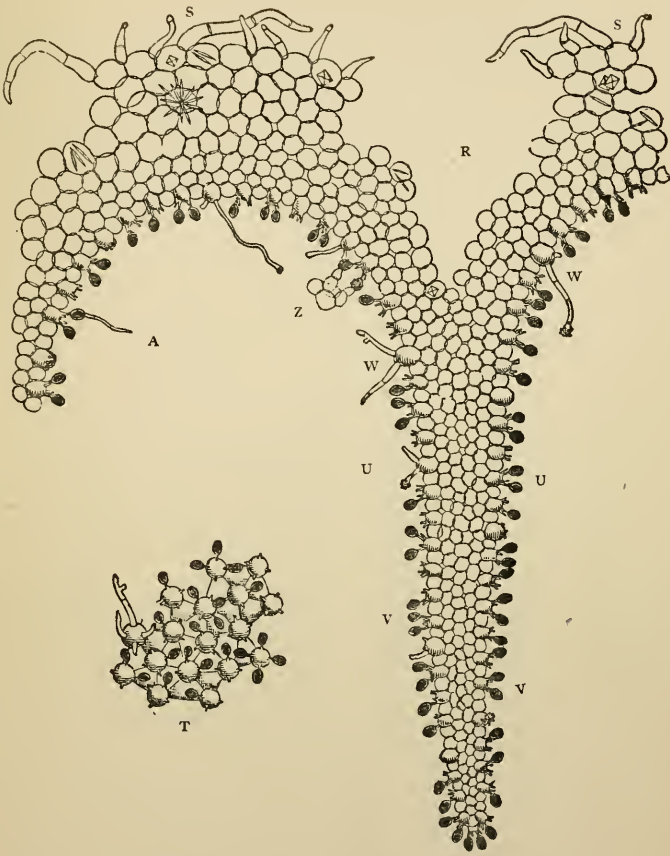
A, Natural size; E, Enlarged 10 diam.; Other Figures, 20 diam.



W.G.S. AU. DEL. ET.

COPRINUS RADIATUS, FR.
Enlarged 50 diam.



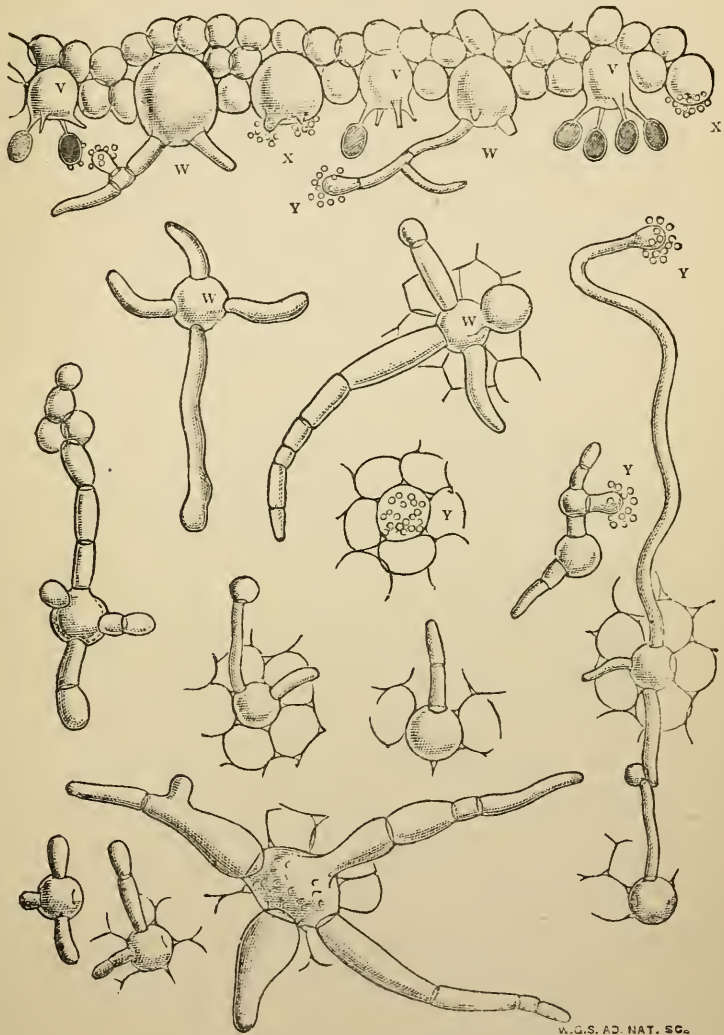


W.E.B. AD. NAT. 502

COPRINUS RADIATUS, FR.

