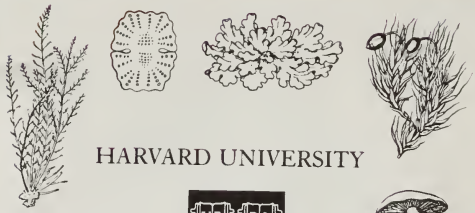
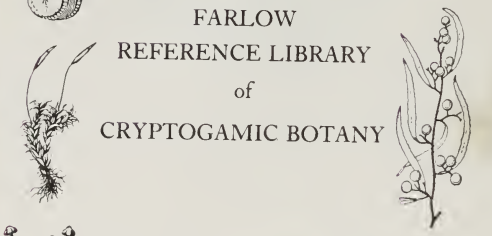
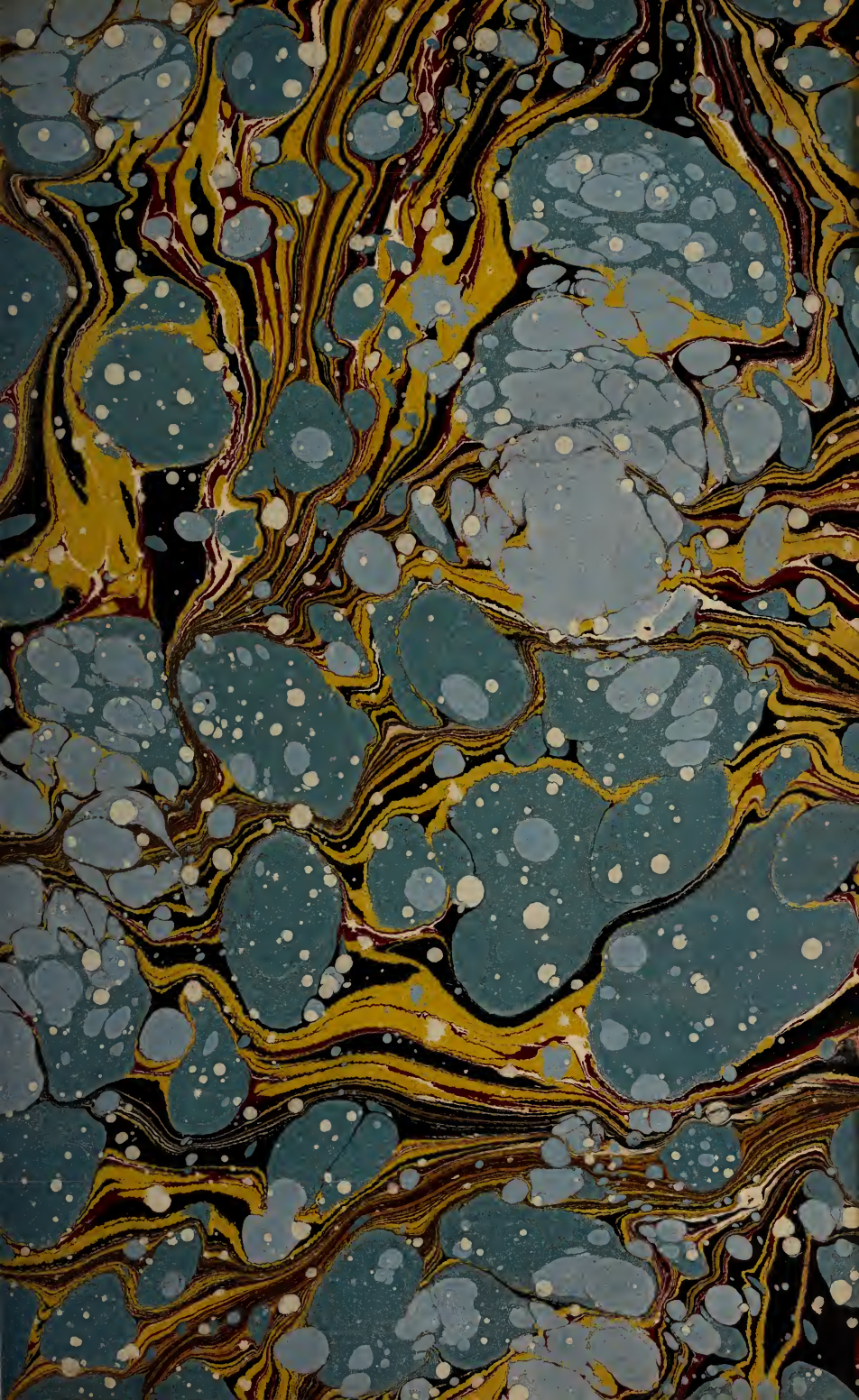


HARVARD UNIVERSITY

FARLOW
REFERENCE LIBRARY
of
CRYPTOGAMIC BOTANY





Grevillea,

A QUARTERLY RECORD OF

CRYPTOGAMIC BOTANY

AND ITS LITERATURE.

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

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

VOL. VII.

1878—9.

WILLIAMS AND NORGATE,
HENRIETTA STREET, COVENT GARDEN, LONDON;
SOUTH FREDERICK STREET, EDINBURGH.
LEIPZIG: F. A. BROCKHAUS. NEW YORK: WESTERMANN & CO.

ALEX. RIVINGTON, PRINTER, LEWES.

Grevillea,

A QUARTERLY RECORD OF CRYPTOGAMIC BOTANY AND ITS LITERATURE.

CALIFORNIAN FUNGI.

(*Collected by* Dr. W. Harkness. *Determined by* M. C. Cooke.)

Polyporus (Placodermei) obvolutus. *Berk. & Cke.* — Scarcely exceeding an inch in diameter, and two-thirds as thick.

On *Pinus contortus*. Harkness. No. 1004.

Polyporus (Placodermei) carneus. *Nees.*—On fir. Harkness. No. 915.

Polyporus (Anodermei) labyrinthicus. *Schw.*—On decaying *Pinus contorta*. Sierra Nevada, 7000-8000 feet. Harkness. No. 1012.

Polyporus (Inodermei) versicolor. *Fr.*— On oak. Sierra Nevada. Harkness. No. 980.

Polyporus (Resupinatus) argillaceus. *Cooke.*—Totus resupinatus, e mycelio tenui albo oriundus ; margine albo; hymenio argillaceo ; poris angulatis, inæqualibus, elongatis, laceratis; sporis globosis, ·008 mm.

On rotting oak, and *Pinus Lambertiana*. Sierra Nevada, 2500 feet. Harkness. Nos. 958, 1000.

Polyporus (Resupinatus) ferruginosus. *Fr.*—On wood. Sierra Nevada. Harkness. No. 901.

No. 984, *Ozonium aureum* is probably a mycelial condition of some *Polyporus*.

Hydnum chlorinum. *Cooke.* — Totum resupinatum, ceraceum, chlorinum, aculeis, inæqualibus ; elongatisve, acutis, apicibus pallidis, hinc illic confertis. (*H. udum* affine.),

On maple. Sierra Nevada, 2500 feet. Nos. 974, 955.

Solenia candida. *Fr.*—On wood of fir. Sierra Nevada, 2500 feet. No. 917.

Merulius confluens. *Schw.*—On decaying spruce. Harkness. No. 1010. Sierra Nevada, 8000 feet.

Corticium carneum. *Berk. & Cooke.*—Effusum, membranaceum, ochraceo-carneum, albitu albo-fibrillosum ; hymenio tenui, subcarneo, glabro, lævi, siccitate rimoso.

On *Pinus contorta*. Nos. 1016, 1025.

Corticium comedens. *Fr.*—On *Oreodaphne Californica*, 2500 feet. Sierra Nevada. No. 965.

Stereum evolvens. *Fr.*—On branches of *Prunus*. No. 766.

Stereum hirsutum. *Fr.*—On cedar logs. No. 1040.

Stereum purpureum. *Fr.*—On *Sambucus*. Sierra Nevada. Harkness. No. 938. Young state.

Hymenochæte rubiginosa. *Fr.*—On oak bark. Sierra Nevada. Harkness. No. 907.

Corticium sambuci. *Fr.*—On *Sambucus*. Sierra Nevada. Harkness. No 937.

Corticium incarnatum. *Fr.*—On *Cornus*. Harkness. Nos. 987, 988.

Corticium scutellare. *B. & C.*—On dead shrubs. Sierra Nevada, 2500 feet. Harkness. No. 977.

Corticium calceum. *Fr.*—On branches. Sierra Nevada. Harkness. No. 903.

Grandinia ocellata. *Fr.*—On *Arbutus Menziessi*. Sierra Nevada. Harkness. Nos. 899, 902.

Clavaria abietina.—Under firs. Sierra Nevada. No. 913.

Hirneola auricula Judæ. *Fr.*—An abnormal form, without fruit, but probably developed in the form of *Peziza acetabulum*, by pressure during growth.

On fir logs. Sierra Nevada. No. 1006.

Dacrymyces deliquescens. *Fr.*—On pine wood. Sierra Nevada. No. 1037.

Lycogala epidendrum. *Buxb.*—On wood. Sierra Nevada. Nos. 905, 912.

Cryptosporium lupini. *Cke.*—Sparsum, tectum, minutum; sporis lunatis, utrinque acutis, continuis, hyalinis, ·03 × ·004 mm.

On stems of *Lupinus*. No. 1033.

No. 1009 on willow, is apparently an immature *Phoma*.

Macroplodia sambucina. *C.*—Gregaria, atra, erumpens. Peritheciis submembranaceis, papillatis; sporis subglobosis, brunneis, ·01 × ·008 mm.

On *Sambucus*. Sierra Nevada, 8000 feet. No. 1011.

Excipula strigosa. *Fr*—Probably this species, but no spores seen.

On *Sambucus*. Sierra Nevada. No. 940.

Nemaspora crocea. *Fr.*—On bark. Sierra Nevada. No. 916.

Ceratium hydnoides. *A. & S.*—On rotten oak. Sierra Nevada. No. 928.

Cytispora leucosperma. *Fr.*—On *Prunus Virginiana*. Sierra Nevada, 8000 feet. No. 1027.

Cytispora salicis. *Rabh.*—On *Salix*. Sierra Nevada, 8000 feet. No. 1023.

Uromyces intricata. *Cooke.*—Epiphylla, soris compactis, convexis, purpureo-brunneis; sporis ovatis, ·035 × ·025 mm., glabris, læte-brunneis; pedicellis elongatis, hyalinis, ·0-1 mm. long, intertextis, infra attenuatis.

On leaves, peduncles, and stems of *Gayophytum ramosissimum*, No. 726.

Uromyces lupini. *B. & C.*—On *Lupin.* No. 740.

Puccinia striata. *Cooke.*—Epiphylla. Soris bullatis, pulverulentis, ovatis, purpureo-brunneis; sporis biglobosis, constrictis, asperulis, verrucis in lineas parallelas dispositis; pedicellis subobsoletis.

On aquatic plant unknown. No. 732.

Puccinia hieracii. *Mart.*—On *Crepis glaucus.* No. 724.

Hysterium formosum. *C.*—Sparsum, elevatum, ellipticum, opacum, leniter striatum; ascis cylindraceis; sporidiis uniserialibus, ellipticis, ad medio constrictis, triseptatis, cellulis divisis, brunneis, ·023-·025 × ·012 mm.

On *Pinus contorta.* Sierra Nevada, 8000 feet. No. 1020.

On *Juniperus occidentalis.* No. 1028.

Hysterium (Hypoderma) commune. *Fr.*—On herbaceous stems. Sierra Nevada. No. 1031.

Hysterium (Lophodermium) pinastri. *Schrad.*—On leaves of *Pinus contorta.* Sierra Nevada. No. 1024.

Hysterium foliicolum. *Fr.*—On leaves of *Quercus vaccinicefolius*, Sierra Nevada. No. 1036.

Peziza (Dasyscypha) obscura. *C.*—Sessilis, sparsa, atro-fuliginosa; cupula pubescens, demum applanata, margine elevato, disco aquoso-cinereo, $\frac{1}{2}$-1 mm.; ascis cylindraceis; sporidiis linearibus, ·01 mm.; paraphysibus filiformibus.

On twigs of *Quercus.* Sierra Nevada. No. 1034.

Peziza (Dasyscypha) epixantha. *C.*—Stipitata, brunnea, extus floccosa; cupula cyathiforma, 1 mm., disco pallidiore; ascis cylindraceis; sporidiis linearibus, ·01 mm.; paraphysibus fusiformibus, utrinque acutis.

On twigs of *Quercus*, with the foregoing. No. 1034.

The external brown septate hairs are pale at the tips, crowned with a deciduous, subglobose, rough hyaline cell, as in *P. echinulata*, &c.

Peziza, immature, with the asci just formed, on cones of *Pinus contorta.* No. 1013.

These species of *Peziza* are accompanied by an anomalous kind of *Diplodia*, to which the name of *Diplodia anomala* is applied provisionally, as further specimens must be examined before it can be described satisfactorily.

Peziza hyalina. *P.*—On *Pinus contorta.* Sierra Nevada, 8000 feet. No. 1017.

Stictis radiata. *Fr.*—On oak twigs. Sierra Nevada. No. 921.

Patellaria abietina. *Cooke.*—Sparsa, atra. Cupulis orbicularibus, applanatis, $\frac{4}{10}$-$\frac{6}{10}$ mm., margine vix elevatis; ascis clavatis; sporidiis fusoideis, hyalinis, ·01 × ·002 mm., paraphysibus supra brunneis, connatis, gelatina hymenea olivaceo.

On decorticated *Abies Douglassi*. No. 763.

Cenangium leptospermum. *B. & C.*—On *Abies Douglassi*. No. 764.

Hypoxylon stigmateum. *Cooke.*—Effusum, nigrum, incrustans, ex ostiolis prominulis papillosum; ascis linearibus; sporidiis lanceolatis, brunneis, ·028 × ·008 mm., rectis vel leniter curvulis.

On dead oak bark. No. 947.

Cucurbitaria macilenta. *Cooke.*—Cæspitulis minimis, erumpentibus; peritheciis atris, papillatis, sub-nitidis, sicco collapsis; ascis cylindraceis; sporidiis uniseriatis, ellipticis, utrinque attenuatis, binucleatis, ·015 × ·006 mm.

On *Abies* and *Libocedrus*. Nos. 747, 757.

Dothidea ribesia. *P.*—(Stylospores). On wild currant. No. 1001.

Sphæria (Pleospora) permunda. *C. in Grevillea.*—On herbs. Sierra Nevada. No. 1032.

Sphæria (Immersæ) tumulata. *C.*—Immersa. Peritheciis subglobosis, atris, ostiolis erumpentibus; ascis cylindraceis; sporidiis sublanceolatis, obtusis, uniseptatis, atro-brunneis, utrinque hyalino-apiculatis, ·035-·04 × ·012 mm.

On wood of *Pinus contorta*. Sierra Nevada, 8000 feet. No. 1014.

Allied to *S. apiculata*, but with larger and coarser sporidia, the external appearance is also different.

Erysiphe Montagnei. *Lev.*—On *Apocynum*. No. 730.

NEW JERSEY FUNGI.

By M. C. Cooke and J. B. Ellis.

(*Continued from Vol. VI., p.* 96.)

Polyporus (Merisma) Ellisii. *Berk.*

Pileo convexo, reniforme, carnoso-lento, sulphureo, in verrucas farinaceis concoloribus rupto, stipite brevi, velutino, reticulato; poris parvis, angulatis, brevibus decurrentibus.

On the ground in low woods. Newfield, New Jersey. Oct. 13, 1872. Ellis. No. 873.

Pileus 2½ inches across, and long, sulphur-coloured, reniform, convex, unequal, the surface broken up into pulverulent warts, which become scales towards the margin, interstices pulverulento-tomentose, margin strongly incurved, flesh nearly snow-white, about

half an inch thick; stem irregular, thickened at the base, $1\frac{1}{2}$ inch high, more than half an inch thick, solid, darker than the pileus, covered with raised reticulations which appear to be abortive pores, slightly branched at the base; pores decurrent, angular, milk-white, about $\frac{1}{36}$ inch diam., about a line deep.

Allied to *P. pes-capræ*. A very curious and distinct species.

Clavaria molaris. *Berk.*

Erumpens, coccinea, apice verrucosa l. cristata.

On dead branches of *Magnolia glauca*. Newfield, New Jersey, June, 1873. Ellis. No. 892.

About a line high, bursting through the bark, scarlet, thickened upwards. Apex either coarsely warty or with a multitude of crest-like processes; spores clavate, acuminate below, ·0075 mm., ·0003 in. long. Allied to *C. contorta*.

Sphæropsis sassafras. *C. & E.*

Peritheciis papillæformibus, epidermide cinctis. Sporis elongato-ellipticis, ·03-·035 × ·012 mm., brunneis.

On bark of *Sassafras*. No. 2856.

Sphæropsis pinastri. *C. & E.*

Peritheciis papillæformibus, epidermide cinctis, hinc illic subgregariis. Sporis elongato-ellipticis, brunneis, ·03 × ·012, vel. ·035-·04 + ·015 mm.

On Scotch fir. No. 2917.

In some perithecia the spores are larger uniformly than in others.

Sphæropsis opaca. *C. & E.*

Peritheciis congestis, in pustulis minimis confluentibus, epidermide cinctis, nec papillatis, dothidioideis. Sporis ellipticis, obtusis, brunneis, ·025-·03 × ·012 mm.

On *Artemisia* stems. No. 2854.

Diplodia radicina. *C. & E.*

Erumpens, gregaria. Peritheciis atris, elevatis, subglobosis. Sporis ellipticis, nec constrictis, brunneis, ·03 × ·01-·012 mm.

On roots of *Maclura*. No. 2954.

Diplodia hyalospora. *C. & E.*

Peritheciis tectis, minimis, puncti formibus, membranaceis. Sporis elongato-ellipticis, subconstrictis, hyalinis, ·02-·026 × ·009 mm., hinc illic biseptatis.

On stems of *Chenopodium*. No. 2945.

Sometimes one of the cells is divided, so that the spore is unequally biseptate.

Diplodia hibiscina. *C. & E.*

Peritheciis atris, depressis, epidermide cinctis, sparsis vel congestis. Sporis ellipticis, vix constrictis, brunneis, inæqualibus, ·025-·03 × ·012 mm.

On branches of *Hibiscus*. No. 2939.

Hendersonia anomala. *C. & E.*

Erumpens. Peritheciis elongatis, atris. Sporis ellipticis, triseptatis; brunneis, cellulis ultimis hyalinis, quandoque divisis, ·02 × ·01 mm.

On branches of *Tephrosia Virginiana*. No. 2887a.

The spores are very peculiar, the two central cells are brown, the terminal cells hyaline, sometimes one or both of the terminal cells is divided and constricted, in which case it is broader than the central cells.

Pestalozzia unicornis. *C. & E.*

Pustulis lirellæformibus, atris. Sporis cylindricis, 5-septatis, brunneis; cellulis ultimis hyalinis, superne unicornutis, inferne longe stipitatis, ·035 × ·008 mm.

On white cedar wood. No. 2924.

Chætomella andropogonis. *C. & E.*

Sparsa. Perithecis brunneis, $\frac{1}{5}$ mm. dia., pilis rigidis erectis ornatis. Sporis ovatis, ·006 × ·005 mm., hyalinis.

On leaves of *Andropogon*. No. 2827.

Myxormia convexula. *C. & E.*

Erumpens, atro-brunnea. Pustulis orbicularibus, convexis, intus olivaceis, sporis concatenatis, minimis, ellipticis, hyalinis, ·007 × ·004 mm.

On young twigs of *Robinia*. No. 2906.

Myxormia (?)

On decorticated oak branches. No. 2809.

This is not a true *Myxormia*, but more resembles a *Peziza* without asci. It is not improbable that it is an imperfect *Discomycete*.

Discosia podisomæ. *C. & E.*

Sparsa. Peritheciis convexis, minimis, opacis. Sporis cylindraceis, curvulis, triseptatis, ·025-·028 mm. long, utrinque aristatis.

On old *Podisoma macropus*. No. 2931.

Septonema toruloidea. *C. & E.*

Atra, effusa, velutina. Sporis 3-4 septatis, constrictis, brunneis, ·025 mm. long, in hyphis simplicibus concatenatis.

On pine slab. No. 2942.

Speira punctulata. *C. & E.*

Punctiformis, atra. Pustulis minimis, erumpentibus. Sporis subellipticis, applanatis, cellulis quadriseriatis, fuscis, ·025-·03 × ·015-·018 mm.

On *Vaccinium*. No. 2884.

Sporotrichum æruginosum. *Schwz.*

Probably a form of this.

On pine stump. No. 2872.

Penicillium repens. *C. & E.*

Argillaceum, effusum. Hyphis repentibus, intricatis; ramis adscendentibus; ramulis patentibus, brevibus, quandoque furcatis; capitulis bifurcatis, hyalinis; sporis globosis.

On rotten *Magnolia*. No. 2900.

Zygodesmus fuscus. *Corda.*

On old oak log. No. 2878a.

Zygodesmus bicolor. *C. & E.*

Effusus, centro fuligineus, ambitu luteo-fuscus. Hyphis sterilis

furcatis, croceis, fertilis flexuosis, fuligineis, hinc illic papillatis. Sporis globosis, echinulatis, ·009 mm.

On bark of cedar. No. 2732.