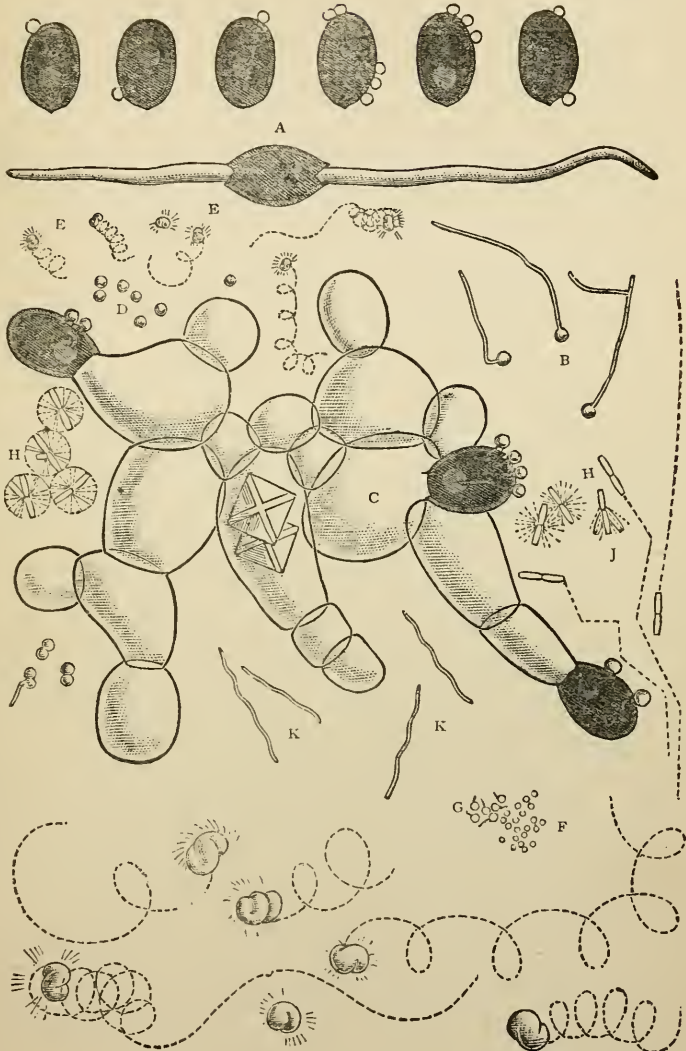
Vertical Section and Surface of Gill enlarged 50 diam.

v, Basidia with spores; w, Cystidia.



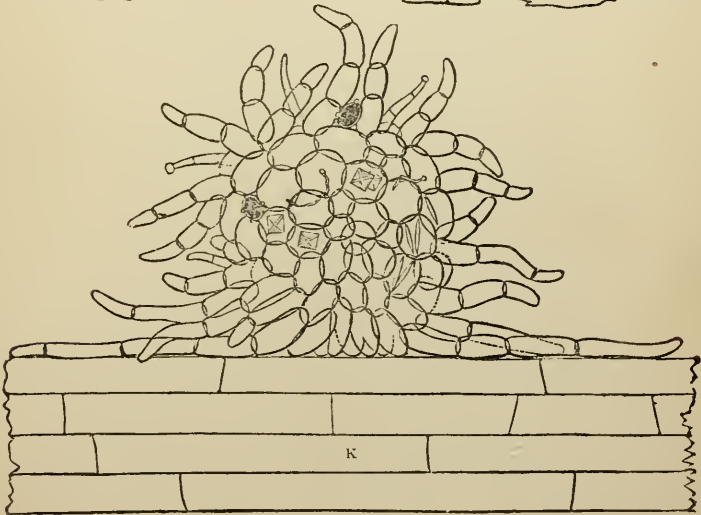
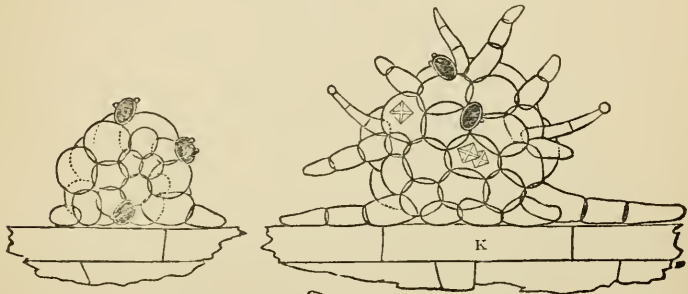
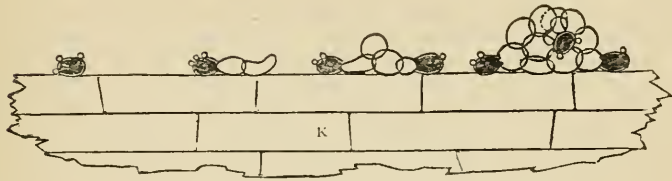
COPRINUS RADIATUS, FR.

v, Basidia bearing Spores; w, Cystidia; x, y, Spermatozoids.



COPRINUS RADIATUS, FR.