Arthrobotryum robustum. *C. & E.*

Sparsum, atrum. Stipite robusto, brevi, compacto; capitulo globoso. Sporis pyriformibus, 1-2 septatis, brunneis, ·03 × ·01 mm.

Inside maple bark. No. 2879.

Habit much resembling a *Didymium*. Capitulum dense and compact.

Dendryphium Ellisii. *Cke.*

Tenue effusum. Hyphis erectis, opacis, supra breviter ramosis. Sporis cylindraceis, 2-5 septatis, 2-3 concatenatis, ·03-·06 × ·01 mm., brunneis.

On cedar wood. No. 2950.

Peziza (Mollisia) paulupuncta. *C. & E.*

Gregaria. Cupulis atrobrunneis, minimis, $\frac{1}{4}$ mm., demum applanatis; disco cinereo. Ascis cylindraceis. Sporidiis linearibus, ·005 × ·001 mm.

On maple bark. No. 2889.

Peziza (Mollisia) introvirida. *C. & E.*

Gregaria. Cupulis atro-brunneis, punctiformibus, $\frac{1}{2}$ mm.; disco fuligineo, vel subolivaceo. Ascis cylindrico-clavatis. Sporidiis elongato-ovatis, ·007 × ·003 mm. Paraphysibus filiformibus, supra, et gelatinâ, viridis.

On naked wood. No. 2883.

Peziza (Dasyscypha) solfatera. *C. & E.*

Sparsa. Cupulis hemisphericis, citrinis, subtus papillato-affixis, tomentosis, pilis asperulis, granulato-capitatis. Ascis cylindraceis. Sporidiis linearibus, ·008 mm. long. Paraphysibus filiformibus.

On pine leaves. No. 2907.

Peziza (Dasyscypha) theiodea. *C. & E.*

Sparsa, gilva. Cupulis subglobosis, dein hemisphericis, leniter tomentosis, pulvere sulfureo ubique conspersis. Ascis cylindraceis. Sporidiis globosis, ·003 mm. diam.

On decorticated *Rhus venenata*. No. 2956.

The sulphury powder which covers the cups is sprinkled over the matrix.

Stictis (Xylographa) linearis. *C. & E.*

Lirellæformis, sparsa, brunnea, disco testaceo. Ascis clavatis. Sporidiis fusoideis, triseptatis, hyalinis, ·015 × ·006 mm.

On decorticated oak and *Vaccinium*. No. 2896.

Phacidium sphæroideum. *C. & E.*

Gregarium, sphæroideum, cinereum, in lacinas 4-5 obtusas dehiscens, disco cinereo. Ascis clavatis. Sporidiis fusiformibus, hyalinis, ·02 × ·006 mm. Paraphysibus filiformibus.

On leaves of *Ilex glabra*. No. 2892.

Hysterium stictoideum. *C. & E.*

Innatum, lanceolatum, ore apertum, disco fusco. Ascis clavatis.

Sporidiis ellipticis, 3-5 septatis, merenchymatis, hyalinis, ·02-·025 × ·008 mm.

On decorticated oak. No. 2843.

Hysterium lineolatum. *Cke., in Texas Fungi.*

On old oak stumps. Nos. 2885, 2902.

Hysterium smilacis. *S.*

On *Smilax*. No. 2899.

Nectria aureofulva. *C. & E.*

Cæspitosa, aureofulva, glabra, subnitens. Ascis cylindraceis. Sporidiis uniseriatis, ellipticis, uniseptatis, vix constrictis, hyalinis, ·012 × ·005 mm.

On *Magnolia* bark. No. 2859.

Ceratostoma fallax. *C. & Sacc.*

Peritheciis superficialibus, laxo gregariis, globoso-depressis, ¼ mm. diam., in ostiolum filiforme subflexuosum, usque 1 mill long, productis. Perithecii contextu parenchymatico dilute fuligineo ostioli contextu lineari parenchymatico, aterrimo. Conidiis (?) perithecium conspergentibus globoso-angulosis, .015-·025 mm. diam., aterrimis, quandoque hyalino punctatis. Spermatiis intra perithecium, orientibus minimis oblongis, ·001 × ·001-·0015, copiosisssimis hyalinis saepe in glomerulis, subglobosus, pluribus coalitis; ascosporis. (?)

On pine boards. No. 2764.

Diatrype rhuina. *C. & E.*

Stroma effusum, ambitu et magnitudine maxime varium. Perithecciis globosis, in ligno etiolato immersis, ostiolis cylindricis, exsertis. Ascis cylindrico-clavatis. Sporidiis fusiformibus, leniter curvulis, nucleatis, demum, 1-5 septatis, ·04 × ·004 mm.

On *Rhus venenata*. No. 2915.

Diatrype albopruinosa. *Schw.*

On oak and maple. No. 2865.

= *Diatrype Duriæi*, Thumen. Myc. Univ. 275.

Melogramma aceris. *C. & E.*

Irregulariter erumpens. Peritheciis confluentibus, subdepressis, atris. Ascis clavatis. Sporidiis longe ellipticis, subcurvulis, brunneis, ·035-·04 × ·015 mm.

On branches of *Acer*. No. 2335b.

Valsa myricæ. *C. & E.*

Peritheciis globosis, linea nigra varia circumscriptis, ostiolis cylindricis, in disco plano atro subjunctis. Ascis cylindrico-clavatis. Sporidiis minutis, allantoideis, ·01-·012 mm. long.

On *Myrica*. No. 2903.

In habit approaching *Diatrype*.

Valsa conscripta. *C. & E.*

Epidermide tecta. Peritheciis subglobosis, ostiolis demum in fissuras lineas erumpentibus. Ascis clavatis. Sporidiis cylindricis, obtusis, curvulis, hyalinis, ·02 × ·004 mm.

On branches of *Carya* and *Comptonia*. No. 2861.

Valsa laurina. *C. & E.*

Epidermide nigrofacta tecta. Pustulis convexis ; ostiolis convergentibus. Ascis clavatis. Sporidiis cylindricis, utrinque obtusis, curvulis, hyalinis, ·02 × ·004 mm.

On twigs of sassafras. No. 2855.

Valsa cenisia. *Not.*

On *Juniperus Virginiana.* Nos. 2853, 2910.

Valsa personata. *C. & E.*

Pustulis variis, tectis. Peritheciis in ligno immersis, nigrocinctis. Ascis clavatis. Sporidiis lanceolatis, uniseptatis, quadrinucleatis, ·025-·028 × ·006 mm.

On *Robinia pseudacacia.* No. 2918.

Valsa rhuiphila. *C. & E.*

Pustulis orbicularibus. Peritheciis globosis, congestis ; ostiolis in disco brunneo, dein atra, erumpentibus. Ascis clavatis. Sporidiis hyalinis, allantoideis, circa ·01 mm. long.

On *Rhus venenata.* No. 2957.

Valsa (Diaporthe) paulula. *C. & E.*

Pustulis minimis, epidermide tectis. Peritheciis subglobosis, ostiolis brevibus erumpentibus. Ascis clavatis Sporidiis arcte fusiformibus, quadrinucleatis, ·016-·018 mm. long.

On twigs of *Nyssa.* No. 2943.

Valsa parasitica. *C. & E.*

Circinata. Peritheciis globosis, parvulis, decumbentibus, ostiolis elongatis, subflexuosis, supra fuscis. Ascis clavatis. Sporidiis allantoideis, minimis, ·006 mm. long.

On old *Massaria sudans.* No. 2844.

Growing beneath the cuticle over old pustules of *Massaria.*

Valsa obtecta. *C. & E.*

Pustulis minimis, ovatis. Peritheciis 3-5 globosis; ostiolis supra attenuatis, erumpentibus. Sporidiis allantoideis, ·014-·015 × ·0035 mm.

On *Clethra alnifolia.* No. 2513b.

Resembling *Valsa cypri*, Tul., but the ostiola are not united.

Sphæria (Pertusæ) albocincta. *C. & E.*

Sparsa. Peritheciis, hemisphericis, atris, mycelio albo cinctis, poro pertusis. Ascis clavatis. Sporidiis lanceolatis, utrinque obtusis, triseptatis, subconstrictis, hyalinis, ·03-·033 × ·012 mm.

On pine and cedar wood. No. 2866.

Sphæria (Immersæ) picacea. *C. & E.*

Peritheciis globosis, subgregariis, in maculas nigrofactas immersis. Ascis cylindraceis. Sporidiis uniseriatis, cylindricis, obtusis, rectis, fuscis, ·016 × ·004 mm.

On decorticated *Vaccinium.* No. 2846.

Sphæria (Obtectæ) biglobosa. *C. & E.*

Epidermide nigrofacta tecta. Peritheciis depressis. Ascis cylindraceis. Sporidiis uniseriatis, ellipticis, uniseptatis, forte constrictis, hyalinis, ·014 × ·007 mm., cellulis globosis.

On sassafras. No. 2905.

Sphæria (Obtectæ) thyoidea. *C. & E.*

Described as belonging to the "Immersæ," but really of the section "Obtectæ.

On *Juniperus Virginiana.* Nos. 2929, 2927.

Sphæria (Obtectæ) squamata. *C. & E.*

Sparsa, tecta. Peritheciis globoso-depressis, demum epidermide lacerato cinctis. Ascis amplis, saccatis. Sporidiis lanceolatis, triseptatis, hyalinis, ·025 × ·006 mm.

On fir twigs. No. 2922.

Sphæria (Obtectæ) castanella. *C. & E.*

Peritheciis epidermide lacerato tectis, hinc illic gregariis. Ascis clavatis. Sporidiis biseriatis, ·016 × ·003 mm., cylindricis, uniseptatis, hyalinis.

On twigs of *Castanea.* No. 2948.

Sphæria (Obtectæ) tephrosiæ. *C. & E.*

Sparsa primo tecta, demum apice nuda. Ascis cylindraceis. Sporidiis uniseriatis, arcte lanceolatis, 1-3 septatis, fuscis, ·03 × ·006 mm.

On *Tephrosia Virginiana.* No. 2887.

Sphæria (Thyridium) ambleia. *C. & E.*

Sparsa. Peritheciis atris, sub-prominulis, tectis. Ascis clavato-cylindricis. Sporidiis late lanceolatis, vel ellipticis, centro constrictis, merenchymatis, fuscis, ·025 × ·01 mm.

On *Carya* and *Azalea.* No. 2834.

Sphæria pustulata. *Sacc.*

On *Corylus.* No. 2838.

Sphæria (Diaporthe) cryptica. *Nke.*

On *Lonicera.* No. 2933.

Sphæria (Obtectæ) filispora. *C. & E.*

Sparsa. Peritheciis subprominulis, epidermide cinereo tectis. Ascis cylindraceis. Sporidiis filiformibus, ·13 mm. long.

On *Smilax* twigs. No. 2864.

Sphæria (Caulicolæ) Bokoniæ. *C. & E.*

Sparsa. Peritheciis membranaceis, brunneis, subglobosis, epidermide tectis. Ascis clavatis. Sporidiis biseriatis, lanceolatis, rectis vel curvulis, 3-septatis, pallide fuscis, ·03 × ·005 mm,

On stems of *Bokonia.* No. 2955.

REHM'S ASCOMYCETEN.

The 10th fasciculus of this excellent collection has just reached us. In quality the specimens seem to be fully equal to those contained in previous fasciculi, but in quantity there appears to be a visible decline from the liberal supply which characterized the earlier fasciculi.

CALIFORNIAN FUNGI.

(*Collected by* Dr. W. H. Harkness. *Determined by* J. E. Vize.)

Asteroma rosæ. *D.C.*—On rose leaves. No. 723.

Discella anomala. *Cooke.*—Pustulis sparsis, orbicularibus, atris, epidermide tectis; sporis fusiformibus, endochromate bipartito, hyalinis. ·07 × ·01 mm.

On *Yucca draconis.* No. 692.

The habit is that of *Discella*, but the spores resemble those of *Bactridium.*

Sporidesmium induratum. *Cooke.*—Effusum, atrum; sporis subglobosis, irregularibus, induratis, opacis, e cellulis angulatis compositis.

On leaves of *Arctostaphylos.* No. 683.

Very firm and compact, almost like a small *Sclerotium*, each mass composed of smaller subglobose portions which separate with difficulty, and these again are divided into irregular cells.

Phragmidium gracile. *Grev.*—On wild raspberry. No. 337.

Gymnosporangium biseptatum. *Ellis.* — On green twigs of *Libocedrus decurrens.* No. 581.

Puccinia xanthii. *Sch.*—On *Xanthium strumarium.* No. 258.

Puccinia berberidis. *Mont.*—On leaves of berberry. No. 687.

Puccinia helianthi. *Sch.*—On *Helianthus Californica.* No. 266.

Puccinia graminis. *Pers.*—On native grass. No. 269.

Puccinia artemisiarum.—*Duby.*—On *Artemisia.* Nos. 293, 294.

Puccinia angustata. *Peck.*—On *Juncus.* Nos. 309, 310, 314.

Puccinia splendens. n. s.—Amphigena, magnis acervis formantibus densas maculas cinctas fibra, sporidiis brunneis, medio vix constrictis, obtusis, ·05 × ·035 of mm. long.

On *Onion* or rabbit bush. No. 678.

Puccinia obtusa. *Schr.*—On white sage. No. 695.

Puccinia œnotheræ. *Vize.*—On *Œnothera strigulosa.* No. 705.

Puccinia Harknessi. n. s.—Acervulis parvis, oblongis, fuscis, demum erumpentibus epiderme cinctis, stipite parvo fultis; sporidiis oblongis, brunneis, in medio pæne æqualiter septatis, ·05 mm. long, ·025 mm. crass.

On branches of *Zygodesmia*, Sierra Nevada, at an altitude of 7,000 feet. No. 742.

Puccinia saniculæ. *Grev.*—Uredo form. The spores in this plant are immensely large compared with our British plants.

On stems of *Sanicula.* No. 1070.

Uromyces trifolii. *D.C.*—On clover leaves. No. 706.

Uromyces junci. *Tul.*—On *Juncus.* Nos. 253, 700.

Uromyces junci. *Schw.* var. **Scirpi.** — On *Scirpus triquetra.* No. 316.

Uromyces appendiculata. *Lev.*—Nos. 270, 674.

Uromyces prunorum. *Lk.* var. **Amygdali.**—On peach leaves. No. 305.

Ustilago bromivora. *F. de W*—On grass. No. 724.

Uredo lupini. *B. & C.*—On *Lupin.* Nos. 281, 719.

Uredo scirpina. *West.*—On *Scirpus.* No. 312.

Ræstelia cancellata. *Ret.*—On pear leaves. No. 334.

Æcidium gayophyti. n. s.—Hypophyllum, cupulis coccineis irregulariter dispositis, gregariis vel solitariis, primo epiderme tectis demum liberis; sporidiis irregulariter globosis vel polygonis, 1-4 nucleis coccineis.

On leaves of *Gayophytum.* No. 752.

Cladosporium delicatulum. *Cooke.*—On leaves. No. 718.

Cladosporium herbarum.—On *Typha.* Nos. 672, 698.

Cladosporium epiphyllum. *Corda.*—On poplar leaves. No. 335.

Aspergillus glaucus. *Lk.*—On *Larix Europœa.* No. 702.

Ramularia obovata. *Fckl.*—On *Rumex.* No. 280.

Oidium Tuckeri. *B. & Br.*—On vine leaves. No. 751.

Fusarium personatum. *Cooke.*—Pusillum, pallidum, hyphis abbreviatis; sporis fusiformibus, curv tis, ·03 mm. long.

Scattered over the leaves of *Oreodaphne Californica.* No. 333.

Scarcely visible to the naked eye; mixed with a sterile *Sphærella,* probably *S. maculæformis.*

Cercospora inquinans. *Cooke.*—Amphigena, atra; hyphis fasciculatis, brevibus, fuligineis; sporis abbreviatis, obclavatis, robustis, 1-3 septatis, fuligineis, ·03-·07 × ·006 mm.

On leaves of *Gymnocarpus.* No. 260.

Sphæria yuccægena. *Cooke.*—Gregaria, tecta; peritheciis prominulis, atris; ascis cylindraceis; sporidiis uniseriatis, ellipticis, uniseptatis, constrictis, brunneis, ·028 × ·01 mm.

On *Yucca.* No. 693.

Sphæria palmacea. *Cooke.*—Immersa, tecta; peritheciis minimis, subglobosis; ascis cylindraceis; sporidiis ellipticis, uniseriatis, constrictis, brunneis, ·013 × ·006 mm.

On palm leaves. No. 717.

Only visible through the cuticle when moist.

Sphæria Vizeana. *Cooke.*—Caulicola, sparsa; peritheciis atris, prominulis, ascis clavatis; sporidiis biseriatis, subellipticis, uniseptatis, hyalino-luteolis, ·03 × ·01 mm.

On stems of *Lathyrus venosa.* No. 753.

Quite different from *S. lathyrina,* B. & C.; upper cell of sporidia broadest.

Sphæria herbarum. *Pers.*—On stems of soap plant. No. 707. The ascus contains 16 sporidia, and therefore adds to the varieties already recorded of this plant.

Sphæria conflicta. *Cooke.*—Epiphylla, maculis rotundatis, brunneis; peritheciis in centro gregariis; ascis clavatis; sporidiis filiformibus, nucleatis, ·06 mm. long.

On leaves of *Quercus*. No. 691.

Phyllactinia guttata. *Lev.*—On fallen leaves. Nos. 328, 331, 690.

Erysiphe Martii. *Lk.*—On clover. No. 706.

Rhytisma arbuti. *Phillips.*—Hyphophylla, innata, in maculis, rugosis atris irregularibus confluens, dirumpens, in rotundis flexuosum fissuris, disco brunneo, atro; ascis latis sub-clavatis, sporidiis filiformibus.

On *Arbutus* leaves. No. 336.

Rhytisma. sp.—Immature. On Balm of Gilead. No. 682.

SOME EXTRA-EUROPEAN FUNGI.

By M. C. Cooke.

A small collection of fungi from Mr. W. R. Gerard, collected in the State of New York, included the following species:—

160. **Sphærella nigrita.** *Cke.*
Hypophylla. Peritheciis semi-immersis, in maculis orbicularibus nigrofactis congestis. Ascis clavatis; sporidiis elongato-ellipticis, uniseptatis, hyalinis (·015 × ·004 mm.).
On oak leaves.

161. **Tubercularia nigricans.** *Link.*

173. **Polyporus radiatus.** *Fr.*

176. **Sphæropsis fusispora.** *C.*

178. **Polyporus gilvus.** *Schw.*

179. **Diatrype quercina.** *Fr.*

182. **Polyporus poripes.** *Fr.*

193. **Sphæria acuminata.** *Sow.*

195, 203. **Valsa stellulata.** *Fr.*

196. **Sphæria doliolum.** *Pers.*—On herbaceous stems.

198. **Sphæria stictostoma.** *B. & C.*—On herbaceous stems.

199. **Diatrype verrucæformis.** *Fr.*

200. **Peziza pteridis.** *A. & S.*

202. **Peziza fusca.** *Pers.*

204. **Sphæropsis puncta.** *C. & E.*—On *Lonicera*.

205. **Sphæria anguillida.** *C. & E.*—On herbs.

206. **Sphæropsis celtidis.** *Curt.*—On galls of *Celtis*.

207. **Diplodia compacta.** *C. & Gr.*

Pustulis erumpentibus, epidermide cinctis. Peritheciis confluentibus, obtusis; sporis ellipticis, vel biglobosis, brunneis, constrictis (·03 × ·018 mm.).

On branches.

208. **Fusarium glandicolum.** *C. & Ger.*

Roseum, subglobosum dein confluens; sporis ellipticis (·008 × ·004 mm.).

On acorns.

210. **Peziza virginea.** *Batsch.*

211. **Microthyrium smilacis.** *Not.*—On *Smilax.*

212. **Stictis patellea.** *Cke.*

Sparsa, orbicularis, concava, immersa, disco cervino; ascis clavatis; sporidiis lanceolatis, 3 septatis, hyalinis (·02 × ·005 mm.).

On naked wood.

216. **Sphæria modesta.** *Desm.*—On herbs.

215. **Peziza vinosa.** *A. & S.*

217. **Myrothecium inundatum.** *Tode.*—On dead fungi.

220. **Pestalozzia guepini.** *Desm.*—On Camellia leaves.

221. **Nectria episphæria.** *Tode.*—On old *Hypoxylon.*

222. **Cucurbitaria cupularis.** *Fr.*

223. **Dothidea smilacicola.** *C. & G.*

Sparsa, atra, erumpens, convexa; ascis cylindraceis; sporidiis biglobosis, valde constrictis, brunneis (·018-·02 × ·01 mm.).

On *Smilax* twigs.

224. **Melogramma ambiguum.** *Schw.*—On branches of *Rhus.*

225. **Helicoma Berkeleyi.** *Curt.*

226. **Mystrosporium aterrimum.** *B. & C.*

Erysiphe Montagnei. *Lev.*—On *Strumarium.*

Hysterium viticolum. *C. & P.*—On *Vitis.*

The following specimens were sterile:—191, 192, 194, 209, 213, 214, 216, 218, 225.

Dr. Bancroft also placed in our hands a very interesting species of *Hypocrea*, found on the leaves of the nutmeg tree at Singapore. This does not appear to have been hitherto described.

Hypocrea scutata. *Cke.*

Epiphylla, orbicularis, scutellata, convexa, glabra, aurantia, infra puncto centrali affixa; carne stramineo, ceraceo, radiato-celluloso; peritheciis tenuis, immersis, extus nec conspicuis; ascis elongato-cylindraceis, 3 mm. long; sporidiis filiformibus, multiseptatis, in frustulis, ·01 mm. long, dissilientibus.

On leaves of *Myristica.* Singapore.

The peltate discs are about $\frac{1}{2}$ to 1 centimetre in diameter, somewhat resembling button galls, but quite smooth, of a bright ochraceous orange colour, and of a resinous or waxy appearance; the sporidia are nearly as long as the asci.

Amongst some fragments of petioles of *Astrocaryum*, from Brazil, specimens of a superficial *Sphæria* were found, of which the following is a description:—

Sphæria (Denudatæ) astrocaryi. *Cooke.*

Subgregaria, vel sparsa, atra; peritheciis superficialibus, rugosis, vix papillatis; ascis clavatis; sporidiis fusiformibus rectis, vel leniter curvulis, multiseptatis (8-10) hyalinis, ·06-·07 + ·007 mm.

On petioles of *Astrocaryum*, Brazil.

At length we have succeeded in obtaining, through Mr. G. Western, of Madras, specimens of one of the kinds of smut which affects rice in India. It is of a dingy olive colour, pulverulent, and surrounds the grain, destroying the whole substance, except a small portion in the centre. See "Fungi, their Nature," &c., p. 224.

Ustilago virens. *Cooke.*

Pulverulentum, effusum, olivaceo-virens; sporis globosis, olivaceo-fuscis, episporio granulosis, ·005 mm.

On grains of rice (*Oryza sativa.*) Tinnevelly, India.

Penicillium tenellum. *Cke.*

Effusum, pallide fumosum. Hyphis gracilibus, simplicibus vel furcatis, brevibus, septatis, diaphanis; sporis globosis, minimis, hyalinis, ·003 mm. diam.

On fading leaves of *Symplocos.* Bengal, India.

The effused patches are as much as an inch in diameter, but very thin, and but little darker than the leaf. The threads are very delicate and short, not exceeding one-tenth of a millimetre.

NORTH AMERICAN ALGÆ.

The second fasciculus of "Algæ Am. Bor. Exsiccatæ," by Farlow, Anderson, and Eaton, is just issued, and contains—

51. Dasya elegans. *Ag.*
52. Polysiphonia Woodii. *Harv.*
53. Polysiphonia verticillata. *Harv.*
54. Bostrychia rivularis. *Harv.*
55. Rhodomela subfusca. *Ag., var.* firmior *forma* juvenilis. *Ag.*
56. Odonthalia dentata. *Lyngb.*
57. Chondria atropurpurea. *Harv., var.* tenuior. *Farlow.*
58. Ricardia Montagnei. *Derb. & Sol., var.*. gigantea. *Farlow.*
59. Laurencia pinnatifida. *Lam'x., var.* spectabilis.
60. Laurencia virgata. *J. Ag.*
61. Laurencia intricata. *Kütz.*
62. Laurencia tuberculosa. *J. Ag., var.* gemmifera. *J. Ag.*

63. Laurencia papillosa. *Grev., var.* subsecunda. *Kütz.*
64. Grinnellia Americana. *Harv.*
65. Delesseria quercifolia. *Bory.*
66. Delesseria (Caloglossa) Leprieurii. *Mont.*
67. Nitophyllum spectabile. *Eaton.*
68. Nytophyllum latissimum. (*Harv.*) *J. Ag.*
69. Nitophyllum Fryeanum. *Harv.*
70. Liagora valida. *Harv.*
71. Liagora Cheyneana. *Harv.*
72. Nemalion? Andersonii. *Farlow.*
73. Plocamium coccineum. *Lyngb., var.* Californica.
74. Euthora cristata. *Ag.*
75. Lomentaria Baileyana. (*Harv.*) *Farlow.*
76. Rhabdonia Coulteri. *Harv.*
77. Cordylecladia conferta. *Ag.*
78. Halosaccion ramentaceum. *Ag.*
79. Gigartina microphylla. *Harv., var.* horrida. *Farlow.*
80. Halymenia decipiens. *Ag.*
81. Prionitis lanceolata. *Harv.*
82. Ptilota asplenioides. *Ag.*
83. Ptilota densa. *Ag.*
84. Ptilota elegans. *Bonnem.*
85. Ptilota plumosa. *Ag., var.* serrata. *Kutz.*
86. Microcladia Coulteri. *Harv.*
87. Microcladia Californica. *Farlow.*
88. Grffithsia Bornetiana. *Farlow.*
89. Callithamnion (Antithamnion) Americanum. *Harv.*
90. Callithamnion pellucidum. *Farlow.*
91. Zonaria Tournefortii. (*Lam'x.*)
92. Zonaria lobata. *Ag.*
93. Dictyota Kunthii. *Ag.*
94. Chordaria abietina. *Ruprecht in Herb. Petrop.*
95. Dictyosiphon hippuroides. (*Lyngb.*) *Aresch.*
96. Caulerpa ericifolia. *Ag.*
97. Dasycladus occidentalis. *Harv.*
98. Monostroma Blyttii. (*Aresch.*) *Wittr.*
99. Botrydium gregarium. (*A. Braun.*)
100. Nostoc flagelliforme. *Berkeley & Curtis.*

We commend this collection of the Algæ of the United States to our readers. The specimens are carefully determined by gentlemen thoroughly competent for the work, and although there are numerous collections of fungi, some good, and some indifferent, constantly in course of issue, it is but rarely that collections of Algæ make their appearance. We do not hesitate to pronounce in favour of the excellent quality of the above series now in course of publication.

HEPATICÆ BRITANNICÆ EXSICCATÆ.

The following is a list of the species contained in the first fasciculus of this work, by Dr. Carrington and W. H. Pearson.

1. Gymnomitrium concinnatum. *Corda.*
2, 3. „ crenulatum. *Gotsch.*
4. Nardia sphacelata. *Carr.*
5. „ adusta. *Carr.*
6, 7. „ scalaris. *Gr. & B.*
8, 9. „ compressa. *Gr. & B.*
10, 11. Trichocolea tomentilla. *Dmrt.*
12, 13, 14. Saccogyna viticulosa. *Dmrt.*
15. Plagiochila tridenticulata. *Tay.*, & exigua? *Tay.*
16, 17. Scapania resupinata. *Dmrt.*
18. „ Bartlingii. *Nees.*
19. „ compacta. *Dmrt.*
20. „ umbrosa. *Dmrt.*
21, 22. „ undulata. *Dmrt.*
23, 24. Diplophyllum albicans. *Dmrt.*
25. „ Dicksoni. *Dmrt.*
26. Jungermannia crenulata. *Smith.*
27. „ cordifolia. *Hooker.*
28, 29. „ inflata. *Hudson.*
30. „ intermedia. *Ldg.*
31. „ Lyoni. *Taylor.*
32. „ stellulifera. *Taylor.*
33. „ Starkii. *Nees.*
34. „ curvifolia. *Dicks.*
35. Anthelia julacea. *Dmrt.*
36. Lophocolea heterophylla. *Dmrt.*
37. Lepidozia reptans. *Dmrt.*
38. „ cupressina *var.* tumidula. *Carr.*
39. Bazzania trilobata. *G. & B.*
40, 41. Physiotium cochleariforme. *Nees.*
42. Herbertia adunca. *Gr & B.*
43. Radula aquilegia. *Taylor.*
44. „ voluta. *Taylor.*
45. Porella laevigata. *Lindb.*
46. „ Thuja. *Lindb.*
47. Frullania dilatata. *Dmrt.*
48. „ Tamarisci. *Dmrt.*
49. „ „ *var.* cornubica. *Carr.*
50. „ Hutchinsiæ. *Nees.*
51. Lejeunia minutissima. *Dmrt.*
52. „ ovata. *Taylor.*
53, 54. Fossombronia caespitiformis. *De Not.*
55, 56. „ angulosa. *Raddi.*

57, 58. Fegatella conica. *Corda.*
59. Riccardia pinguis. *Gr. & B.*
60, 61. ,, sinuata. *Gr. & B.*
62. ,, multifida. *Gr. & B.*
63. ,, ,, *var.* ambrosioides. *Nees.*
64. Targionia hypophylla. *L.*
65. Riccia nigrella. *D.C.*
66. ,, glaucescens. *Carr.*, Mss.
67. ,, tumida. *Ldg*
68. Jungermannia laxifolia. *Hooker.*
69. Odontoschisma denudatum. *Dmrt.*
70. Chiloscyphus polyanthos. *Dmrt.*
71. Porella platyphylla. *Dmrt.*
72, 73. Metzgeria furcata. *Dmrt.*
74. Jungermannia attenuata. *Ldg.*
75. Lejeunia hamitifolia. *Dmrt.*

ON ANTHRACNOSE—A NEW DISEASE OF THE VINE.

By Dr. Maxime Cornu.*

The vineyards of the Narbonne district have been attacked this year by a new disease, caused by a special Fungus, which, I believe, with Monsieur Planchon to be identical with the *Phoma uvicola.*† This disease, which has received the name of anthracnose, is characterised by its peculiar effects on the boughs and leaves, and on the grapes. This parasite produces on the grapes a circular spot—black, as if burnt—in the middle of which a smaller white circle is seen, formed by the development of the conidiiferous form of the fungus.

On the stem, these black spots become depressed circles ; the stem appears corroded and burnt through to the woody tissue, sometimes to the pith ; it is this peculiar effect which has caused the disease to be sometimes designated by the characteristic name of "Chanchre" (canker). On the leaves, spots of different sizes are seen, more or less confluent, formed by the dried-up tissue which has been affected by the influence of the parasite.

I have received from Monsieur Blavet, President of the Society of Agriculture of Étampes, leaves and bunches of grapes, showing a disease which has alarmed the vinegrowers of that district. The grapes, scarcely ripe, showed circular black spots, which appeared to radiate from the point of attachment of the grape ; the leaves, partially dried up, were covered in some places rather abundantly with a brown mould.

* Translated from the Bulletin of the Botanical Society of France.
† "Comptes rendus de l'Académie," August, 1877.

The anatomical examination of a single grape showed an abundant mycelium, spreading through the whole of the substance of the tissue, and frequently ramifying. The peripheral portions of the grape contained the earlier stages of the mycelium.

This mycelium is relatively large and black in colour; the septa are numerous, and the articulations are filled with minute oleaginous globules; it presents in places a felted appearance, the early state of a second form of fructification which has not arrived at maturity. These peculiarities of structure and appearance are those of a *Pleospora* or a *Cladosporium*. The leaves showed on their lower surface numerous conidiiferous tufts of a fungus belonging to this last genus, the nature of which I was able to ascertain. A transverse section of the leaf shows that the filaments proceed from the stomata, and escape in order to form their spores. The filaments are blackish brown, septate, ramifying but little, and produce at their extremities small spores either simple or multilocular. The spores are oval, and variable in form and diameter; they are frequently elongated and acuminate at their point of insertion.

The form, the dimensions, the nature of the spores and of the mycelium, of which in all their parts the diameter is ten times greater than that of the corresponding parts of the parasite which causes the anthracnose, prevents the supposition that these two diseases of the vine can have any relation to each other. The grapes are not attacked by the anthracnose in any definite spot, but it is near the point of attachment that this new disease first appears; by this peculiarity alone, one is enabled at the first glance to distinguish between these two diseases.

It is probable that the vine disease of Étampes ought to be referred to the *Cladosporium*, developing itself at the expense of living plants, in the same manner as that species which produces the speckled appearance on pears, and which has been studied lately by Monsieur Prillieux, a member of our Society.* Our species appears to be identical with the *Cladosporium viticolum* Ces.† This species does not appear to be of rare occurrence in our vineyards. I have met with it several times, both in the plain of Montpellier, and at Cognac, during the numerous excursions I made through the vine district when engaged in my researches on the Phylloxera.

The vines cultivated in these districts have generally cottony leaves, and the parasite which is found on the lower surface of the leaf, always covered with a thick down, forms greyish spots; these spots are caused by the abundant spores, mixed with hairs twisted together. The presence of these grey spots is perhaps the only character indicating the existence of this fungus, of which the bad effects appear to be easily overlooked. I have never observed any bunch of grapes attacked and blackened

* "Comptes rendus de l'Académie," September, 1877.

† "Klotsch et Rabenhorst Fungi germ," t. xix., 1854, No. 1877.

like those I received from Monsieur Blavet. Perhaps the development of the *Cladosporium* and of the anthracnose may be attributed to the unusual rainfall of this year, and which may make these species formidable in wet seasons.

I do not hesitate to consider the development of the *Cladosporium* as the cause and not as the effect of the disease : this last hypothesis will not stand examination. This *Cladosporium* is developed on plants in perfect health, and on portions which are not in the least decayed ; the same is the case with *Cl. dendriticum*, which attacks Pear trees and Service trees, and which may serve to corroborate what I have just stated. It may perhaps be interesting to state here that I found an allied species probably new to the French flora, last September. Numerous plants of Vincetoxicum officinale were growing on calcareous rocks, at a few feet from the fine cascade formed by the fall of the Doubs and called the " Saint du Doubs."

The leaves of this plant showed on their lower surface a black down, caused by a parasitic fungus. Microscopical examination revealed the existence of a *Cladosporium*, of which the filaments escaped from the tissue of the leaf by the openings of the stomata ; the parenchyma was traversed by the mycelium, which, here and there, had formed knots or filaments felted together, probably the commencement of a second kind of fructification. It was the *Cl. Bellynckii* Westendorp, which that author has published in his Exsiccata.

This species is closely related to the *Cladosporium* of the Vine and Rosaceæ ; it deserves to be studied carefully as well as the others, as it would be interesting to know the form and nature of its other modes of reproduction. The genus *Cladosporium* includes plants varying much from each other, and which all belong to the Ascomycetes.

FUNGI OF CALIFORNIA.

(*Collected by* Dr. H. W. Harkness *and* Mr. J. P. Moor.)

By William Phillips, F.L.S.

Having received a further consignment of fungi from Dr. Harkness and Mr. J. P. Moor, collected in California, chiefly belonging to the sections Myxomycetes and Discomycetes, I propose to give an account of such species as have not been recorded in my former papers. ("Grevillea," Vol. v., p. 35 and p. 113.) The ground searched by these gentlemen were the forests bordering the coast of the Pacific,in which the red wood (*Sequoia sempervirens*) abounds, having an elevation of 4,500 feet above the level of the sea, and the Yosemite Valley, in which the big trees (*Sequoia gigantea*) are found, having an elevation of 5,000 feet above the level of the sea.

Dr. Harkness directed his attention especially to the fungi found growing on the bark and wood of the above-named trees, and, as might have been anticipated, he has found several species new to science, besides a large number of already described species.

Didymium [clavus. *A. & S.*—No. 504.

Comatricha Friesiana. *D'By.*—No. 647.

Comatricha typhina. *Roth.*—No. 968.

Dictydium cernuum. *(Pers.)*—Immature. No. 606.

Trichia varia. *Pers.*—Nos. 590, 997, 1039 ?

Arcyria nutans. *Bull.*—No. 469.

Lycogala epidendrum. *Bux.*—Nos. 447, 524, 895.

Cyathus striatus. *Hoffm.*—No. 477.

Fusisporium *sp. ?*—On fruit of *Oreodaphne Californica.* No. 505.

Stilbum fimetarium. *B. & Br.*—No. 550.

Reissia semiophora. *Fresen.*—No. 605.

Myxotrichum ochraceum. *B. & Br.*—No. 884.

Chætomium elatum. *Kze.*—No. 554.

Peziza fulgens. *Pers.*—Nos. 611, 658.

Peziza bufonia. *Pers.*—No. 932.

Peziza (Cupulares) secreta. n. s.—Gregarious, sessile or substipitate, medium sized, salmon-coloured, concave, sulcate towards the base; margin thin, crenulate; asci cylindrical; sporidia 8, elliptical, smooth, hyaline, ·016-·018 × ·009-·01 mm.; paraphyses filiform.

On the earth in dense forests. No. 994.

This differs from *Peziza crenulata*, B. & Br., in colour, the paraphyses not being thickened upwards, the smaller sporidia, and growing on the earth.

Peziza (Cupulares.) sub-urceolata, n. s.—Gregarious, stipitate, small, at first urceolato campanulate, then concave, smooth, pale orange, or pale tan-coloured; margin thin, crenulate; stipes short, rather thick; asci cylindrical; sporidia 8, oblong-ovate, ·019 × ·008 mm., smooth, hyaline; paraphyses filiform, numerous.

On the earth attached to buried fragments of wood by an abundant mycelium. In very young specimens the mouth of the cup is merely a minute pore, around which the edge forms a thin membrane or veil. No. 914.

Peziza carbonaria. *A. & S.*—No. 637.

Peziza hinnulea. *B. & Br.*—No. 978.

Peziza macrocystis. *Cooke.*—No. 922.

Peziza (Humaria) gemmea. n. s.—Gregarious, small, sessile, fleshy, at first sub-turbinate, then expanded; disc blood-red; externally pale-red, smooth; asci cylindrical; sporidia 8, sphæ-

rical, smooth, hyaline, ·008-·009 mm.; paraphyses filiform, branched at the summits 1-4 times.

On decaying foliage of *Sequoia sempervirens*. No. 876.

This is very near *Peziza constellatio*, B. & Br., from which it differs in the size of the sporidia.

Peziza scubalonta. *Cooke.*—No. 507.

Peziza (Sarcoscyphæ) sequoiæ. n. s.—Gregarious, sessile, medium size, concave, fleshy; clothed externally with a dense coat of brown, septate, entangled hairs, which are larger and straighter near the margin; disc reddish flesh-colour; asci cylindrical; sporidia 8, ovate, smooth, hyaline, ·017-·02 × ·012-·013 mm.; paraphyses linear, simple, slightly enlarged upwards.

On dead twigs of *Sequoia gigantea*. Nos. 636, 638.

Peziza clandestina. *Bull.*—No. 1034.

Peziza sanguinea. *Pers.*—On dead black oak. No. 594.

Peziza relicina. *Fr.*—On spikenard stems. No. 992.

Peziza acutipila. *Karst.*—On wild raspberry. No. 900.

Peziza acuum. *Fr.*—On foliage of *Sequoia sempervirens*. Nos. 887, 933, 1021.

Peziza (Dasyscyphæ) setigera. n. s.—Gregarious, sessile, small, concave, clothed externally with brown, septate, rigid hairs; disc brownish flesh-colour; asci clavate; sporidia 8, oblong, ·016 × ·0035 mm., paraphyses broad, exceeding the asci in length, pointed at the summit.

On dead stems of a species of *Aralia*. No. 981. This differs from its congeners in the much larger sporidia, asci, and paraphyses.

Peziza (Dasyscyphæ) scabro-villosa. n. s.—Gregarious, stipitate; disc yellowish-white; cup clothed externally with rather long scabrous, white hairs, often surmounted with a head of angular granules; asci cylindrical; sporidia 8, fusiform, ·015-·021 × ·002-·003 mm.; paraphyses broad, pointed at the summit, exceeding the asci in length.

On *Rubus nutkanus*. No. 982.

Peziza subtilissima. *Cooke.*—On spruce. No. 1029.

Peziza Agassizii, *B & C. var.* **rufipes.** n. var.—The colour of the stem may justify this being regarded as a variety.

On Pinus contorta. No. 1019.

Peziza cupressina. *Batsch.*—On dead foliage of *Sequoia sempervirens*. No. 869.

Peziza pithya. *Pers.*—On bark of *Sequoia sempervirens*. No. 894.

Peziza fusca. *Pers.*—Nos. 500, 610.

Peziza bulgarioides. *Rabh.*—On dead cones of *Sequoia gigantea* No. 1035.

Peziza nigrescens. *Cooke.*—No. 1008.

Peziza (Hymenoscyphæ) alutipes. n. s.—Gregarious, stipitate, infundibuliform, then plane, tan-colour, margin entire; stem firm, long, slender, and flexuous, or short, slightly enlarged at its junction with the rugose cup, concolorous; asci clavate, broad; sporidia 8, oblong-ovate, multinucleate; ·018-·02 × ·005-·008 mm.; paraphyses filiform, thicker at the top, adherent, somewhat coloured.

On decaying foliage of *Libocedrus decurrens.* No. 993.

Peziza caucus. *Rebent.* var. **fusco-purpurea.** n. v.—On dead foliage of cedar. No. 1081. I have grave doubts as to the propriety of referring this to Rebentisch's species.

Peziza vinosa. *A & S.*

Helotium aureum. *Pers.*—No. 976.

Cenangium sequoiæ. *Plowright in litt.*—Gregarious, turbinate, black, margin connivent; disc black, pale, cinerious within; asci broadly clavate; sporidia 8, ovate, or ovate-oblong, simple, or triseptate, enucleate, ·025-·03 × ·007-·015 mm.; paraphyses slender, furcate. On *Sequoia gigantea.* No. 639.

Cenangium prunastri. *Fr.*—No. 579.

Dermatea flavo-cinerea. n. s.—Gregarious, sessile, at first hemisphærical, then expanded; disc yellow, or bluish-cinerious, margin fringed with short brown hairs, externally nut-brown; asci clavate; sporidia 8, fusiform, straight, or curved, uniseptate, or with three nuclei, ·01-·02 × ·004-·006 mm.; paraphyses numerous, very slender.

On chips. No. 990.