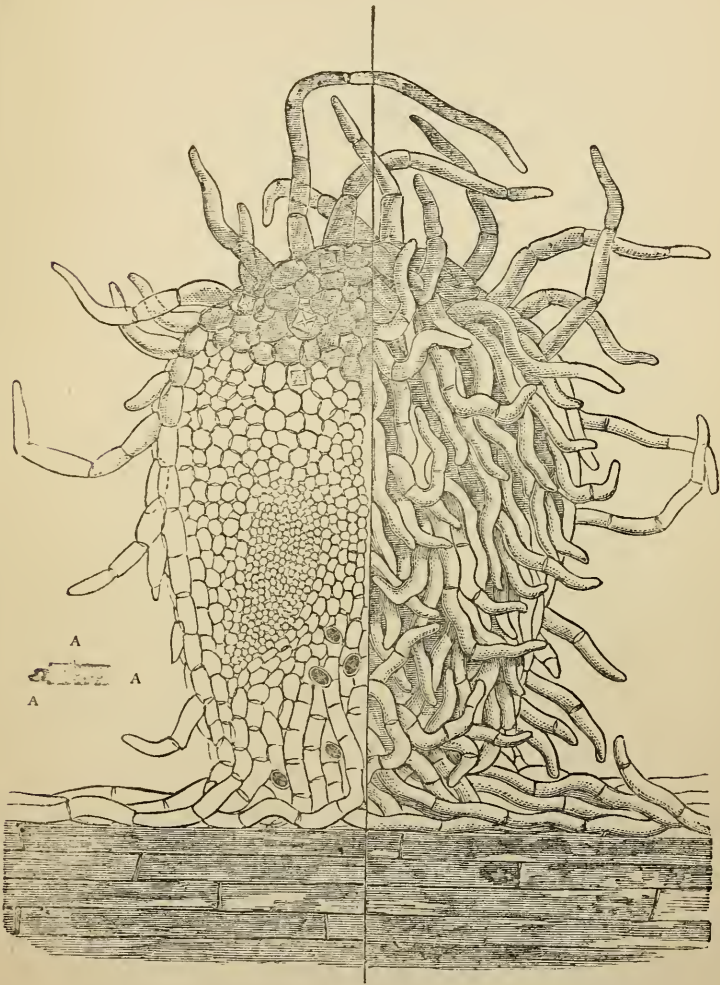
Spores, infant plant c, and infusoria, enlarged 1000 diam.; Spermatozooids at bottom further enlarged 2000 diam.



W.C.S. AD. NAT. SC.

COPRINUS RADIATUS, FR.

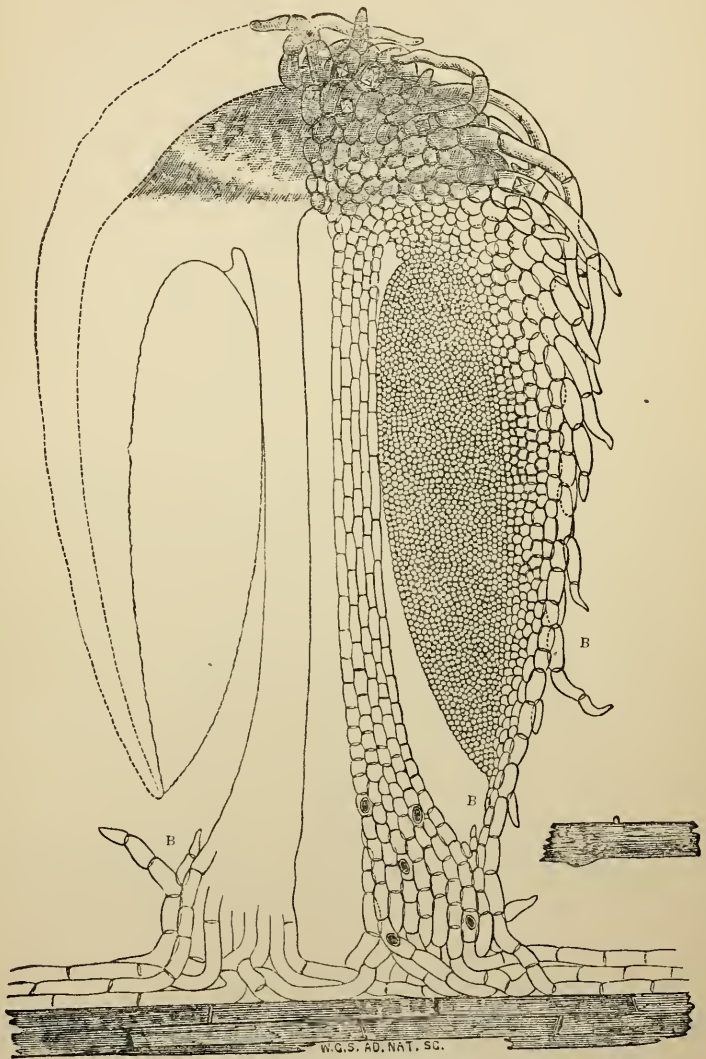
Enlarged 500 diam., as grown from the Spores, in expressed juice of horse dung, under a covering glass of microscope.



W. C. S. AC. NAT. SC.

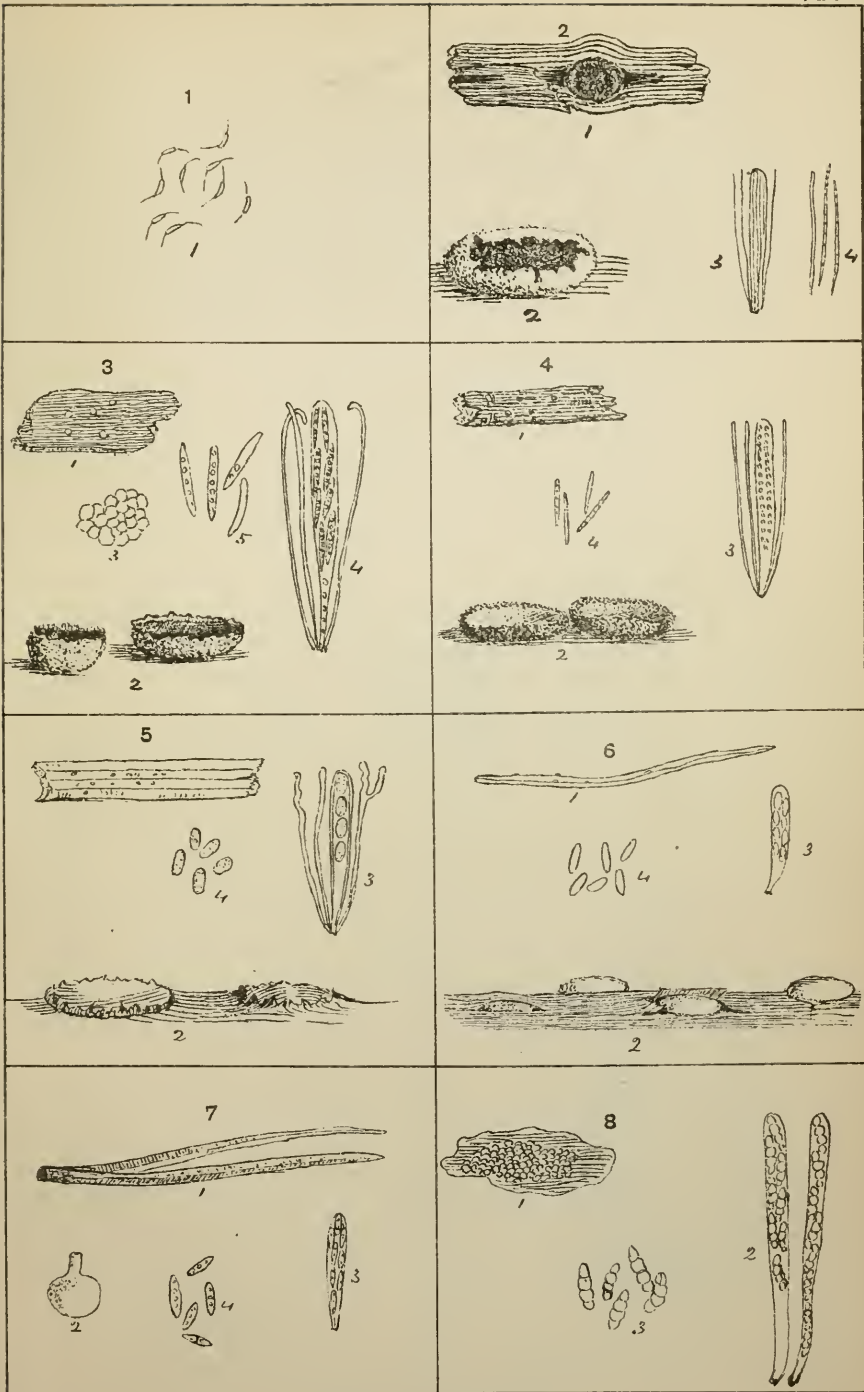
COPRINUS RADIATUS, FR.

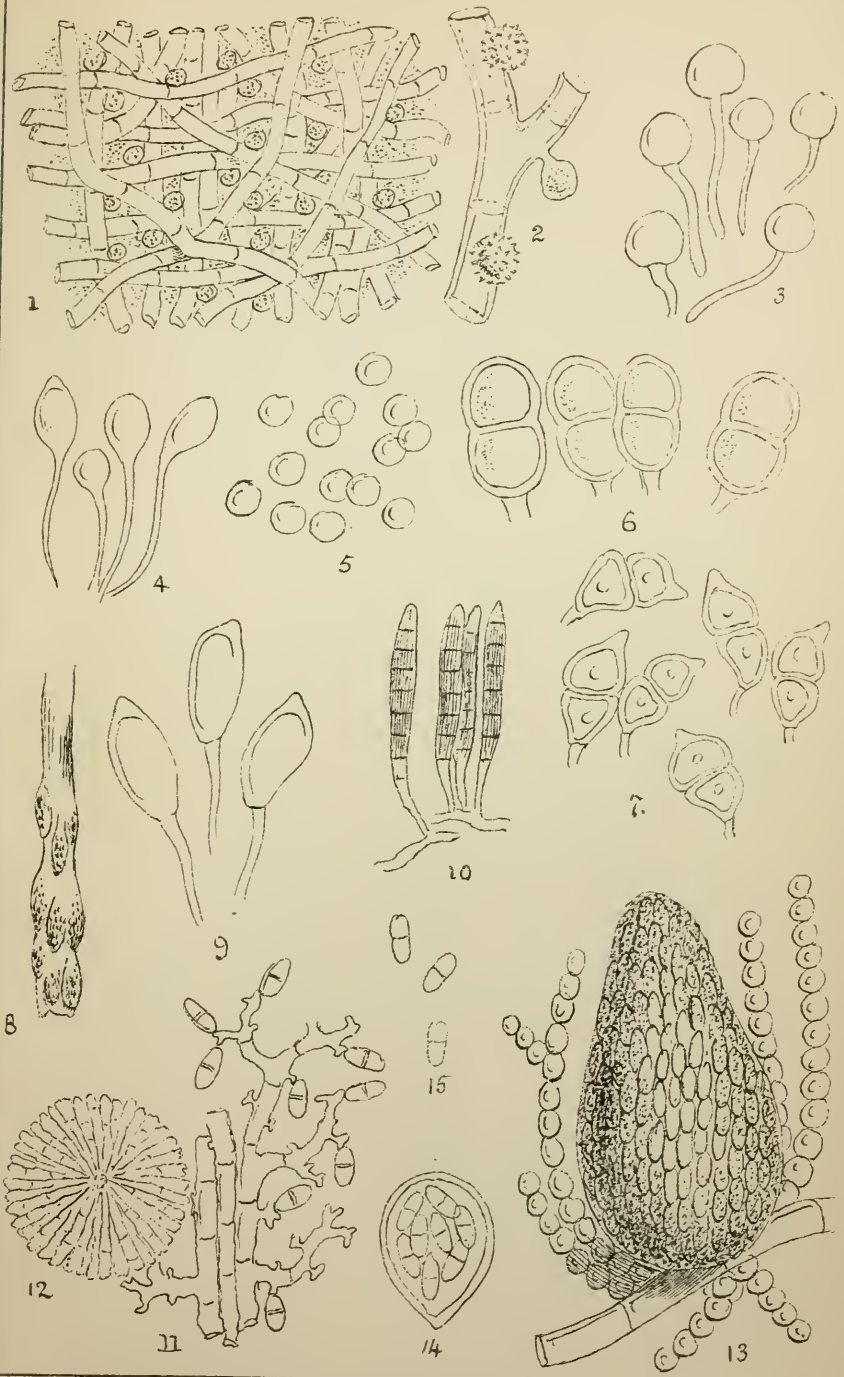
Enlarged 200 diam., and natural size at A, A, A.