Ascobolus (Ascophanus) pilosus. *Boud.*—On dog's dung. No. 954.

Ascobolus (Ascophanus) raripilus. n. s.—Gregarious, or crowded, minute, sessile, glabrous, at first globose, then hemisphærical; disc convex, pale, egg-yellow, scantily clothed externally with a few, pale, septate, straight hairs; asci broadly clavate; sporidia 8, ovate, smooth, hyaline, ·025 × ·014 mm.; paraphyses linear, simple, clavate at the summit.

On cow dung. No. 509.

Ascobolus (Ascophanus) ciliatus. *Boud.*—No. 619.

Ascobolus (Ascophanus) papillatus. *Boud.*—No. 622.

Bulgaria sarcoides. *Fr.*—No. 525.

Stictis versicolor. *Fr.*—No. 562.

ON CHÆTOPHOMA.

By M. C. Cooke.

A small group of minute fungi have undoubtedly presented themselves in the experience of most mycologists, similar, if not identical with those of the present communication. These insignificant plants have been thrown aside as unworthy of attention, because, as most probably is the case, they are not autonomous. At the outset we must confess, unreservedly, that we do not regard them in any other light than as the pycnidia, or bodies of a similar value, of some higher and unknown forms. The only good purpose which can be served by attaching names to such organisms is to afford a definite means for their identification, so that hereafter they may the more readily be referred to the species of which they are but a simple condition. Such records may in the future help to elucidate the life history of plants now imperfectly known. By themselves the species which compose such genera as *Septoria*. *Phyllosticta*, *Phoma*, *Sphæropsis*, *Tubercularia*, &c., are of little interest or value; but when we are enabled to associate them undoubtedly with other fungi, as simple conditions, or accessories, they acquire a value in proportion as they lose their distinctive name. With this explanation we may proceed to the bodies in question.

Somewhat allied to *Phoma*, but quite distinct from that genus, there are a number of *species*, as we shall for the present designate them, which possess a delicate membranaceous perithecium, sometimes globose, sometimes flask-shaped and sometimes elliptical or cylindrical, which are entirely superficial, that is, not immersed in any matrix, but usually seated upon, or amongst an intricate byssus of ramifying threads. It is very usual to meet them in company with some *Cladosporium* or *Macrosporium*. It is true that they may prove to be the pycnidia of the species of *Sphæria* of which the *Cladosporium*, or the *Macrosporium*, are the conidia; but it will not serve the purposes of science to guess at their function until the facts are established, since there is even a possibility that they may be parasites upon the threads with which they are found associated.

These membranaceous perithecia contain a very large number of minute simple spores which are expelled, at least in some instances, in a long tendril from the apex, either through a cleft or generally a pore or ostiolum. In some features they resemble very minute species of *Phoma*, but they are certainly not good members of that genus, they form a very natural group in themselves with various features in common, and would constitute a far more natural and distinct genus than many of the new genera of *Sphæriacei* now in vogue. *Coniothyrium* is another genus for which they have some affinity, but, as that genus is now being understood, they would

scarcely find a place in it. *Aposphæria* is a genus which was constituted to receive such species of carbonaceous *Phomæ* as in time became superficial by the falling away of the cuticle; hence these species have less reason for being associated with *Phoma*, because they are always superficial, and have as distinct a byssoid stroma as the majority of species of *Asteroma*.

Temporarily, therefore, and for the purposes of identification, we propose the association of these simple forms under the name of *Chætophoma*, so that each may have a name by which it may be spoken or written about, and consequently aid in referring them to their proper position, whenever that may be discovered.

Chætophoma. *Gen. nov.*

Perithecia membranacea, minutissima, superficialis, intra hyphis intricatis plerumque nidulans, spermatiis minimis, continuis, hyalinis saepe ovalibus vel ellipsoideis. Principally foliicolous.

The enumeration of some of the forms which we would propose for insertion under this name will serve to illustrate better than a mere technical description, which is necessarily somewhat lax, the features which a number of these minute forms have in common.

A. Perithecia subglobose.

Chætophoma ilicifolia. *Cke.*

Hypophylla, fuliginea, maculæforma. Hyphis byssinis ramulosis, intricatis, brunneis, ramulis adscendentibus, cladosporioideis. Peritheciis brunneis, globosis (·07 mm. diam,) sparsis. Sporis ellipticis, vel ovalibus, hyalinis (·004 × ·0025 mm.).

On leaves of *Ilex opaca*. S. Carolina. Rav. (No. 2567.)

Forming smoky spots on the under surface of the leaves. The minute perithecia are seated amongst the threads of a species of *Cladosporium*.—Pl. 118, fig. 3.

Chætophoma quercifolia. *Cke.*

Hypophylla, effusa, fuliginla. Hyphis byssoideis repentibus, flexuosis, furcatis, intricatis, brunneis. Peritheciis globosis, fuscis, (·03-·04 mm. diam.), gregariis vel sparsis. Sporis minimis, ovatis, hyalinis.

On leaves of *Quercus nigra*. U. States. S. Carolina. Rav.

The perithecia are smaller and more gregarious than in *C. ilicifolia*, and no conidia have yet been detected on the byssoid threads, which are densely interwoven.—Plate 118, fig. 1.

Chætophoma Catesbeyi. *Cke.*

(*Phoma Catesbeyi* Thum. Flora, 1878, p. 179.)

Hypophylla, fusca. Hyphis byssoideis, ramosis, intricatis, brunneis, repentibus. Peritheciis gregariis, foliorum paginam inferiorem toto occupans, subglobosis, fuscis (·025-·03 mm.) Sporis sub-ovato globosis, hyalinis (·0015 mm.)

On leaves of *Quercus Catesbeyi*. S. Carolina. Rav. (2202).—Plate 118, fig. 2.

Chætophoma anthelmintica. *Cke.*

Epiphylla, atro-fuliginea. Hyphis byssoideis repentibus, brunneis, ramulosis, ramulis conidiiferis erectis, cladosporoideis. Peritheciis globosis-depressis, brunneis (·01 mm.) Sporis arcte ellipticis, obtusis, hyalinis (·007 × ·003 mm.)

On fading leaves of *Chenopodium anthelminticum.* S. Carolina. Rav. (2088.)

In this instance the perithecia are seated amongst the threads of a *Cladosporium.*—Plate 119, fig. 5.

Chætophoma Catalpæ. *Cke.*

Hypophylla, effusa, brunnea. Hyphis byssoideis repentibus, flexuosis, ramulosis, paucis. Peritheciis globosis, brunneis (·04-·05 mm.). Sporis subovatis, hyalinis (·002 × ·0015 mm.)

On dead leaves of *Catalpa cordifolia.* S. Carolina. Rav. (2302.)—Plate 118, fig. 4.

In this species the hyphæ are not so profuse or distinct as in most of the others. In some conditions the threads are nearly obsolete, in others they constitute a *Cladosporium*, with small uniseptate spores.

B. Perithecia elongated.

Chætophoma cycadis. *Cke.*

Hypophylla, maculæforma, sparsa, brunnea. Hyphis byssoideis ramosis, repentibus, ramulis conidiferis assurgentibus, macro sporoideis. Peritheciis lagenæformibus, superne attenuatis, fuscis (·015 × ·09 mm.) Sporis ellipticis, hyalinis (·005 × ·003 mm.)

On leaves of *Cycas.* S. Carolina (2543.)

Seated amongst *Macrosporium commune*, in velvety patches on the under side of the leaves. In this species we saw the expulsion of the spores in a long continuous tendril during examination under the microscope.—Plate 119, fig. 6.

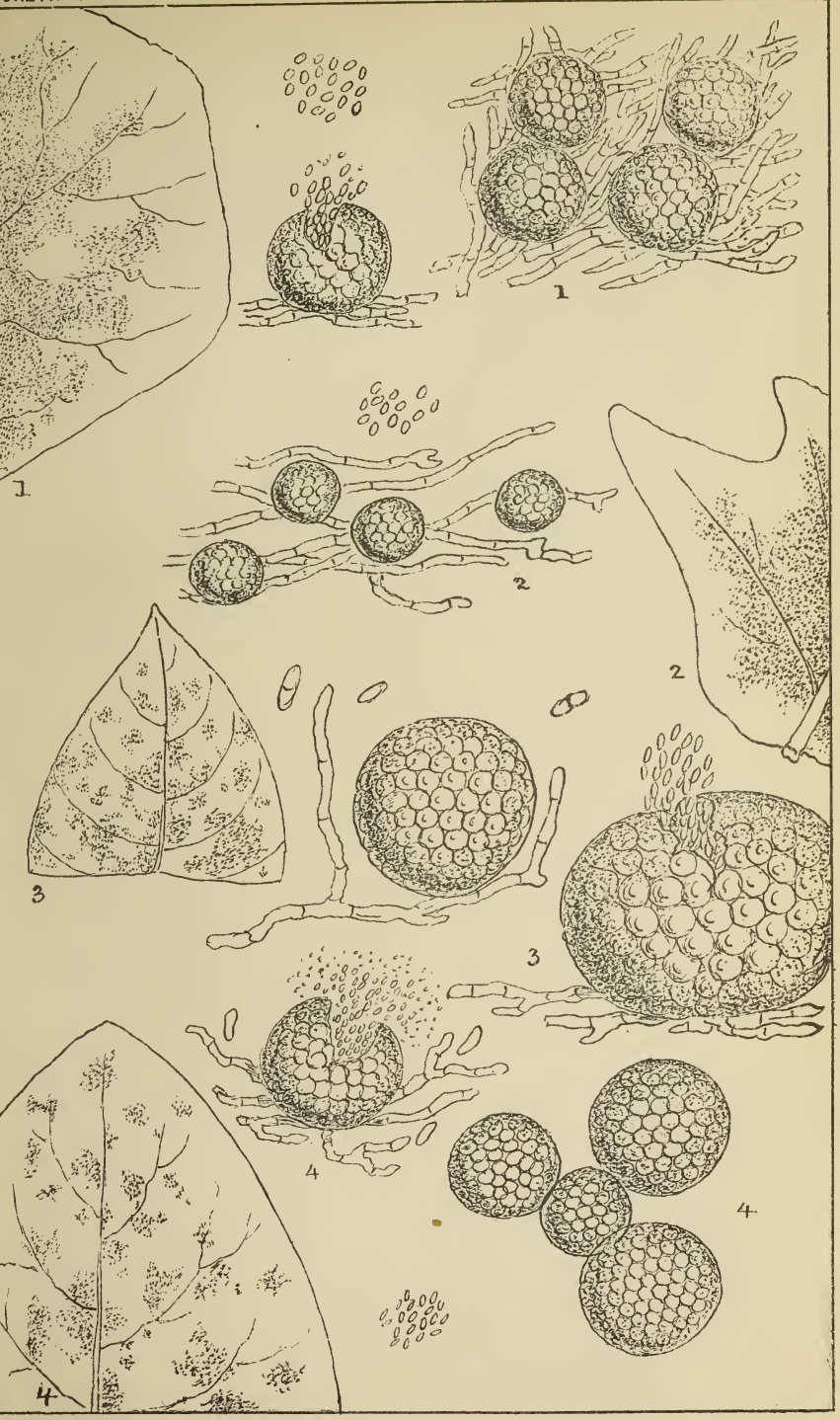
Other species have been met with, as for instance one on dead sheaths of maize *(Zea mays);* and another mixed with *Cladosporium* and *Macrosporium* on leaves of oleander, but these have not been described, as they require further investigation and study.

The species already enumerated will be sufficient to illustrate the scope of the genus, of which specimens of four will be issued in Ravenel's "American Fungi." Up to the present we have not met with any genuine European species.

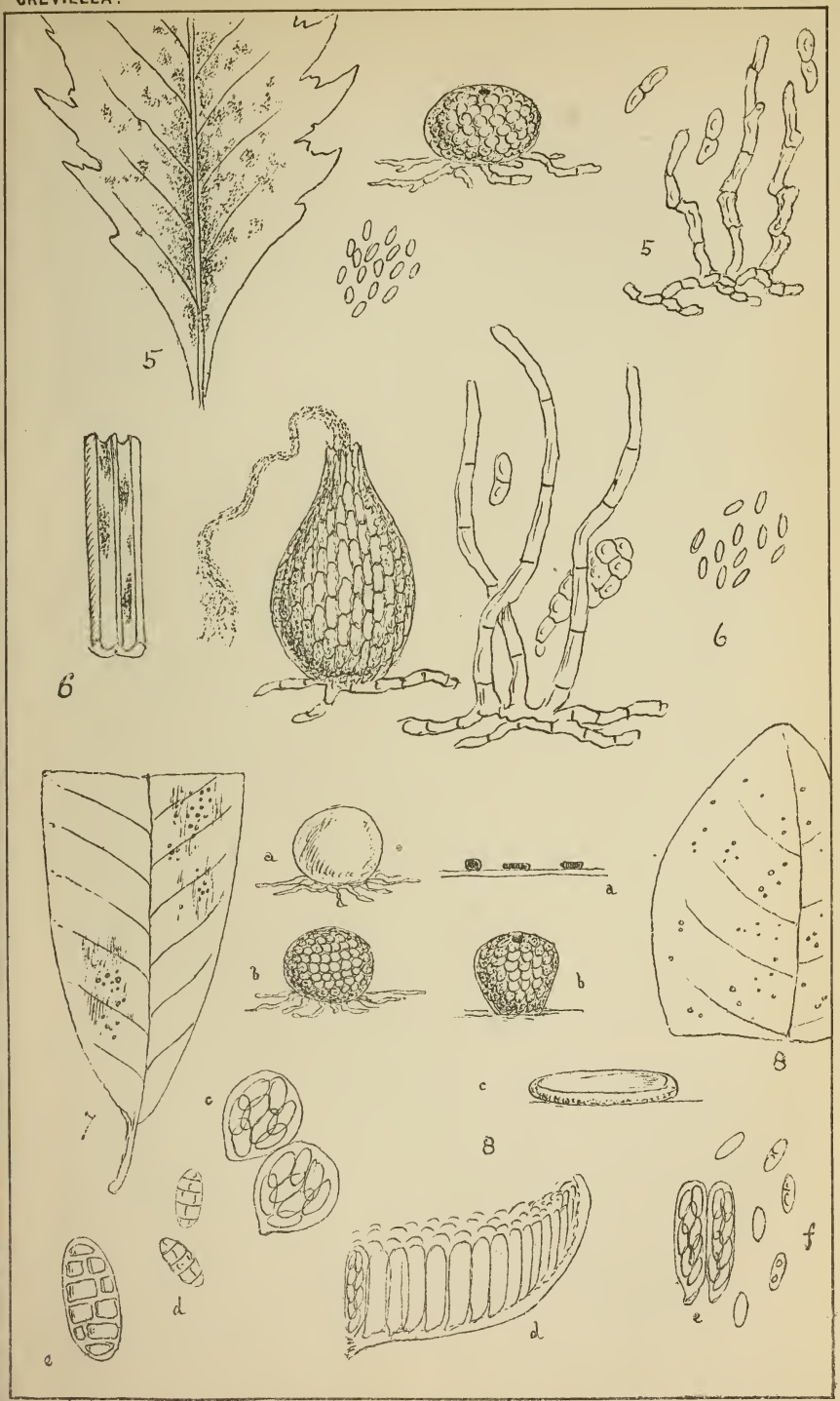
The plates in illustration will be issued in a subsequent number of this journal.

Plate 118, fig. 1. *Chætophoma quercifolia*, perithecia and spores × 500; fig. 2, *Chætophoma Catesbeyi*, perithecia and spores × 500; fig. 3, *Chætophoma ilicifolia*, perithecia and spores, × 500; fig 4, *Chætophoma catalpæ*, perithecia and spores, × 500.

Plate 119, fig. 5. *Chætophoma anthelmintica*, perithecia and spores × 500; fig. 6, *Chætophoma cycadis*, perithecia and spores × 500.



1. *Chætophoma quercifolia* 2. *C. Catesbeyi.*
3. *C. ilicifolia* 4. *C. Catalpœ*



5. *Chætophonia anthelmintica* 6. *C. cycadis.*
7. *Saccardia quercina.* 8. *Phillipsiella atra.*

A PROPOSAL OF PHÆNOLOGICAL OBSERVATIONS ON MOSSES.

Bg William Arnell.

Simultaneous observations on periodical phenomena in plants and animals, or so called phænological observations, have for many years been made as well in most of the European countries, as also in North-America and even at some few stations in the Russian part of Asia. It is especially after 1842, in which year Professor *Quetelet* in Brussel's renowned "*Instructions pour l'observation des phénomènes périodiques*"* were issued, that a very lively interest has been taken in these phenomena. Many and important are the laws of nature that have been discovered by means of the stock of comparable phænological observations thus collected to the greatest part after the above-mentioned year. As for plants these observations have, however, hitherto extended only to phanerogams. It has even, strangely enough, as for what I know, only once before been proposed, to wit by doctor *A. Pokorny*,† to extend the observations also to cryptogams; but these summons appear to have led to no purpose, probably because the proposal was made in too vague terms. It must, however, of course be as important to examine cryptogams as phanerogams with respect to their phænological relations. Especially it would be very important to find whether the laws, existing for phanerogams, are followed also by cryptogams, or, if this be not the case, what differences these may display in this respect. It is from these reasons, that, to the readers of *Revue Bryologique*, I renew the summons, already issued by doctor *Pokorny*, as far as they refer to mosses, and summon to simultaneous phænological observations on these plants, the more so as mosses, on account of the wide distribution of some of their species, are still better adapted to such observations than phanerogams; and, because in observations of this kind it is necessary that all observers agree on a common plant, lest the observations of different observers may become fully comparable to each other, I dare at the same time give an account of the plan according to which I have believed that these observations would be arranged with the greatest profit.

As it is especially the blooming and the fructification that have been made the objects of observation in phanerogams, it is highly desirable that the same phenomena were observed also in mosses. The *blooming* is, to be sure, not fully so well adapted to phænological observations in mosses, as in phanerogams, because it is only through very toilsome and time-wasting researches by

* In "Bulletins de l'Acad. Royale des Sciences, etc., de Bruxelles," tome 9.

† A. Pokorny: "Ansichten über Beobachtungen an Kryptogamen (in Jæhrbücher der K. K. Central-Anstalt für Meteorologie," etc., in Wien. Band 8. Anhang).

means of the microscope possible to determine the precise day at which a moss begins to bloom; I believe, however, that it will prove to be of such importance to learn the time of blooming of different mosses in different parts of the world,* that I, nevertheless, dare propose observations on the blooming of mosses: but as it would be connected with too much labour to fix the days of blooming as nicely in mosses, as in phanerogams, we must perhaps in mosses be contented with dates that denote the day of blooming only approximatingly, which dates are, on the contrary, very easily won, as I know from my own experience. For getting such dates I have found it connected with the least labour to collect small specimina of the moss that I desired to examine from different parts of a year; for instance, one specimen from each fortnight, and afterwards to examine all the collected specimina at once in the winter. It is, however, of course even only in the first year in which these observations are made in a station, that it is necessary to collect specimina from *every* season, as in following years it is clear from the researches of preceding years about which time the blooming begins, on which account it is then sufficient to collect specimina for examination only from about this time. The *fructification* is, on the contrary, much better adapted to phænological observations in mosses, at least in stegocarpous mosses, in which the time of the detachment of the lids is so easily observed, than in phanerogams, on which account I do not think any further pleading my proposing observations on this phenomenon necessary.

Both the above-mentioned kinds of phenomena, the blooming and the fructification, I think, are most properly to be observed in mosses, as is also most commonly the case in phanerogams at their beginning; this stage of formation being considered to have entered at the blooming, when in a species in at least two flowers only one or two archegonia are opened, while, on the contrary, the other archegonia are still closed and uncoloured, or, if archegonia are not accessible, when in each of at least two flowers only one or two antheridia are opened and uncoloured or brown, while, on the contrary, all the other antheridia are still closed. In determining the blooming-time, however, if archegonia are at hand, these ought in the first place to be consulted; because we are less subjected to errors when determining the blooming-time of a moss according to archegonia than according to antheridia. Especially I dare warn observers of believing the blooming to have entered in a moss only because its antheridia may appear fully developed, if not at the same time any antheridium is opened, as antheridia may often appear fully developed many months before their being opened, and before their antherozoids begin to swarm. The fructification I have, on the contrary, believed may be considered to have begun when in a species about 5-10 lids are *in the nature* (not on dried

* In this respect I besides refer to the summons already before issued by E. Roze in *Revue Bryologique*, 1874, pag. 2-3.

specimina in collections, in which, as every bryologist knows, the lids are detached earlier than in nature) detached from their fruits.

The above proposed observations I have thought it best to limit to only a small number of species, because many a one would be deterred from undertaking a greater number of observations, as being too toilsome, and because it is better to get numerous dates of few species, than few dates of many species. Besides, I have, in making choice of the mosses, here underneath proposed as objects of observing, tried to get mosses :

That through their wide distribution, may be common to observers in the most distant countries ;

That are easily recognised lest they may not by any observer be confounded with other species ;

That I have found to have a more limited time of their blooming and fructification ;

That, as far as possible, represent very different parts of the year, as it is important to examine what variations the phænological laws are subjected to according to different seasons ;

That their blooming and fructification are at least in Sweden contemporary with many kindred species, by which means at the same time, as the time of blooming and fructification in different regions of the world become known in the proposed species, this time is at least approximatingly indicated also to their contemporaries in Sweden, as mosses that are contemporary in Sweden, must be supposed with very great probability to be contemporary also in other countries ; or finally

The blooming and fructification of which in Sweden exhibit any extraordinary peculiarities ; as for which it were interesting to find whether they exist also in other countries. Among the mosses that I have chosen chiefly from the last reason I dare in the first place call attention to *Dicranella cerviculata* and *varia*, the former of which, as well as also *D. heteromalla*, *subulata*, and *curvata*, blossoms in Sweden about the 1st of September, and ripens its fruits first 16-19 months after the blooming, whereas *D. varia*, as well as the remaining Swedish species of *Dicranella*, blossoms about midsummer, but ripens its fruits already 6-8 months after the blooming : to *Hypnum crista-castrensis*, that blossoms in Sweden in the former half of August, and requires 16-21 months for the formation of its fruits, this species and *Hypnum purum* thus being the only pleurocarpous mosses in Sweden that require more than a year for the formation of their fruits ; to *Aulacomnion palustre*, *Tetraphis pellucida*, *Polytrichum commune* and *piliferum* that require in Sweden at least 13 months for the formation of their fruits ; to *Dicranum undulatum* and *fuscescens* that require even 17 months for the formation of their fruits, and, besides, bloom at different seasons in different parts of the Scandinavian peninsula, in the midst of Sweden a little before the 1st of August, in more northern parts of Norway in June, etc.

The mosses that on account of one or another of the above-mentioned principles, I have considered most adapted to the purpose in question, and that I on that account dare propose to the readers of the *Revue Briologique* for observation are the following, that I have arranged as well in the order in which they blossom as also in the order in which they ripen their fruits at Hernoesand (at 15° 30′ east. long. from Paris, 62° 30′ n. lat.) in the midst of Sweden, from which arrangement every reader will, to be sure, immediately perceive that these phenomena at Hernoesand and in the place to the phænological relations of which the reader may be best acquainted, belong to very different times.

	Blooms at Hernoesand.		
Eurhynchium strigosum (Hoffm.)	about the	25	of May.
Pylaisia polyantha (Schreb.)	,,	10	June.
Hypnum cupressiforme L.	,,	,,	,,
Tetraphis pellucida (L.)	,,	,,	,,
Aulacomnion palustre (L.)	,,	20	,,
Dicranella varia (H.)	,,	,,	,,
Mnium punctatum L.	,,	,,	,,
Atrichum undulatum (L.)	,,	1	July.
Barbula unguiculata H. (*)	,,	,,	,,
Webera cruda (Schreb.)	,,	,,	,,
Polytrichum piliferum Schreb.	,,	,,	,,
— commune L.	,,	,,	,,
Mnium cuspidatum H.	,,	,,	,,
Grimmia apocarpa (L.)	,,	5	,,
Hedwigia ciliata (Dicks.)	,,	,,	,,
Ceratodon purpureus (L.)	,,	,,	,,
Hypnum Schreberi Willd.	,,	,,	,,
Hylocomium triquetrum (L.)	,,	,,	,,
— splendens (H.)	,,	15	,,
Bartramia pomiformis (L.)	,,	,,	,,
Barbula ruralis (L.)	,,	25	,,
Pottia truncata L.	,,	,,	,,
Dicranum undulatum Willd.	,,	,,	,,
— fuscescens Turn.	,,	,,	,,
Phinolotis fontana (L.)	,,	1	August.
Brachythecium salebrosum (Hoffm.)	,,	5	,,
Hypnum incurvatum Schrad.	,,	,,	,,
— crista-castrensis L.	,,	15	,,
— cordifolium H.	,,	,,	,,
— cuspidatum L.	,,	,,	,,
Funaria hygrometrica (L.)	,,	1	September.
Plagiothecium denticulatum (L.)	,,	,,	,,
Dicranella cerviculata (H.)	,,	,,	,,

(*) The time of blooming and fructification of this species, that is not found at Hernoesand, is given according to specimina collected at Trondhjem, in Norway, which town is but little northlier than Hernoesand.

Ripens its fruits at Hernoesand.

Atrichum undulatum (L.)	about the	1	of May.
Pottia truncata L.	,,	,,	,,
Dicranella cerviculata (H.)	,,	,,	,,
Barbula unguiculata H.	,,	,,	,,
Hypnum crista-castrensis L.	,,	,,	,,
Pylaisia polyantha (Schreb).	,,	10	,,
Dicranella varia (H.)	,,	,,	,,
Hylocomium triquetrum (L.)	,,	,,	,,
Hypnum Schreberi Willd.	,,	,,	,,
— cupressiforme L.	,,	,,	,,
Brachythecium salebrosum (Hoffm).		,,	,,
Hedwigia ciliata (Dicks.)	,,	,,	,,
Eurhynchium strigosum (Hoffm.)	,,	20	,,
Grimmia apocarpa (L.)	,,	,,	,,
Mnium punctatum L.	,,	1	June.
Hylocomium splendens (H.)	,,	10	,,
Mnium cuspidatum H.	,,	20	,,
Ceratodon purpureus (L.)	,,	1	July.
Bartramia pomiformis (L.)	,,	,,	,,
Hypnum cordifolium H.	,,	7	,,
— cuspidatum L.	,,	,,	,,
Barbula ruralis (L.)	,,	,,	,,
Polytrichum piliferum Schreb.	,,	15	,,
Tetraphis pellucida (L.)	,,	,,	,,
Webera cruda (Schreb.)	,,	,,	,,
Philonotis fontana (L.)	,,	,,	,,
Aulacomnium palustre (L.)	,,	25	,,
Funaria hygrometica (L.)	,,	1	August.
Polytrichum commune L.	,,	,,	,,
Hydnum incurvatum Schrd.	,,	,,	,,
Plagiothecium denticulatum (L.)	,,	1	September.
Dicranum undulatum Willd.	,,	15	October.
— fuscescens Turn.	,,	,,	,,

ARNELL.

AUTUMNAL GATHERINGS.

HEREFORD.—The annual meeting of the Woolhope Club is fixed for the week from September 30th to October 5th.

EDINBURGH.—The fourth annual Conference of the Cryptogamic Society of Scotland will commence at Edinburgh on October 7th, and continue through the following days. On Monday, by permission of the Regius Keeper, Professor Balfour, President of the Society, a general meeting will be held in the class-room, at the Royal Botanic Garden, at 1 p.m. The President will deliver an address, and several papers will be read. In the evening the

annual dinner will take place at the Albert Hotel, Hanover Street. On Tuesday, 8th October, excursion to the valley of the Esk, from Waverley Station, 10.15 a.m. On Wednesday, 9th October, exhibition of Fungi in the Herbarium Hall, at the Royal Botanic Garden; open from 1 p.m. to 4 p.m. Any communications as to the meeting may be sent to Mr. Jno. Sadler, Royal Botanic Garden, Edinburgh, the Society's Local Secretary and Treasurer.

RAVENEL'S AMERICAN FUNGI.

By M. C. Cooke.

(Continued from Vol. vi., p. 146).

Leptostroma durissimum. *Cke.*

Gregaria. Peritheciis atris, scutatis, irregularibus, vel confluentibus, durissimis; sporis linearibus, obtusis (·008 mm. long).

On pine leaves. Aiken, S. Car. (2433).

Sacidium symploci. *Cke.*

Epiphyllum. Peritheciis punctiformibus, atris, scutatis, gregariis; sporis subglobosis, hyalinis (·004 × ·003 mm.).

On leaves of *Symplocos tinctoria.* Aiken, S. Car. (1600).

Phoma Nyssæcarpa. *Cke.*

Sparsum. Peritheciis epidermide tectis, vix prominulis; sporis ellipticis, hyalinis (·007 × ·003 mm.).

On fruits of *Nyssa.* Aiken, S. Car. (2133).

Phoma circumscripta. *Cke.*

Maculis exaridis, brunneo-cinctis. Peritheciis atris, nitidis; sporis ellipticis, hyalinis (·007 × ·0025 mm.).

On dead leaves of *Bumelia.* Darien, Georgia (2434a).

Phoma Yuccæ. *Cke.*

Sparsum, tectum. Peritheciis prominulis, papillatis; sporis ellipticis, utrinque nucleatis, hyalinis (·009 × ·003 mm.).

On *Yucca.* Aiken, S. Car. (2580, 2581).

Phoma Psoraleæ. *Cke.*

Peritheciis atris, punctiformibus, in maculis angulatis congestis (potius *Sphærellæ* spermogoniis); sporis minimis (·005 × ·002 mm.).

On leaves of *Psoralea.* Aiken, S. Car.

Phoma minutissima. *Cke.*

Maculis irregularibus, nigricantibus. Peritheciis semi immersis, atris, punctiformibus, congestis; sporis minimis (·004 × ·002 m.m.).

On leaves of *Liatris odoratissima.* Aiken, S. Car. (1920).

Sphæropsis nervisequum. *Cke.*

Peritheciis atris, hysteriiformibus, sparsis; sporis ellipticis, hyalinis (·01-·012 × ·005 mm.).

On veins of leaves of *Quercus Catesbeyi*. Aiken, S. Car. (2046).

Sphæropsis Gleditschiæcola. *Cke.*

Peritheciis confluentibus in pustulis erumpentibus, epidermide cinctis; sporis ellipticis, brunneis (·018 × ·008 mm.).

On branches of *Gleditschia*. Aiken, S. Car. (2380b).

Probably a form of *Melogramma Gleditschiæ*.

Diplodia fulvella. *Cke.*

Sparsa. Peritheciis immersis, tectis, ostiolis abbreviatis, erumpentibus; sporis ellipticis, brunneis, uniseptatis, nec constrictis (·03 × ·014 mm.).

On bark of *Platanus*. Aiken, S. Car. (1547).

Diplodia cupressina. *Cke.*

Sparsa. Peritheciis atris, globosis, sub-superficialibus, minute papillatis; sporis ellipticis, brunneis, uniseptatis, constrictis (·01 × ·005 mm.).

On foliage of *Juniperus*. Darien, Georgia (2438).

Hendersonia fissurata. *Cke.*

Gregaria. Peritheciis in lineas erumpentibus, epidermide fissuratis; sporis arcte ellipticis, brunneis, triseptatis (·012 × ·0045 mm.).

On bark of *Ficus*. Darien, Georgia (2399).

Staurochæta membranacea. *Cke.*

Gregaria. Peritheciis applanatis (·08 mm.), membranaceis, fuscis, supra hyphis septatis, furcatis, radiantibus ornatis; sporis ovalibus (·012 × ·01 mm.), hyalino-fuscis, vix coloratis.

On old oak galls. Aiken, S. Car. (2588).

Sphæronema Micropereæ. *Cke.*

Peritheciis in pustulis *Micropereæ* nidulantibus, elongatis, supra attenuatis, rectis, vel curvulis, atris; sporis arcte fusiformibus, curvulis, continuis, hyalinis (·04 mm. long).

On pustules of *Micropera*. Darien, Georgia (2394).

Septoria Ludwigiæ. *Cke.*

Epiphylla. Maculis exaridis, rubro-cinctis; peritheciis paucis, punctiformibus (5-8) gregariis; sporis linearibus, obtusis, multinucleatis flexuosis, hyalinis (·04 mm. long).

On leaves of *Ludwigia*. Aiken, S. Car. (2043).

Melanconium palmarum. *Cke.*

Pustulis erumpentibus, convexis, atris, centro pallidis; sporis ovatis, atro-brunneis (·012 × ·01 mm.).

On *Sabal*. Darien, Georgia (2449).

Torula diversa. *Cke.*

Atra, pulvinata. Hyphis repentibus ramosis; sporis concatenatis, erectis, variis, demum leniter asperulis, articulis subglobosis (·006-·01 mm. diam.).

On leaves of *Agave*. Darien, Georgia (2522).

Sporidesmium toruloides. *Cke.*

Effusum, atrum, mycelio brunneo repente ; sporis erectis, simplicibus vel furcatis, cylindraceis, utrinque leniter attenuatis, multiseptatis (·07-·15 × ·01 mm.), articulis subquadratis.

On dead wood. Florida (81).

Sporidesmium translucens. *Cke.*

Effusum, fuligineum, tenue. Sporis rectis, simplicibus, vel furcatis, cylindricis, hinc illic leniter constrictis, multi-cellulosis, pallide fuligineis, subdiaphanis (·1-·15 × ·02-·025 mm).

On pine logs. Aiken, S. Car. (2069).

This is at best a doubtful species.

Stilbum didymum. *Cke.*

Stipite fuligineo, glabro, basi incrassato; capitulis ovatis, pallidis; sporis elongato-ellipticis, uniseptatis, fuscis (·012-·015 × ·005 mm.).

On bark of *Platanus*. Aiken, S. Car. (1820).

Found growing in company with the *Stilbum* of *Sphærostilbe gracilipes*, from which it is widely distinct.

Glæosporium Angelicæ. *Cke.*

Maculis fuscis, variis ; acervulis gregariis, rotundatis, vix prominulis ; sporis cylindrico-clavatis, nucleatis, demum biseptatis, hyalinis (·04-·06 × ·008 mm.)

On fading leaves of *Archangelica*. Aiken, S. Car. (2012).

Fusarium Yuccæ. *Cke.*, pro. tem.

On *Yucca aloifolia*. Aiken, S. Car. (2564).

Certainly the stylospores of *Nectria depauperata*, C., in conjunction with which it is described.

Campsotrichum simplex. *Cke.*

Atrum, maculæforme. Floccis simplicibus, brunneis, asperulis, sursum cirrhosis ; sporis cylindraceis, rectis, vel curvulis (·02 mm. long).

On dead leaves of *Platanus*. Aiken, S. Car. (2583).

Cercospora purpurea. *Cke.*

Epiphylla. Maculis latis, variis, purpureo-brunneis ; cæspitulis erumpentibus ; hyphis cæspitosis, fuligineis, cylindraceis, 2-3 septatis, pallide-fuscis (·05-·06 + ·006 mm.).

On leaves of *Persea*. Darien, Georgia (2499).

Cercospora rubella. *Cke.*

Amphigena. Maculis effusis, rubris ; hyphis in strato lanoso brunneo enatis, subfasciculatis ; sporis cylindraceis, supra attenuatis, hyalinis, 1-2 septatis (·03-·05 mm.).

On *Eriogenum tomentosum*. Aiken, S. Car. (2586).

Cercospora Diodeæ. *Cke.*

Maculis orbicularibus, fuscis. Hyphis paucis, erectis, septatis, fuscis ; sporis cylindraceis, gracilibus, hyalinis (·05 + ·003 mm.).

On leaves of *Diodea*. Aiken, S. Car. (2284).

Cercospora Yuccæ. *Cke.*

Maculis ellipticis, brunneis. Cæspitulis erumpentibus; hyphis brevissimis, fasciculatis, fuligineis; sporis cylindricis, sursum attenuatis, fuscis, 1-3 septatis (·06·08 mm.).

On *Yucca* leaves. Darien, Georgia (2516).

Cercospora polytricha. *Cke.*

Hypophylla. Maculis latis, fuligineis; hyphis erectis, sparsis, multi-septatis, articulis, subquadratis, toruloideis, brunneis; sporis obclavatis, biseptatis (·03-·05 mm. long).

On leaves of *Quercus virens*. Aiken, S. Car. (2417).

Macrosporium Nerii. *Cke.*

Effusum, atrum, velutinum. Hyphis repentibus, dichotomis; ramulis assurgentibus; sporis clavatis, stipitatis, multicellulosis, fuligineis (·08 + ·015 mm.).

On Oleander leaves. Darien, Ga. (2497, 2348).

Dendryphium Arundinariæ. *Cke.*

Atrum, effusum. Hyphis erectis, opacis, simplicibus, vel sursum breviter furcatis, ad basi incrassatis, corticatis; sporis clavatis, concatenatis, brunneis, 4-10 septatis, constrictis (·06-·08 + ·01-·012 mm.).

On *Arundinaria*. Darien, Ga. (2509).

A much coarser species than *D. Ellisii;* chiefly confined to the nodes, which it surrounds as with a black velvety band.

Torula maculans. *Cke.*

Late effusa, atra. Hyphis paucis repentibus; sporis in ramulis brevibus concatenatis, articulis dissilientibus, subglobosis (·004 mm. diam.).

On *Yucca* leaves. Darien (2569).

Phyllosticta Batatas. *Cke.*

(=*Depazea Batatas*, Thümen.)

On leaves of *Convolvulus batatas*. Aiken.

Phoma longisporum. *Cke.*

(=*Leptothyrium longisporum*, Thümen.)

On twigs of *Vitis æstivalis*. Aiken (2605).

CRYPTOGAMIC LITERATURE.

Stirton, Dr. J. Lichens Growing on Living Leaves, from the Amazons.

Thümen, F. de. Il mal di Cenere e la Disseccazione Delle Foglie dei Limoni.

De Seynes, J. Sur un Nouveau cas de Parasitisme d'un *Aspergillus*.

De Seynes, J. Les Conidies du *Polyporus sulfureus* et leur developpement.

Bescherelle, M. Mousses Nouvelles du Paraguay, in "Revue Bryologique," No. 4, 1878.

Gerber, M. Mousses Nouvelles de l'ile Maurice, in "Revue Bryologique," No. 4, 1878.

Rabenhorst, L. Beitrag zur Meersalgen Flora der Auckland-Inseln. "Hedwigia," May, 1878.

Spegazzini, C. Ampelomiceto Italici, in "Revista di Viticoltura Italiana," May and June, 1878.

Oudemans, C. A. J. A. Aanwinsten voor de Flora Mycologica van Nederland (continued).

Bennett, A. W. On the Structure and Affinities of Characeæ. "Journ. Botany," July, 1878.

Castracane, F. Nuova forma della Melosira Borrerii, in "Atti Soc. Critt. Ital.," Vol. i.

Lanzi, M. Diatomee Raccolte in Ostia, in "Atti Soc. Critt. Ital.," Vol. i.

Saccardo, P. A. Genera Pyrenomycetum Hypocræaceorum, in "Atti Soc. Critt. Ital."

Ardissone, F. Rodomelacee Italiche, in "Atti Soc. Critt. Ital."

Comes, O. Sulla Malattia dei Cavoli.

Arnell, W. A Proposal of Phænological Observations on Mosses.

Thumen, F. de. Fungorum Americanorum triginta species novæ. "Flora," No. 12, 1878.

Schulzer, P. Mycologisches, in "Flora," No. 13, 1878.

Minks, Dr. A. Das Microgonidium, in "Flora," No. 15, 16, 17, 18, 1878.

Nylander, Dr. W. Addenda nova ad Lichenographiam Europæam. "Flora," No. 16, 1878.

Saccardo, P. A. "Michelia," No. 3, July, 1878.

Thumen, F. de. "Mycotheca Universalis," Cent xi.

Lindbebg, S. O. "Monographia Metzgeriæ" Helsingfors, 1877.

Borzi, A. Morfologia e Biologia delle Alghe Ficocromaceæ, in "Nuovo Giorn. Bot. Ital." July, 1878.

Piccone, A. Florula Algologica della sardegna, in "Nuovo Giorn. Bot. Ital.," July, 1878.

Dickie, Dr. A. Algæ of the Arctic Expedition, in "Linn. Journ.," July, 1878.

Berkeley, M. J. Fungi of the Arctic Expedition, in "Linn. Journ.," July, 1878.

Robinson, Jno. Ferns in their Homes and Ours. "American Natural History" series.

Just, Dr. L. "Botanischer Jahresbericht," Vol. iv., part 3.

Cooke, M. C. Vine Diseases, No. 3, in "Journal Roy. Hort. Soc.," July, 1878.

Thuemen, F. von. "Mycotheca Universalis," Cent. xi.

Rehm, Dr. Ascomyceten. Fasc. x.

Grevillea,

A QUARTERLY RECORD OF CRYPTOGAMIC BOTANY AND ITS LITERATURE.

NEW JERSEY FUNGI.

By M. C. Cooke, and J. B. Ellis.

(*Continued from page* 10.)

Næmatelia encephala. *Fr.*

On bark. No. 3013.

Comatricha typhina. *R.*

On rotten *Nyssa.* No. 3034.

Lamproderma physarioides. *A. & S.*

On dead wood. No. 3035.

Sacidium Pini. *Fr.*

On pine leaves. No. 2908.

Leptostroma petiolorum. *C. & E.*

Sparsa, orbicularis, scutellata, nigra; sporis minimis, linearibus, rectis, hyalinis (·005 mm. long).

On petioles of *Ailanthus.* No. 2984.

Phoma glandulosum. *Cke.*

On petioles of *Ailanthus,* in company with the foregoing. No. 2984.

Cryptosporium Nyssæ. *C. & E.*

Erumpens. Pustulis tectis, demum epidermide laceratis, atris; sporis lanceolatis, hyalinis, nucleatis, rectis (·02-·022 × ·005).

On branches of *Nyssæ.*

Very similar to *Cryptosporium coronatum,* Fckl., but neither of them good species of *Cryptosporium.* No. 3000.

Ceuthospora foliicola. *Rabh.*

On *Kalmia latifolia.* No. 3019.

Cryptosporium epiphyllum. *C. & E.*

Maculis orbicularibus, fuscis. Pustulis 1-3, obscuriore, convexis; sporis fusoideis, lunatis, hyalinis, utrinque acutis (·03 mm. long).