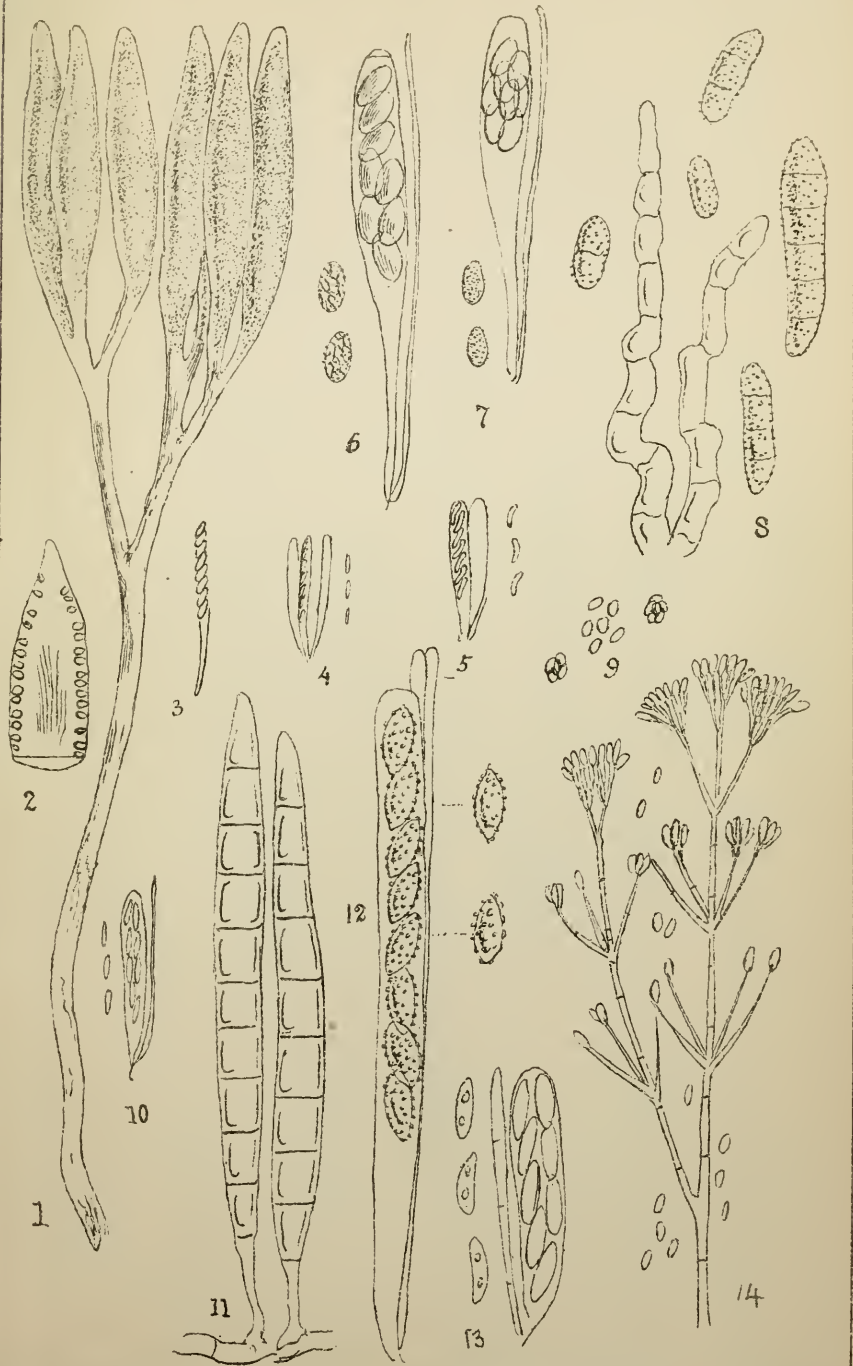


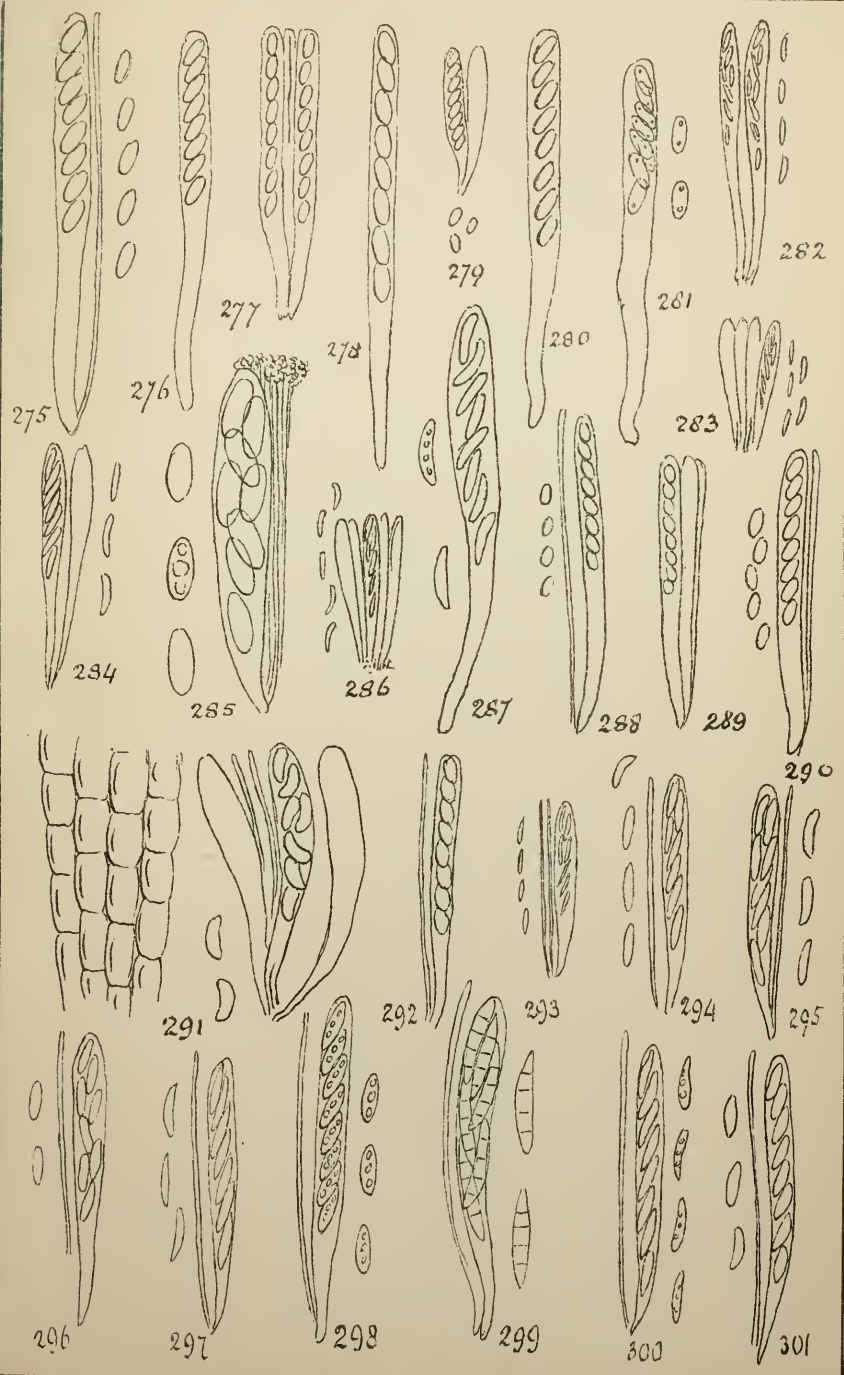