On fading leaves of *Castanea.*

In some respects resembling a *Fusarium,* the spots pass to both sides of the leaf, but spores are developed only on the under surface. Professor Saccardo considers this a species of *Septoria;* but as we can trace no distinct perithecia, we prefer to retain it in the above genus. No. 3077.

Sphæropsis lanceolatum. *C. & E.*

Sparsum, epidermide nigrofacta tectum. Peritheciis brunneis, sub-membranaceis, poro pertusis ; sporis lanceolatis, hyalinis, rectis, granulis repletis (·03 × ·007 mm.).

On *Asparagus* stems. No. 3011.

Hendersonia trimera. *Cke.*, in " Nuova Giorn. Bot. Ital."

On *Fimbristylis autumnalis.* No. 3063.

Septoria Kalmiæcola. *Curt.*

(*Depazea Kalmiæcola*, Schw.)

On leaves of *Kalmia.* No. 3020.

Dinemasporium patellum. *C. & E.*

Sparsum. Peritheciis demum superficialibus, atris, cupulæformibus ; margine incurvatis, extus flexuoso-pilosis ; sporis fusiformibus, curvulis, utrinque attenuatis, 3-4 nucleatis (·025 × ·03 mm. long, sine appendiculis).

On herbaceous stems.

Very similar in habit and size to *Excipula recurva*, Ger., but the spores in that species are rather smaller, and do not appear to be aristate. It is doubtful whether the separation of *Excipula* from *Dinemasporium*, merely on account of this slight feature in the spores, is not too artificial. The present species has evidently more natural affinity with *Ex. recurva.* than that species with *Excipula strigosa*, and yet they are placed in different genera.

No. 2982.

Vermicularia compacta. *C. & E.*

On Dahlia stems. No. 2988.

Torula bigemina. *C. & E.*

Brunnea, tenue effusa. Floccis multiseptatis (7-9), æqualibus, fuscis, binis conjunctis, articulis quadratis, persistentibus.

On rotten wood. No. 3010.

Torula sphæriæformis. *C. & E.*

(*Torula abbreviata* var. *sphæriæformis*, B. & Br. ?)

Sphæriæformis, sparsa. Floccis fasciculatis, multiseptatis, hyalinis ; articulis subglobosis, connatis.

On oak limb.

The articulations are twice as numerous as in the variety described by Berkeley, and can scarcely be retained as a form of *Torula abbreviata*, Corda. No. 3048.

Torula herbarum. *Lk.*

On potato stems. No. 3008.

Coryneum Kunzei. *Corda.*

On white oak. No. 3078.

Epochnium macrosporoideum. *B. & Br.*

On rotten maple. No. 3029.

Fusarium diplosporum. *C. & E.*

Roseum, pulvinatum. Sporis aliis fusiformibus, utrinque acutis, arcuatis, nucleatis, demum leniter 3 septatis (·04 mm. long), aliis ellipticis, uniseptatis (·018 × ·008 mm.).

On potato stems. No. 2983.

Fusarium roseum. *Lk.*
On wormwood. No. 3070.

Fusisporium pallido-roseum. *Cke.*
On *Phytolacca.* No. 3007.

Epicoccum Duriæanum. *Mont.*
On leaves of *Orontium.* No. 3041.

Polyactis streptothrix. *C. & E.*
Fuliginea, effusa. Hyphis repentibus, ramosis; ramis assurgentibus, divisis, intricatis, crenulato-flexuosis; capitulis breviter ramulosis, ramulis rotundatis; sporis globosis (·018 mm.) in apicibus congestis.
On leaves of *Orontium.*
The threads have the appearance of a coarse species of *Streptothrix*, but the spores, and their mode of attachment, are those of a *Polyactis.* No. 3040.

Oidium compactum. *C. & E.*
On bark.
Probably only a state of *Ægerita.* No. 2992.

Illosporium pallidum. *C.*
On *Zea Mays.* No. 3069.

Sphæridium citrinum. *Sacc.*
On fir branches. No. 2920.

Graphium stilboideum. *Corda.*
Apparently this species, but not in good condition.
On herbaceous stems. No. 2986.

Dactylium roseum. *Berk.*
On Holly bark. No. 3030.
On *Lactuca.* No. 3027.

Cladosporium delectum. *C. & E.*
On leaves of *Magnolia.* No. 3038.

Menispora glauco-nigra. *C. & E.*
Effusa, atro-brunnea, subvelutina. Hyphis erectis, tenuibus, septatis, fuscis, supra hyalinis; sporis acrogenis, fasciculatis, cylindricis, curvulis, utrinque rotundatis, hyalinis (·02 × ·004 mm.).
On rotten *Magnolia.* No 3047.

Macrosporium inquinans. *C. & E.*
Effusum, atrum, velutinum. Hyphis brevibus, simplicibus; sporis fuligineis, clavatis, hetero-divisis, fortissime constrictis (·04-·05 × ·015-·02 mm.), cellulis subglobosis.
On stems of *Lactuca.* No. 3032.

Macrosporium atrichum. *C. & E.*
Tenue effusum, griseum. Hyphis obsoletis; sporis ovatis, vel ellipticis, 2-3 septatis, hinc illic divisis, læte-brunneis (·02-·03 × ·01-·015 mm.).
On stems of *Lactuca.* No. 3015.

Macrosporium commune. *Rabh.*
On *Chenopodium.* No. 3025.
On *Helianthus.* No. 3024.
On *Asparagus.* No. 3006.

Mystrosporium orbiculare. *C. & E.*

Hypophyllum, orbiculare, atrum. Sporis clavatis, 5-7 septatis, hinc illic divisis, fuligineis (·04 × ·02 mm.) in stipitibus septatis longe productis (·01 mm.).

On leaves of *Ilex*. No. 3043.

Dendryphium Ellisi. *Cke*

On rotten maple. No. 3072.

Cercospora pulvinula. *C. & E.*

Punctiformis, hypophylla. Hyphis brevissimis, in cæspitulis dense congestis, subolivaceis; sporis cylindricis, leniter 1-2 septatis, hyalinis (·02-·035 mm. long).

On holly leaves. No. 3042.

Helminthosporium interseminatum. *B. & Rav.*

(=*Helminthosporium vimineum*, B. & C., γ *Dendryphium nodulosum*, Sacc., and *Helminthosporium nodulosum*. Gerard.)

On *Phytolacca* stems. No. 3046.

Helminthosporium brachytrichum. *C. & E.*

Smaller and younger form.

On maple. No. 3073.

Helminthosporium fusiforme. *Corda.*

On rotten wood. No. 3009.

Helminthosporium persistens. *C. & E.*

On alder. No. 3031.

Mucor caninus. *Pers.*

On mouse dung. No. 3036.

Mucor mucedo. *Linn.*

On sweet potato. No. 3033.

Peziza acetabulum. *Linn.*

On the ground. No. 3028.

Peziza (Sarcoscypha) scutellata. *Linn.*

On rotten wood. No. 2985.

Peziza (Dasyscypha) acerina. *C. & E.*

Hypophylla, sparsa, punctiformis; cupulis sessilibus, tenuibus, fuscis ($\frac{1}{5}$ mm.); margine albopileatis; ascis subclavatis; sporidiis linearibus (·006 mm.).

On leaves of maple.

Marginal hairs minutely rough. No. 3045.

Peziza (Tapesia) fusca. *P.*

On *Vaccinium*. No. 3014.

Peziza (Moll) tenella. *C. & E.*

Hypophylla, sparsa. Cupulis tenuibus, hemisphericis, demum applanatis (0·15-0·2 mm.) pallide corneis; margine albidis; ascis clavatis; sporidiis linearibus, rectis (·005 mm.).

On fronds of *Osmunda*. No. 3023.

Patellaria lignyota. *Fr.*

On bark of *Nyssa*. No. 3022.

Cenangium acuum. *C. & Pk.* **(Peziza pinastri,** *C. & Pk.*)

Additional specimens convince us that this belongs to *Cenangium* and not to *Peziza*.

On pine leaves. No. 3001.

Hysterium (Lophodermium) arundinaceum var. **gramineum.**
On sheaths of *Phlœum*. No. 3052.

Sporomega degenerans. *Duby.*
On *Vaccinium corymbosum*. No. 2987.

Melogramma ambiguum. *S.*
On *Rhus*. No. 3076.

Valsa stellulata. *Fr.*
On apple branches. Nos. 2998, 2990.

Valsa thelebola. *Fr.*
On *Alnus*. No. 3049.

Diatrype Badhami. *Curr.*
On *Prinos glaber*. No. 2999.

Sphæria (Ceratostoma) barbirostris. *Dufour.*
On rotten wood. No. 3018.

Sphæria (sub-tectæ.) bisphærica. *C. & E.*
Semi-immersa. Peritheciis atris, papillatis, hinc illic gregariis; ascis cylindraceis; sporidiis uniseriatis, ellipticis, uniseptatis, medio constrictis, brunneis (·012 × ·007 mm.).
On decorticated apple limbs. No. 3068.

Sphæria (sub-tectæ.) subcutanea. *C. & E.*
Semi-immersa, sparsa. Peritheciis atris, papillatis; ascis clavatis; sporidiis fusiformibus, rectis vel curvulis, 5 septatis, medio constrictis, hyalinis (·04 × ·005 mm.).
On decorticated pear twigs.
The third cell of the sporidia slightly swollen. No. 3064.

Sphæria (obtectæ) viscosa. *C. & E.*
On apple. No. 3005.

Sphæria (obtectæ) sublanosa. *Cke.*
Sporidia hyaline, cylindrical or subfusiform, obtuse, straight or slightly curved (·035 × ·005 mm.), constricted but slightly in the centre, nucleate, at length faintly triseptate.
On old branches of *Andromeda*.
The same species has been found on old fallen branches in England. No. 3067.

Sphæria (obtectæ) phomopsis. *C. & E.*
Peritheciis numerosis, minimis, membranaceis, brunneis, subapplanatis, epidermide tectis; ascis clavatis; sporidiis naviculoideis, hyalinis, nucleatis (·012-·014 × ·006 mm.).
On twigs of *Desmodium*.
The sporidia were scarcely mature. It is not improbable that ultimately they are uniseptate. No. 3074.

Sphæria (obtectæ) distributa. *C. & E.*
Sparsa. Peritheciis atris, prominulis, epidermide nigrofacta tectis; ascis clavatis; sporidiis biseriatis, lanceolatis, utrinque rotundatis, triseptatis, medio constrictis, brunneis (·028 + ·009 mm.).
On small twigs of *Desmodium*.
Found in company with another *Sphæria*, but the specimens did not afford sufficient material for description. No. 3065.

Sphæria (caulicolæ) adelphica. *C.*

Apparently the same species as has been found in England on herbaceous plants.

On *Phytolacca.*

The uniseptate brown spores measure ·016 × ·0065 mm.

No. 2989.

Sphæria (caulicolæ) eriophora. *Cke.*

On *Amaranthus.* No. 3075.

Sphæria (caulicolæ) subexserta. *C. & E.*

Sparsa, tecta. Peritheciis atris ; ostiolis elongatis, obtusis, exsertis ; ascis subclavatis; sporidiis arcte ellipticis, biseriatis, uniseptatis, hyalinis (·012-·014 × ·005 mm.).

On *Mulgedium.*

Allied to *S. catariæ*, C. & E., but the spores are smaller.

No. 3060.

Sphæria (caulicolæ) Ogilviensis. *B. & Br.*

On *Erigeron.* No. 3053.

On *Bidens.* No. 3054.

On *Aster.* No. 3055.

Sphæria (Raphidospora) rubella. *P.*

On potato. No. 3058.

On tomato. No. 3057.

Sphæria (Raphidospora) anguillida. *C. & E.*

On aster. No. 3003.

On herb stems. No. 3056.

Perithecium very hard, almost like a *Sclerotium.*

Sphæria (Pleospora) herbarum. *Pers.*

On *Lactuca.* No. 3061.

On *Daucus.* No. 3062.

Sphæria (Foliicolæ) Ilicis. *Schl.*

On holly leaves. No. 3044.

Sphærella Dahliæ. *C. & E.*

Sparsa. Peritheciis membranaceis, brunneis, epidermide tectis, poro pertusis; ascis clavatis ; sporidiis biseriatis, ellipticis, uniseptatis, hyalinis (·012 × ·004 mm.).

On stems of *Dahlia* with *Vermicularia.* No. 2988.

Sphærella Gaultheriæ. *C. & P.*

Epiphylla. Maculis orbicularibus, albidis, purpureo-cinctis; peritheciis punctiformibus, circinatis ; ascis clavatis ; sporidiis lanceolatis, biseriatis, uniseptatis (·015-·018 × ·004 mm.).

On leaves of *Gaultheria.* No. 3012.

N.B.—We are informed that the price of Ellis's Specimens of North American Fungi is twenty-eight shillings for each century, of which the first is published.

RAVENEL'S AMERICAN FUNGI.

By M. C. Cooke.

(*Continued from Vol. vii., pp.* 35.)

Agaricus (Inocybe) maritimus. *Fr.*
On the ground in damp places. Georgia (2416).

Agaricus (Amanita) vaginatus. *Fr.*
On the ground. Aiken, S. Car. (2632).

Agaricus (Clitocybe) laccatus. *Fr.*
On the ground. Aiken, S. Car. (2427).

Schizophyllum commune. *Fr.*
On trunks. Aiken, S. Car.

Xerotus lateritius. *B. & C.*
On bark. Darien, Georgia.

Lentinus Lecomtei. *Fr.*
On trunks. Darien, Georgia (2511).

Lentinus Ravenelii. *B. & C.*
On logs. Darien, Georgia (2452).

Boletus pachypus. *Fr.*
On the ground. Aiken, S. Car. (2633).

Polyporus arcularius. *Fr.*
On the ground. Darien, Georgia (2439).

Polyporus cupulæformis. *B. & C.*
On bark of *Rhus.* Darien, Georgia (2537, 2365).

Polyporus versicolor. *Fr.*
On trunks. Darien, Georgia (2515).

Polyporus barbatulus. *Fr.*
On *Juniper.* Darien, Georgia (2536).

Merulius ambiguus. *B. & Rav.*
On logs. Darien, Georgia (2513).

Irpex tabacinus. *B & C.*
On oak. Darien, Georgia (2493).

Craterellus lutescens. *Fr.*
On sandy soil. Aiken, S. Car. (2288).

Stereum versicolor. *Fr.*
On logs. Darien, Georgia (2440).

Stereum albobadium. *S.*
On oak. Darien, Georgia (2550).

Stereum Curtisii. *B.*
On logs. Darien, Georgia (2549).

Stereum subpileatum. *B. & C.*
On logs. Darien, Georgia (2451).

Stereum sulfureum. *Fr.*
On trunks. Darien, Georgia (2426).

Hymenochæte crocata. *Lev.*
On oak. Aiken, S. Car. (1721).

Hymenochæte rubiginosa. *Lev.*
On *Quercus virens.* Darien (2457, 2469).

Solenia anomala. *P.*
On *Quercus.* Darien, Georgia (2531).

Cyphella villosa. *P.*
On *Vitis.* Aiken, S. Car. (2608).

Cyphella virgultorum. *C.*
On *Vitis.* Aiken, S. Car. (2608).

Cyphella cupulæformis. *B. & Rav.*
On Juniper. Darien, Georgia (2480).

Crinula paradoxa. *B. & C.*
On *Quercus virens.* Darien, Georgia (2500, 2503).

Tremella mesenterica. *Fr.*
On branches. Darien, Georgia.

Physarum leucopus. *Lk.*
On oak. Darien, Georgia (2406).

Physarum leucophæum. *Fr.*
On *Yucca.* Aiken, S. Car (2565, 2598, 2611).

Physarum Schumacheri. *Spr.*
On twigs, &c. Aiken, S. Car. (2619).

Leptostroma filicinum. *Fr.*
On *Pteris.* Darien, Georgia (2432).

Leptostroma litigiosum. *Desm.*
On *Osmunda.* Darien, Georgia (2431).

Phlyctæna arcuata. *B. & C.*
On *Rumex.* Aiken (2071).

Coniothyrium concentricum. *Sacc.*
On *Yucca.* Aiken, S. Car. (2570, 2580).
Referred also to *Phoma* and *Macroplodia.*

Coniothyrium epiphyllum. *Cke.*
On *Quercus Catesbeyi.* Aiken (1921).

Phoma glandicolum. *Desm.*
On acorns of *Quercus virens.* Darien, Georgia (2414).

Ceuthospora foliicola. *Lib.* var. **Euonymi.**
On *Euonymus Japonica.* Aiken (2571).

Ceuthospora Cookei. *Thum.*
On *Persea.* Aiken (2188).

Diplodia Hederæ. *Desm.*
On ivy twigs. Aiken, S. Car. (2623).

Diplodia Rosæ. *Fr.*
On rose. Aiken, S. Car. (2625).

Diplodia vulgaris. *Fr.*
On branches. Aiken, S. Car. (2627).

Diplodia Zeæ. *Schw.*
On *Zea Mays.* Aiken, S. Car. (2631).

Diplodia Ravenelii. *Cke.*
Hypophylla. Gregaria, vel sparsa; peritheciis atris, convexis, semi-immersis; sporis elongato-ellipticis, brunneis (·02 × ·008 mm.).
On leaves of *Magnolia.* Aiken, S. Car. (2634).

Pestalozzia stellata. *B. & C.* var. **Nerii,** *Cke.*
On *Oleander.* Darien, Georgia (2498).

Pestalozzia pezizoides. *Not.*
On *Vitis æstivalis.* Aiken (2562, 2561).

Pestalozzia Castagnei. *Desm.*
On acorns. Darien, Georgia (2414).

Discosia artocreas. *Fr.*
On leaves of *Platanus.* Aiken (2584).
On leaves of *Cratægus.* Aiken (2595).

Micropera drupacearum. *Lev.*
On cherry. Darien, Georgia (2393).

Sphæronema spina. *B. & C.*
On *Fraxinus.* Darien, Georgia (2464).

Vermicularia rectispora. *Cke.*
On petioles of *Mella.* Aiken (2388).

Vermicularia dematium. *Fr.*
On *Opuntia.* Charlotte Harbour, Fla. (2556).

Cryptosporium coronatum. *Fckl.*
On *Populus angulata.* Aiken (2048).

Cytispora ocellata. *Fckl.*
On *Amygdalus.* Aiken, S. Car. (2553).

Dendrina Diospyri. *B. & C*
On leaves of *Diospyros.* Aiken, S. Car. (2628).

Septoria specularіæ. *B. & C.*
On *Specularia perfoliata.* Darien (2400).

Ræstelia aurantiaca. *Pk.*
On *Cratægus.* Aiken, S. Car. (9577).

Ræstelia sp. (spermogonia).
On *Cratægus* (15).

Peridermium corticolum. *Lk.*
On *Pinus taeda.* Darien, Georgia (2445).

Peridermium orientalis. *Cke.*
On *Pinus australis.* Aiken, S. Car. (2552).

Graphiola phœnicis. *Poer.*
On *Bambusa?* Fernandina, Fla. (132).

Trichobasis compositarum. *Lev.*
On leaves. Catoosa, Fla. (Austin).

Trichobasis rubrum. *Bon.*
On *Phaseolus.* Aiken, S. Car. (2060).

Trichobasis rubigo. *Lev.*
On rye. Darien, Georgia (2397).

Trichobasis Polygonorum. *Lev.*
On *Polygonum acre.* Aiken, S. Car.

Puccinia Gonolobi. *Rav.*
On *Gonolobus.* Aiken, S. Car. (2610).

Puccinia Amorphæ. *Curt.*
(*Uredo* form.) Aiken, S. Car. (2011).

Puccinia caricina. *D.C.*
On *Cyperus.* Aiken, S. Car. (2092).

Puccinia graminis var. **Sorghi.**
On *Sorghum.* Aiken, S. Car. (c140).

Uredo Quercus. *Brond.*
On *Quercus virens.* Darien (2502).

Uredo luminatum. *Schw.*
On *Rubus.* Darien, Georgia (2435).

Cystopus cubicus. *Str.*
On Convolvulus. Aiken, S. Car. (2636).

Cystopus Portulacæ. *D.C.*
On *Portulaca.* Aiken, S. Car. (2613).

Torula herbarum. *Link.*
On *Chenopodium.* Aiken, S. Car. (2590).

Sporidesmium atropurpureum. *B. & C.*
On logs of *Liquidambar*, &c. Florida (98, 137).
It is somewhat doubtful whether this is not an Alga.

Gymnosporium inquinans. *Berk.*
On *Arundinaria.* Aiken (2466, 2507).
Spores smaller than in *G. arundinis.*

Ceratium hydnoides. *A. & S.*
On Myrica. Darien, Georgia (2447).

Microcera coccophila. *Desm.*
On *Morus.* Darien, Georgia (2512).

Fusarium lateritium. *Nees.*
On *Robinia.* Aiken, S. Car. (2626).

Fusisporium Betæ. *Desm.*
On tubers. Aiken, S. Car. (2578).

Fusarium roseum. *Link.*
On *Ficus.* Aiken, S. Car.

Sporocybe Persicæ. *Fr.*
On *Persica.* Aiken, S. Car.

Sporocybe byssoides. *Fr.*
On *Vitis æstivalis.* Aiken, S. Car. (2605).