COPRINUS RADIATUS, FR.

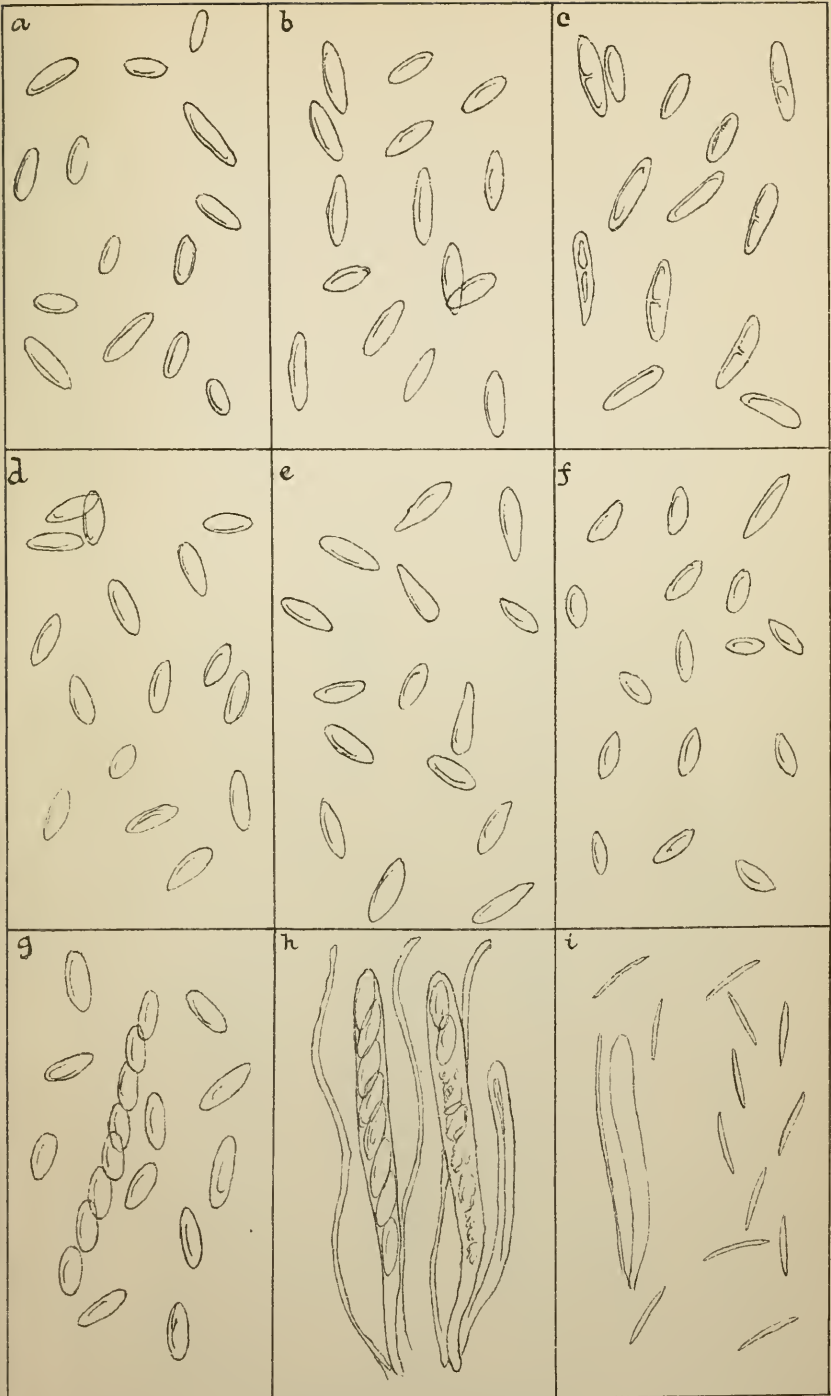
Enlarged 120 diam.