Stilbum glaucum. *Cke.*
Stipite cylindrico, griseo-albo; capitulo concolore, globoso; sporis subglobosis, hyalinis (·004 mm.).
On *Myrica.* Darien, Georgia (2470).
Seated on an erumpent black stroma, perhaps an old *Diatrype.* It resembles *Stilbum vellereum*, B. & C., but is not tomentose.

Graphium explicatum. *B. & C.*
On herbaceous stems. Aiken, S. Car.

Cladosporium atriellum. *Cke.*
On flower stalk of *Yucca* (2563, 2566).

Cladosporium nodulosum. *Cke.*
On spinach. Darien, Georgia (2395).

Macrosporium abruptum. *Cke.*
On *Hibiscus esculentus.* Aiken (1988).

Macrosporium commune. *Rab.*
On *Cycas.* Darien, Georgia (2543).

Macrosporium Cheiranthi. *Fr.*

On *Ficus*. Aiken, S. Car. (2597).

Helminthosporium macrocarpum. *Grev.* var. **caudatum.** *B. & C.*

On oak. Darien, Georgia (2474).

Helicoma Curtisii. *B.*

On bark. Aiken, S. Car. (2341).

Helicoma Berkeleyi. *Curt.*

On logs. Darien, Georgia.

On oak. Darien, Georgia (2490).

On *Arundinaria*. Darien, Georgia (2508).

Peziza (Dasy) albocitrina. *Cke.*

Stipitata, villosa, alba. Cupulis turbinatis, demum expansis, ($\frac{3}{4}$ mm.), stipite brevi, disco citrino; ascis cylindraceis; sporidiis linearibus, rectis (·01 mm.); paraphysibus acuminatis.

On *Vaccinium* leaves. Darien, Georgia (2476).

Closely allied to *P. virginella*, C. & E.

Peziza (Belonidium) eustegiæformis. *B. & C.*

On *Arundinaria*. Darien, Georgia (2462).

Peziza (Moll) vinosa. *P.*

On bark. Darien, Georgia (2517).

Peziza (Dasyscypha) alboviridis. *Cke.*

Sparsa, sessilis, villosa. Cupulis hemisphericis, aerugineo-villosis ($\frac{1}{2}$-$\frac{3}{4}$ mm.); margine albido, disco ochraceo, concavo; ascis cylindraceis; sporidiis linearibus, obtusis, rectis (·008-·01 mm.); paraphysibus filiformibus; pilis asperulis, septatis, viridotinctis.

On decorticated *Myrica*, or in fissures of the bark. Aiken (2447).

Peziza (Mollisia) melichros. *Cke.*

Sparsa, sessilis. Cupulis minimis (vix $\frac{1}{2}$ mm) mellicoloribus, demum applanatis, extus saccharino-granulatis; margine leniter elevato; ascis cylindraceis; sporidiis subellipticis (·005 mm. long); paraphysibus filiformibus.

On bark. Alabama (Peters).

Pocillum Americanum. *Cke.*

Hypophyllum, sparsum. Cupulis cyathiformibus, infra in stipitem brevem attenuatis, fuligineis; margine pallidiore; ascis clavatis; sporidiis cylindrico-clavatis, triseptatis, leniter curvulis (·038-·045 × ·004 mm.); paraphysibus filiformibus.

On *Quercus virens* leaves. Darien, Georgia (2502).

Asci and sporidia quite distinct from those of the European species, which it much resembles.

Ascobolus furfuraceus. *Pers.*

On cow dung. Darien, Georgia (2524).

Ascobolus (Ascophanus) papillatus. *Pers.*

On cow dung. Darien, Georgia.

Stictis versicolor. *Fr.*

On branches. Darien, Georgia (2441).

PHILLIPSIELLA. *Gen. nov.*

Primo globosa, pertusa, demum applanata, velo membranaceo tecta, excipulo membranaceo; ascis saccatis; sporidiis hyalinis, absque paraphysibus.

Phillipsiella atra. *Cke.*

Epiphylla, punctiformis, atra; disco fuligineo; sporidiis ellipticis, biseriatis, hyalinis (·013 × ·004 mm.).

On leaves of *Quercus virens.* Darien, Georgia (2501).

This genus is dedicated to W. Phillips, of Shrewsbury, an earnest worker at the Discomycetes. This is a low form of Discomycetes, removed from Ascomyces by the presence of a membranaceous excipulum, on which the asci are seated, without any intermediate cellular stratum. At first it resembles a small *Sphæria* pierced at the apex, but is afterwards expanded.

Dermatea Magnoliæ. *B. & C.*

On *Magnolia.* Darien, Georgia (2510).

Agyrium rufum. *Pers.*

On *Juniperus.* Darien (2533).

Phacidium dentatum. *Fr.*

(Stylospores)

On oak leaves. Aiken, S. Car. (2575).

Dichæna faginea. *Fr.*

On *Fagus.* N. Hampshire.

Eustegia Magnoliæ. *Rav.*

On leaves of *M. glauca* (2542).

Rhytisma Austini. *Cke.*

Tenue, convexum, atrum, nitidum, rugulosum, hinc illic fertile; ascis clavatis; sporidiis ellipticis, hyalinis (·02 × ·01 mm.).

On leaves. Cotoosa, Fla. (Austin), 2559.

Resembling *R. tostum*, but smaller.

Rhytisma tostum. *B. & C.*

On oak leaf. Darien (2468).

Rhytisma Curtisii. *B.*

On leaves of *Ilex.* Darien, Georgia (2487).

Triblidium rufulum. *Spr.*

On *Rhus.* Darien (2458).

On *Morus.* Darien.

Hysterium putaminum. *Cke.*

Gregarium, vel sparsum, atrum. Peritheciis ellipticis, obtusis, labiis rigescentibus; ascis clavatis; sporidiis biseriatis, ellipticis, triseptatis, hinc illic divisis, fuscis (·025 × ·012 mm.).

On peach stones. Aiken, S. Car. (2603).

A very curious and interesting little species, not larger than a denudate *Sphæria.*

Hysterium Cyrillæ. *B. & C.*

On twigs. Darien (171c).

Hysterium (Lophodermium) maculare. *Fr.*

On *Liriodendron* leaves. Stylospores. Aiken, S. Car. (2600).

On *Persea Carolinensis.* Darien, Georgia (2545).

Hysterium (Hypoderma) virgultorum. *D.C.* var. **petiolare.**
On petioles of *Liriodendron*. Aiken, S. Car. (2599).

Actidium ? diatrypoides (*pro. tem.*)
On *Carpinus*. Darien, Georgia (2425).
On *Ostrya* (2331).

Asterina cuticulosa. *Cke.*
Sparsa, orbicularis, atro-brunneis. Peritheciis pelliculosis, applanatis; mycelio obsoleto; ascis globosis (·025 mm.); sporidiis ellipticis, uniseptatis, utrinque rotundatis, subconstrictis, hyalinis (·01 × ·005).
On leaves of *Ilex opaca*. Darien (2486).
The globose asci are scattered at regular intervals beneath the thin cuticle, which is slightly elevated in those places. A somewhat abnormal species.

Capnodium citri. *B. & M.*
On *Citrus*. Darien, Georgia (2415).

Myriangium Curtisii. *B. & Desm.*
On hickory. Darien.

Meliola amphitricha. *Fr.*
On *Persea* (2499).

Meliola tenuis. *B. & C.*
On *Arundinaria* (2482).
Scarcely different from *M. amphitricha*.

Sphærotheca pannosa. *Lev.*
On *Rosa*. Aiken, S. Car. (2568).

SACCARDIA. *Gen. nov.*
Mycelium arachnoideum, plerumque evanidum; conceptacula globosa; sporangiis globoso-ovatis, 8 sporis repleta; sporis ellipticis, polyblastis; appendiculæ nullæ, aut cum mycelio intertextæ.

Saccardia quercina. *Cke.*
Hypophylla. Mycelio evanido; conceptaculis gregariis vel sparsis; sporangiis globosis, octosporis; sporis ellipticis, hyalinis, merenchymatis ·02 × ·01 mm.
On leaves of *Quercus virens*. Darien, Georgia (2504).
Allied to *Erysiphe*. Dedicated to Professor Saccardo, of Padua, whose valuable contributions to Mycology merit distinct recognition.

Sphærostilbe gracilipes. *Tul.*
On *Platanus* (conidia). Aiken(1820).

Hypocrea chlorina. *Cke.*
Applanata, discoidea, elliptica, vel elongata, argillacea, intus citrina. Peritheciis immersis, brunneis; ostiolis punctiformibus; ascis clavatis; sporidiis biseriatis, elongato-ellipticis, 4 nucleatis, demum triseptatis (·025 × ·009 mm.).
On hickory. Darien (2411).
A very curious species, but slightly elevated above the bark, and of the same colour; stroma bright sulphur coloured, in which the brown membranaceous perithecia are immersed.

Nectria episphæria. *Tode.*

On old *Diatrype.* Darien (2423, 2530, 2422, 2473).

Nectria rubicarpa. *Cke.*

Cæspitosa, rubra. Peritheciis globosis, vix papillatis, obtuse verrucoso-rugosis; ascis cylindraceis; sporidiis uniseriatis, ellipticis, uniseptatis, constrictis (·012 × ·007 mm.), cellulis sub-globosis.

On *Gelsemium.* Aiken, S. Car. (2593).

Like a miniature red raspberry, both in the clusters and individual perithecia, the latter becoming eventually nearly even.

Nectria nigrescens. *Cke.*

Cæspitosa, rubra, demum nigrescens, glabra; ostiolo papillæformi; ascis cylindraceis; sporidiis elongato-ellipticis, uniseptatis (·018 × ·006 mm.); stylosporis in stromate gerentibus, aliis ovatis brunneis (·005 × ·003 mm.), aliis linearibus (·006 × ·002 mm.), hyalinis.

On *Gleditschia.* Aiken, S. Car. (2380a).

Nectria depauperata. *Cke.*

Peritheciis globosis, coccineis, vix papillatis, 1-3 in stromâ *(Fusarium yuccæ)* nidulantibus; ascis clavatis; sporidiis ellipticis, uniseptatis (·01 × ·0035 mm.); stylosporis fusiformibus, curvulis, utrinque acutis (·025 × ·003 mm.).

On *Yucca aloifolia.* Aiken, S. Car. (2564).

Nectria coccinea. *Fr.*

On hickory. Darien, Georgia (2411a).

Dothidea scutula. *B. & C.*

On leaves of *Persea.* Darien, Georgia (2450).

Dothidea Magnoliæ. *Cke.*

Epiphylla, sparsa, atra, elliptica, vel angulata, applanato-convexa, rugosa; ascis clavato cylindraceis; sporidiis cylindricis, obtusis, leniter curvulis, triseptatis, hyalinis (·02 + ·005 mm.).

On leaves of *Magnolia.* Darien (2485).

Dothidea sphæroidea. *Cke.*

Superficialis, subglobosa, atra, sparsa, minute rugosa; ascis saccato-clavatis; sporidiis inæqualiter uniseptatis, brunneis (·032 × ·02 mm.).

On living *Juniperus* foliage. Darien, Georgia (2429).

Upper cell of the sporidia globose, ·02 mm. diam.; lower cell nearly globose, ·01-·012 mm. diam.

Dothidea graminis. *P.*

On *Erianthus.* Aiken (1804).

On *Arundinaria.* Darien (2461, 2620).

Dothidea artemisiæ. *Schw.*

On herbs. Aiken (2607).

Stigmatea arundinariæ. *Cke.*

Epiphylla, gregaria. Peritheciis subglobosis vel depressis, opacis, atris, astomis, superficialibus; ascis clavatis; sporidiis fusoideis, 4 nucleatis, demum triseptatis, hyalinis (·026-·03 × ·008-·01 mm.).

On *Arundinaria.* Darien, Georgia (2483).

Gibbera pulicaris. *Fr.*

On *Opuntia.* Florida (2555).

Gibbera moricarpa. *Cke.*

Pustulis erumpentibus. Peritheciis convexo-applanatis, atris, opacis, minute velutinis, demum subglabris; ascis late clavatis; sporidiis numerosis, linearibus, curvulis, obtusis (·008-·01 mm. long).

On *Myrica.* Darien, Georgia (2471, 2540).

A very curious species. It is *Fracchiœa heterogenea,* Sacc., according to Prof. Saccardo.

Cucurbitaria radicalis. *Cke.*

Pustulis variis, erumpentibus, valsoideis, prominulis; peritheciis atris, ovatis, papillatis, opacis; ascis clavatis; sporidiis linearibus, leniter curvulis, obtusis (·008 mm.).

On roots of oak. Aiken, S. Car. (1680).

Hypoxylon malleolus. *B. & Rav.*

Issued in Ravenel's Fungi Americani, No. 181, by error, under the name of *Hypoxylon concentricum,* Fr.

Hypoxylon annulatum. *Mont.*

On oak. Darien, (2488, 2492, 50).

This species and the following, if carefully studied, will be found to be quite distinct.

Hypoxylon marginatum. *Schwz.*

On *Myrica* (2460).

On oak (2532, 2413).

Hypoxylon confluens. *Fr.*

On oak. Darien, Georgia (2419).

Hypoxylon sassafras. *Schw.*

On *Persea.* Darien (2463).

Hypoxylon perforatum. *Schw.*

On *Arundinaria.* Darien (2506).

On oak. Darien (2404).

Hypoxylon culmorum. *Cke.*

Parvum, convexum, ellipsoideum, atrum, nitidum. Ostiolo papillæformi. Ascis cylindraceis. Sporidiis naviculoideis, curvulis, nucleatis, brunneis (·015-·018 × ·006 mm.).

On *Arundinaria.* Darien, Georgia (2505).

Nummularia discreta. *S.*

On branches. Cotoosa. Fl. (2558).

Diatrype stigma. *Fr.*

On oak. Darien, Georgia (2412).

Diatrype hypophlæa. *B. & Rav.*

On *Persea.* Darien (2539).

Diatrype microplaca. *B. & C.*

On *Persea.* Darien (2465).

Diatrpe rumpens. *Cke.*

On *Fraxinus.* Aiken (1555).

Melogramma Wisteriæ. *Cke.*

= *Thumenia Wisteriæ. Rehm.*

On branches of *Wisteria.* Aiken (2615).

Melogramma ambiguum. *S.*
On *Rhus.* Darien (2489, 2518).

Melogramma liriodendri. *Cke.*
On *Liriodendron.* Aiken, S. Car. (1565).

Melogramma gyrosum. *Schw.*
On oak. Darien (2538)

Valsa stellulata. *Fr.*
On *Fraxinus.* Darien (2467, 2430).
On *Morus.* Darien (2477, 2472).
On *Liquidambar.* Aiken.
On *Xanthoxylum.* Darien (2442).

Valsa leucostoma. *Fr.*
On *Cerasus.* Aiken (2606, 2574).
On peach. Aiken (2576).

Valsa aculeans. *Schw.*
On *Rhus.* Darien (2520).

Valsa vitis. *S.*
On *Vitis.* Darien (2446).

Valsa glandulosa. *Cke.*
Pustulis epidermide tectis, ostiolis convergentibus, erumpentibus, nigris, nec stellatis. Ascis clavatis (.03 × ·01 mm.) Sporidiis minimis, spermatoideis (·005 mm. long).
On *Ailanthus.* Aiken (2385).

Valsa sabalina. *Cke.*
Tecta, prominula. Pustulis in maculis elongatis nigricantibus insidentibus; ostiolis convergentibus, emergentibus. Ascis clavatis. Sporidiis linearibus, obtusis, curvulis (·008-·009 mm. long).
On *Sabal.* Darien (2437).

Sphæria (Byss) aquila. *Fr.*
On oak. Darien (2409).
On *Gelsemium* (conidia) (2594, 2604).

Sphæria pezizula. *B. & Rav.*
On oak. Darien (2459, 2495).

Sphæria (Byss) parvicapsa. *Cke.*
Peritheciis minimis, in byssum floccosam, atro-brunneam insidentibus. Ascis clavato-cylindricis. Sporidiis ellipticis, triseptatis, brunneis (·012-·014 × ·006 mm.).
On logs. Aiken (2341*a*).

Sphæria (Villosæ) decastyla. *Cke.*
Peritheciis sparsis, globosis, minimis, villosis. Ascis cylindrico-clavatis. Sporidiis fusiformibus, nucleatis, demum 5 septatis, hyalinis (·03 × ·005 mm).
On oak. Darien (2420).
Hairs about ·09 mm. long.

Sphæria (Pertusæ) putaminum. *Schw.*
On peach stones. Aiken (2602).

Sphæria (Villosæ) scopula. *C. & Pk.*
On wood. Aiken, S. Car, (2443).

Sphæria (Immersa) inusta. *Cke.*

Sparsa, immersa, nigrofacta; ostiolo albido. Ascis cylindraceis. Sporidiis uniseriatis, ellipticis, triseptatis, brunneis (·015-·018 × ·008 mm.).

On *Juniperus.* Darien (2413).

Sphæria pustulata. *Sacc.?*

On *Cerasus.* Aiken (2572).

Sphæria (Diaporthe) Baccharidis. *Cke.*

Sparsa, punctiformis, cuticula tecta, ostiolis brevibus, erumpentibus. Ascis clavatis. Sporidiis fusiformibus, quadrinucleatis (·018-·02 × ·003 mm.).

On *Baccharis.* Darien (2424).

Sphæria palmetta. *Cke.*

Tecta, subprominula; ostiolis erumpentibus. Ascis cylindraceis vel clavatis. Sporidiis lanceolatis, obtusis, 4 nucleatis, demum 3 septatis, leniter constrictis, hyalinis (·03 × ·007 mm.).

On *Sabal.* Darien (2436).

Sphæria Sabalensis. *Cke.*

Tecta, numerosa. Peritheciis punctiformibus, atro-brunneis. Ascis clavatis. Sporidiis biseriatis, arcte fusiformibus, utrinque filiformi-attenuatis, hyalinis, rectis vel curvulis-nucleatis, dein 1-3 septatis (·05 × ·005 mm.).

On *Sabal.* Darien (2455).

Sphæria (Caulicolæ) anthelmintica. *Cke.*

Sparsa, tecta, parce elevata; ostiolis punctiformibus, epidermide pertusis. Ascis cylindraceis. Sporidiis fusiformibus, tri-septatis, fusceolis, leniter constrictis (·03 × ·007 mm.).

On *Chenopodium anthelminticum.* Aiken, S. Car. (2590).

Sphæria andromedæ. *S.*

On leaves of *Andromeda.* Darien (2475).

Sphærella Ravenelii. *Cke.*

Hypophylla, tota pagina occupans. Peritheciis minimis, vix conspicuis, brunneis. Ascis clavatis. Sporidiis ellipticis, uniseptatis, superne leniter incrassatis (·008 × ·004 mm.).

On oak leaves. Aiken (2596).

Sphærella Pittospori. *Cke.*

Gregaria. Peritheciis atris, semi-immersis, in maculis angulatis, veni-limitatis, congestis. Ascis clavato-cylindricis. Sporidiis ellipticis, uniseptatis, utrinque rotundatis, leniter constrictis (·01 × ·004 mm.).

On leaves of *Pittosporum.* Aiken (2589).

Sphærella Catesbeyi. *C.*

Hypophylla, immersa. Peritheciis sparsis, sæpe 2-4 congestis, cuticula tectis, demum fissuratis. Ascis clavatis. Sporidiis lanceolatis, uniseptatis (·02-·022 × ·004 mm.).

On leaves of *Quercus Catesbeyi.* Darien (2046).

Sphærella Wisteriæ. *Cke.*

Punctiforma, sparsa. Peritheciis semi-immersis, atris, minimis. Ascis clavatis. Sporidiis ellipticis, uniseptatis (·008 × ·003 mm.).

On leaves of *Wisteria sinensis.* Aiken (2551).

Sphærella glaucescens. *Cke.*

Hypophylla. Peritheciis semi-immersis, in maculis orbicularibus, minimis congestis. Ascis clavatis (·03 × ·01 mm.) Sporidiis ellipticis (·006 × ·003).

On leaves of *Acer rubrum.* Aiken (2601).

Sphærella Bumeliæ. *Cke.*

Epiphylla. Peritheciis atris, semi-immersis, in maculis suborbicularibus, nigrofactis congestis. Ascis clavato-cylindraceis. Sporidiis ellipticis, uniseptatis (·012 × ·004 mm.).

On leaves of *Bumelia.* Darien (2434).

Sphærella cerasina. *Cke.*

Hypophylla. Peritheciis atris, semi-immersis, in maculis suborbicularibus congestis. Ascis cylindraceis. Sporidiis arcte ellipticis, uniseptatis (·01 × ·0025 mm.).

On leaves of *Cerasus lauro-cerasus* (2573).

Sphærella vaccinii. *Cke. Hdbk.*

On leaves of *V. arboreum.* Aiken (2591).

Gnomonia petiolorum. *S.*

On petioles of *Liquidambar.* Darien (2496).

The following numbers were sterile, and hence indeterminable :— Phoma, 2481 , Vermicularia, 2484 ; Rhinotrichum, 2547 ; Cenangium, 1833 ; Actidium, 2425, 2331 ; Nectria, 2478 ; Dothidea, 2554; Sphærella on Platanus, 1838, on oak 1922, and on pear leaves.

NEW DIATOMS.

By Prof. H. L. Smith, LL.D.

The following new Diatoms are described by Professor H. L. Smith in the first number of the "American Quarterly Microscopical Journal."