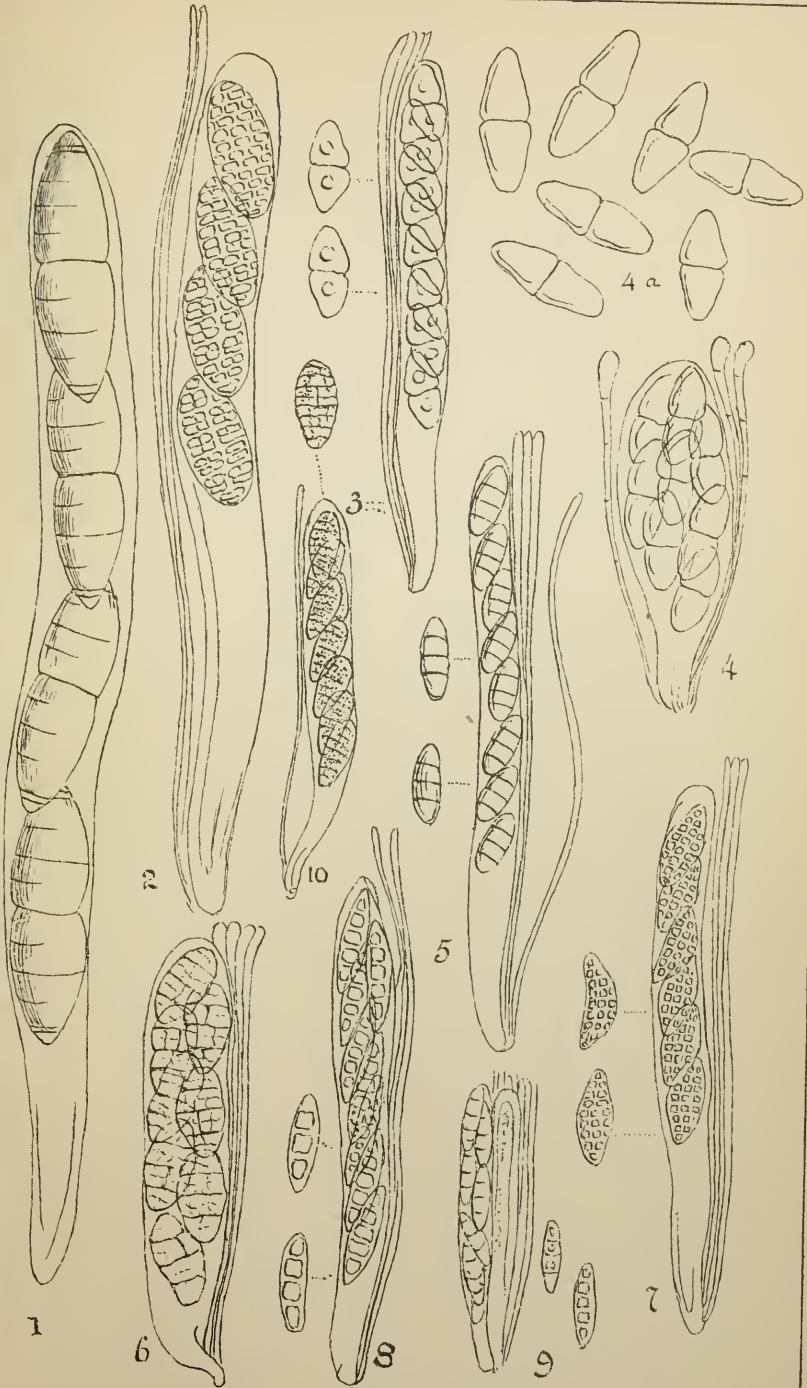




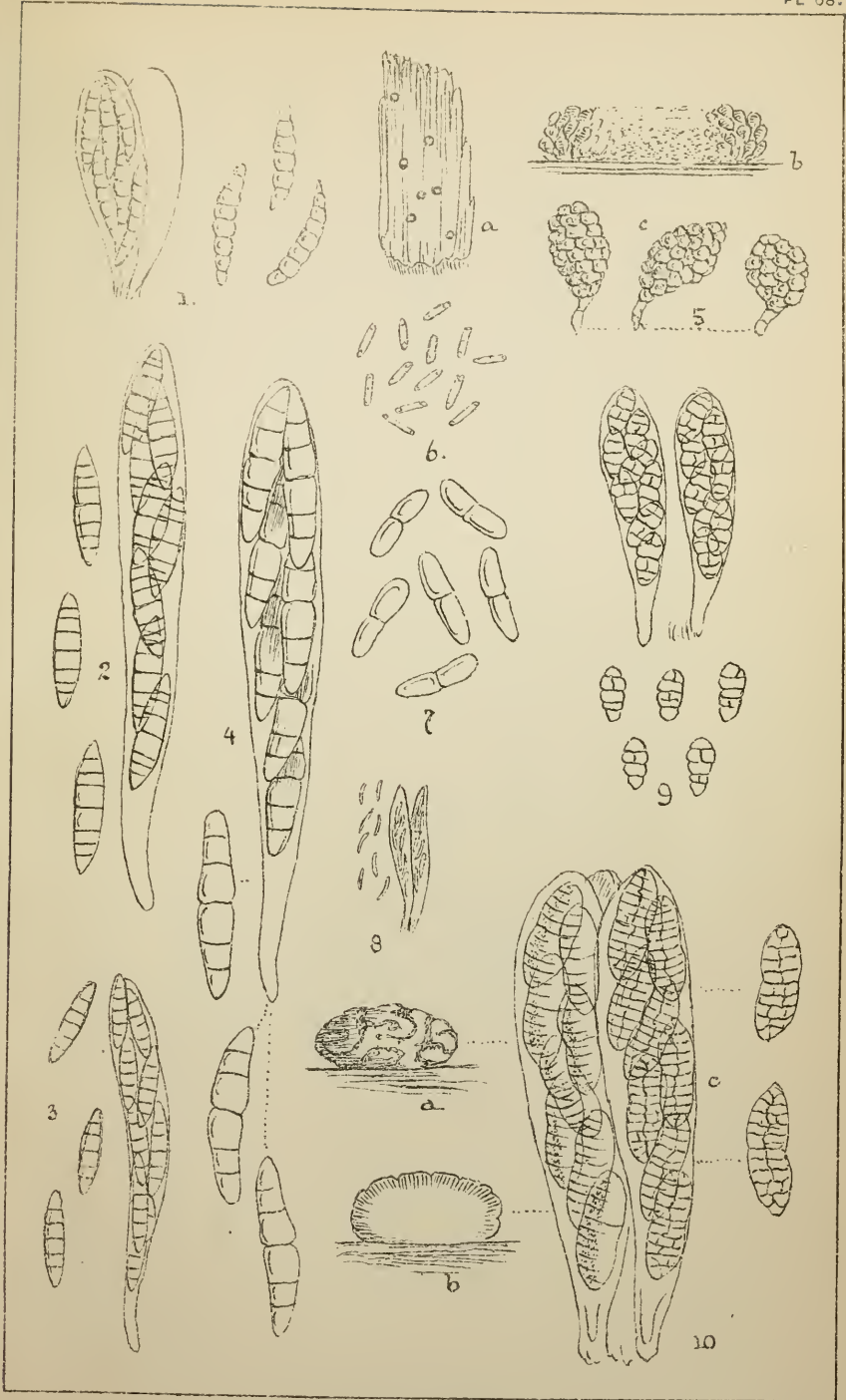


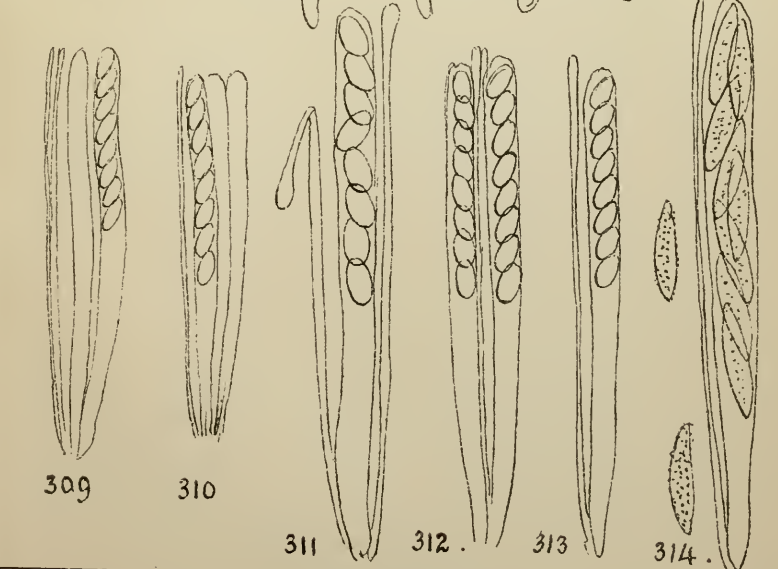


PEZIZA CALYCINA.



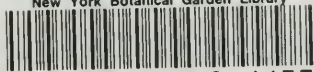
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