Homæocladia capitata. *H. L. S.*

Frond membranaceous, umbellately branched; branches elongated, and with corymbose capitate apex. Frustules linear, valves lanceolate, with acute and very slightly constricted apices; frustules densely packed, but not in series, or fascicles ; marginal punctæ faint, 35 in ·001. Length of frustule, ·0008 in. ; breadth, ·0002 in. Frond, 1·5″ to 2″.

Black Rock, California.

Meridion intermedium. *H. L. S.*

Frustules sessile, cuneate, margins nearly smooth, valves with very faint pervious costæ in f. v., which are scarcely discernible in s. v., cuneate, rounded at the larger extremity. Length ·00166 to ·003.

Knoxville, Tenn.

Navicula Kutzingiana. *H. L. S.*

Frustules linear, valves scarcely inflated, with rounded ends, and three or four conspicuous striæ radiating from the central nodule, and which are prominent also, along with the central nodule, in f. v. Frustules in f. v. quadrangular, frequently adhering and forming a short filament (*Diadesmis*), and with two distinct intra-marginal (bead-like) vittæ at either end. Length ·0006 to ·00085, breadth f. v. ·00035, s. v. ·00021. Striæ about 50 in .001.

Avranches, Normandy, France (de Brebisson).

Navicula parvula. *H. L. S.*

Frustules small, valves lanceolate, with acute apices. Striæ divergent, and readily seen. Frustules linear in f. v. with rounded ends. Length ·0005; breadth ·00015. Striæ 42 in ·001.

Villerville, France (de Brebisson).

Nitszchia Kittoni. *H. L. S.*

Frustules linear, valves lanceolate, with sharp and slightly constricted apices, marginal punctæ very distinct, 16 in ·001 and quite prominent in f. v. Striæ faint. Length ·0007 to ·001; breadth, ·0002.

River Catuche, Caracas, Venezuela (F. Kitton).

Raphoneis australis. *H. L. S.*

Frustules somewhat variable in size, valves cuneate, rounded at the larger end, and coarsely moniliform striate, striæ interrupted by a smooth blank space, frustules slightly cuneate in f. v. Length ·0005 to ·00086; breadth, ·00022 to ·0004. Striæ about 30 in ·001.

Royal Sound, Kerguelen's Land (Dr. J. H. Kidder).

Rhizosolenia Eriensis. *H. L. S.*

Frustules of medium size, compressed, and somewhat flattened; six to twelve times as long as broad; annuli on the dry frustules conspicuous, alternate, and with a ziz-zag median connection, valves finely striate, bristles nearly or quite as long as the frustules, and with the calyptra excentric, lying nearly in a line with one margin of the frustule when the flat side is in view. Length of frustules ·003 to ·006.

Buffalo, N.Y.; Lake Erie; Cleveland, Ohio; Lake Michigan.

Cestodiscus Baileyi. *H. L. S.*

Disc circular, diam. ·0025 to ·0028, inflated, and with distinct radiating granules, and showing more or less the characteristic subulate blank spaces of *Actinocyclus;* without umbilicus; processes intra-marginal, small, and numerous; the punctæ near the margin of the valve are in parallel rows, 27 in ·001. Secondary plate or septum, with a large central opening, fringed with somewhat irregular rays, which do not reach the margin.

Lower Lake Klamath, Oregon (Lt. Williamson).

Amphora mucronata. *H. L. S.*

Frustules in f. v. broadly oval, dorsum with distant longitudinal lines, ventral surface with indistinct longitudinal lines, or furrows, central nodule elongated and pointed (mucronate), end touching

the margin of the connecting zone, which is of variable breadth, nodules at the end quite small. Median line strongly and sharply inflected and minutely punctate along its whole length, an irregular row of minute lines or elongated dots on the valve within the margin. In s. v. dorsum very convex; ventral margin straight, or nearly so, with slight constriction at the ends; central nodule indistinctly shown (out of focus). Striæ excessively minute. Length ·0026; breadth ·0012 to ·002.

Atlantic marshes, N.J. (Dr. Lewis).

Actinocyclus Niagaræ. *H. L. S.*

Disc large, diam. ·0038, valves very much inflated, and densely packed with minute radiating punctæ, which are scattered loosely and irregularly at the centre, and sometimes radiate from two central blank spaces. In the living form the connecting membrane is broad, and the highly inflated valves cause it to lie obliquely. There is a characteristic circlet of minute spines within the margin of the valves, and the subulate blank spaces, so characteristic of *A. Ralfsii*, are more or less apparent.

Lake Erie (H. C. Gaylord).

The above species are illustrated on one plate, in the Journal from which the above descriptions are derived.

CLAVIS HYMENOMYCETUM.

For obvious reasons we shall content ourselves with an announcement of the appearance of this work under the title of "Clavis Synoptica Hymenomycetum Europæorum," the joint authors being the editor of this Journal, and Dr. Quelet. It is clearly, neatly, and compactly printed in a pocket volume for field work. Interleaved copies for notes are being prepared at a slight additional cost.

The arrangement to a great extent follows that of Fries' last work, including all the European species since described, with short characters of each species, just sufficient for the field, in Latin, so as to be available for all European countries. A distinctive mark indicates the British species. Wherever a species has been accurately figured, reference to that figure is given. Some few new species are published for the first time, chiefly from the Vosges.

It was considered advisable not to initiate any considerable departures from the "Monographia" of Fries, since no explanation or reasons could be given within the scope of the work. Nevertheless, in the judgment of the authors, some of the species recorded in that work have been considered as entitled to rank only as varieties; and, in other instances, species placed by error in wrong genera, or subgenera, are transferred to the company of their nearest allies. The work may be obtained in the chief capitals of Europe, or direct from the publishers.

REHM'S ASCOMYCETEN.

The publication of another fasciculus of this collection was announced in our last number. We have since had occasion to examine some of the specimens, on which a few observations are necessary.

No. 451. *Plicaria tracheia*, Rehm, is identical with *Boudiera alveolata*, C. & Phil., and is intermediate between *Ascobolus* and *Ombrophila;* in some respects allied also to *Sphærosoma.*

No. 454. This is certainly not the typical form of *Peziza hirta*, but intermediate between *P. hirta* and *P. scutellata.*

No. 456. *Humaria umbrata*, is a large pallid form, but the fructification is the same as in the type.

No. 457. Dr. Rehm is certainly wrong in his assumption that *Peziza fuscescens*, P., and *Peziza fuscidula*, C. & E., are the same species. This will be manifest when we publish figures of both in an early part of "Mycographia."

Meliola quinqueseptata, Rehm, No. 492, is stated to be the same as *Meliola quinquespora*, Thum. There seems to be a curious fatality about this species; fortunately the specimens can be consulted in both instances. The description by Thuemen, which is quite different from his specimens, would be a novelty in *Meliola.* It says that the asci are ellipsoid, ·035-·038 × ·01-·012 mm., containing 5 ovate sporidia, which are simple, hyaline, ·01 × ·005 mm. The specimens clearly show that he has mistaken the sporidia for asci, and the five cells for five sporidia—a most extraordinary error, but nevertheless true, for he calls the asci brown and the sporidia hyaline. We have examined the specimens; the sporidia are precisely as in *Meliola amphitricha*, brown, with four septa, and consequently five cells, the dimensions of the mature sporidia are rather more than those given above. There are two of these sporidia in each ascus, but when fully mature the asci are dissolved. Dr. Rehm, evidently finding the name an error, changes it to *M. quinqueseptata*, which is again erroneous, for neither in his specimens nor in those issued by Thuemen are the sporidia more than four septate, either name conveys a wrong impression. It is curious that neither Thuemen nor Rehm has indicated the main point of distinction, in fact the *only* difference between this species and *M. amphitricha*, with which evidently neither of them are much acquainted, or they would have recognized the distinction at once. In passing, it may be stated that *Helminthosporium orbiculare*, Thum., according to specimens received from him, is *Meliola amphitricha*, Fr., and that *Meliola Mac-Oweniana*, Thum., is most decidedly not a *Meliola* at all, but a very good species of *Asterina*, and will therefore stand as *Asterina Mac-Oweniana*, and *Meliola Psilostomæ*, Thum., No. 775, is also an *Asterina*, although the specimens are scarcely mature. On the other hand, *Meliola microtheca*, Thum., No. 851, cannot be distinguished from *M. amphitricha*,

of which four forms are published in "Ravenel's American Fungi." In the description of *Meliola microtheca*, the very same kind of error is repeated as to sporidia as in *M. quinquespora*. We would strongly recommend Baron Thuemen to examine his specimens again, and obtain a clearer idea of the genus by comparing them with *M. amphitricha*, and M. Bornet's monograph ; for he will gain himself no credit by descriptions such as these ; assuming, of course, that he distributes the specimens he describes, since our judgment is based upon his own specimens.

Pertinent to this subject, it may be mentioned that *Meliola abjecta*, Schroter, in Rabenhorst's "Fungi Europæi," No. 2424, is certainly not a *Meliola*, although it is probably an *Asterina*. The characters of the genus *Meliola* are given in the "Annales des Sci. Nat.", 3rd ser., Vol. xvi., p. 267. Specimens of *Meliola* are published in Ravenel's "North American Fungi," Nos. 81 to 84, 88, and others. *Asterina veronicæ* (Lib.), "Grevillea," v., p. 122, is the same as *Meliola abjecta*, Schroter, and *Dimenosporium abjectum*, Fckl.

CORTINARIUS.

The following additional plates have been prepared for publication in successive numbers of this journal. They are chiefly from drawings by Dr. L. Quelet, except where otherwise stated:—

Plate 110, *fig.* 1. Cort. caninus, *Fr.*
2. Cort. myrtillinus, *Fr.*
3. Cort. miltinus, *Fr.*
4. Cort. cinnabarinus, *Fr.* In this figure the colour is too dark and brown for the typical form, which Dr. Quelet states should be a beautiful orange-vermillion.
5. Cort. sanguineus, *Fr.*

Plate 111, *fig.* 1. Cort. sanguineus, *Fr.*
2. Cort. cinnamomeus, var. semisanguineus, *Fr.*
3. Cort. croceo-conus, *Fr.* (cinnamomeus, *Fr.*, var.)
4. Cort. orellanus, *Fr.*
5. Cort. cotoneus, *Fr.*
6. Cort. raphanoides, *Fr.*
7. Cort. bivelus, *Fr.* Pileus too dark. It should be of a flesh-coloured ochre.
8. Cort. urbicus, *Fr.*

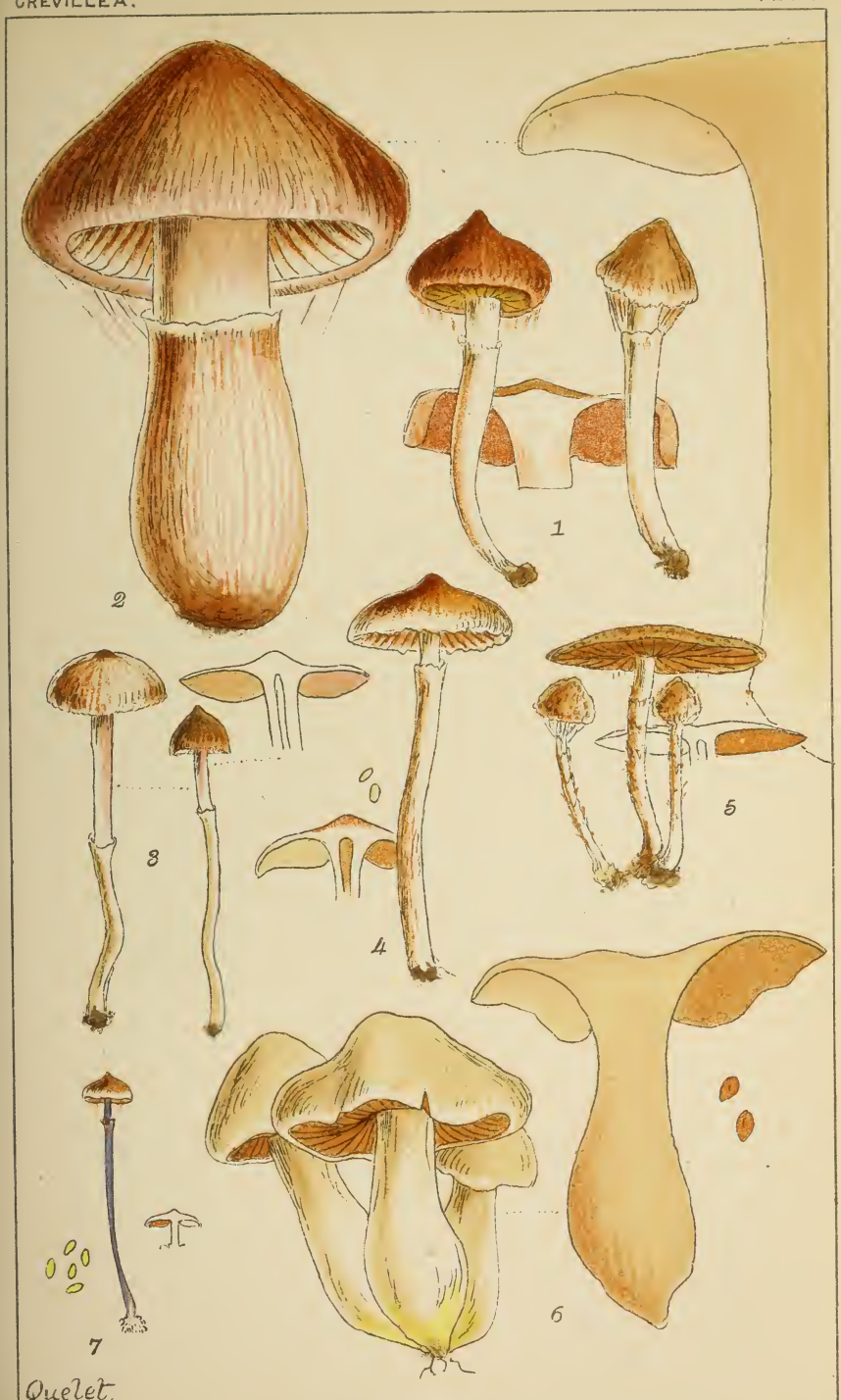
Plate 112, *fig.* 1. Cort. plumiger, *Fr.*
2. Cort. scutulatus, *Fr.*
3. Cort. evernius, *Fr.* (scutulatus, *Fr.*, var.)
4. Cort. limonius, *Fr.*
5. Cort. acutus, *Fr.*

1 *C. caninus.* 2 *C. myrtillinus.*

3 *C miltinus.* 4 *C. cinnabarinus.* 5 *C. sanguineus*

1 *C. anthracinus.*
2 *C. cinnamomeus v. semisanguineus.*
3 *C. croceoconus.*
4 *C. orellanus.*
5 *C. cotoneus.*
6 *C. raphanoides.*
7 *C bivelus.*
8 *C. urbicus.*

1 *Cort. plumiger.* 2 *C. scutulatus.*
3 *C. evernius.* 4 *C. limonius.* 5 *C. acutus.*

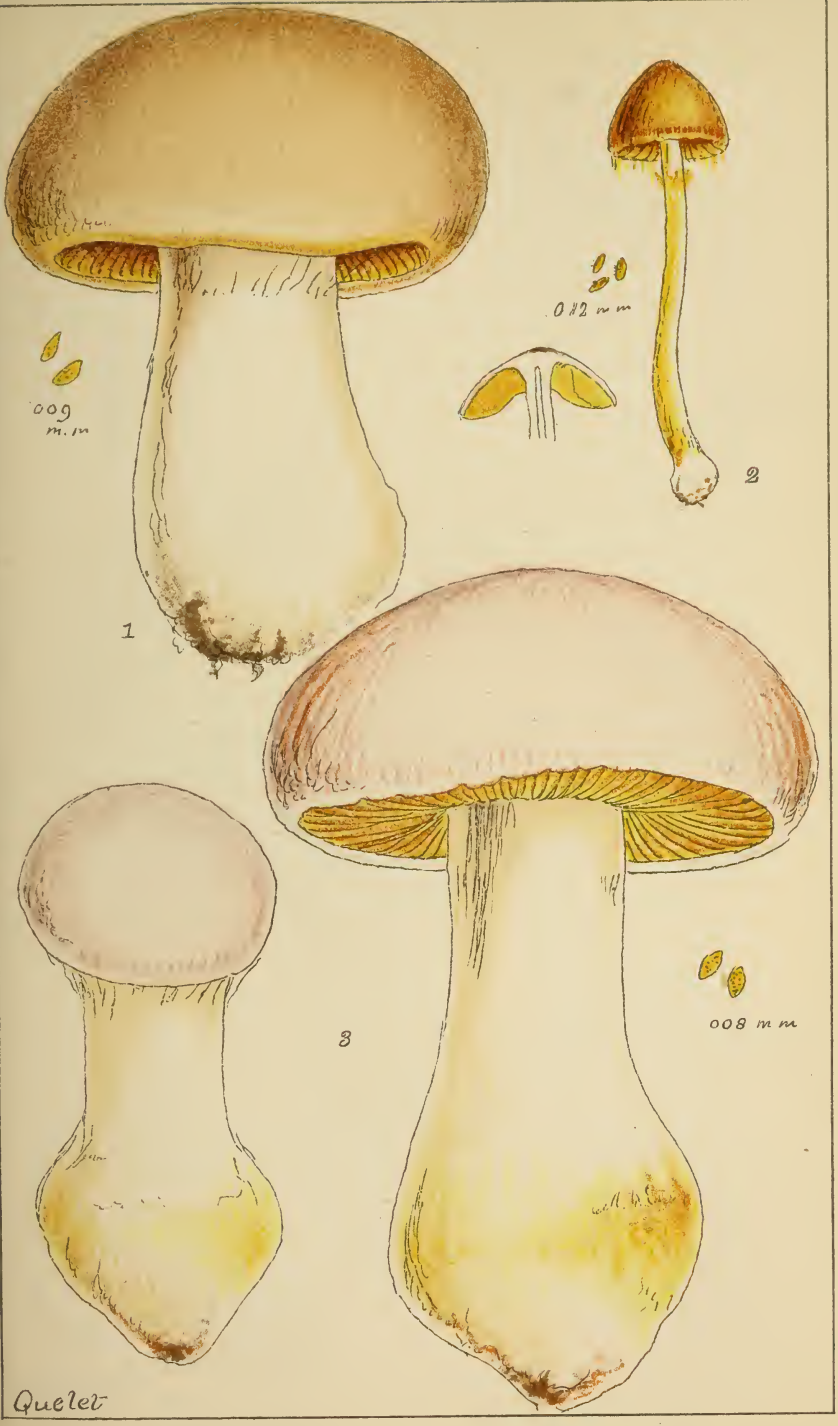


1 *C. hinnuleus.* 2 *C. brunneus.* 3 *C. flexipes.*
4 *C. rigidus.* 5 *C. paleaceus.* 6 *C. subferrugineus.*
7 *C. ianthipes.*

Quelet.

1 *C. isabellinus.* 2 *C. germanus.* 3 *C. decipiens.*
4 *C. paleaceus.* 5 *C. fasciatus.* 6 *C. milvinus.*

1 *Cort. duracinus* 2 *Cort. erythrinus.*
3 *Cort. castaneus.* 4 *Cort. sanguineus*



1 Cortinarius latus. *2 C. fulvescens.*
3 Cortinarius traganus Fr.

1 *Cortinarius pholideus.* 2 *Cort. torvus Fr.*

Plate 113, *fig.* 1. Cort. hinnuleus, *Fr.*
2. Cort. brunneus, *Fr.*
3. Cort. flexipes, *Fr.*
4. Cort. rigidus, *Fr.*
5. Cort. paleaceus, *Fr.*
6. Cort. subferrugineus, *Fr.*
7. Cort. ianthipes, *Fr.*

Plate 114, *fig.* 1. Cort. isabellinus, *Fr.*
2. Cort. germanus, *Fr.*
3. Cort. decipiens, *Fr.*
4. Cort. paleaceus, *Fr.*
5. Cort. fasciatus, *Fr.*
6. Cort. milvinus, *Fr.*

Plate 115, *fig.* 1. Cort. duracinus, *Fr.*
2. Cort. erythrinus, *Fr.*, stipite purpurino, apice violaceo.
3. Cort. castaneus, *Bull*, from drawing by Dr. Bull, "stipite purpureo-violaceo."
4. Cort. sanguineus, *Fr.* Ditto.

Plate 116, *fig.* 1. Cort. latus, *Fr.*
2. Cort. fulvescens, *Fr.*
3. Cort. traganus, *Fr.*

Plate 117, *fig.* 1. Cort. pholideus, *A. & S.*, from drawing by W. Phillips.
2. Cort. torvus, *Fr.*, drawing by Dr. Bull, referred by Quelet to *Cortinarius brunneus.*

The references to the majority of these figures are already given in the "Clavis."

BOTANICAL LOCALITY RECORD CLUB.

It is desired to enlist the co-operation of Botanists in general, and more especially of Bryologists, in a scheme set on foot by the Botanical Locality Record Club for investigating the geographical distribution of Mosses in the British Isles.

The Botanical Locality Record Club was founded in 1873, for the purpose of working out the distribution of British Plants; records, accompanied by specimens as vouchers, being sent in by the members and embodied by the Recorder in an Annual Report on the plan of "Topographical Botany." The Club, which commenced with 54 members, now contains nearly 100, including some of our most eminent botanists. A large amount of work has been done by the Club during the five years that it has been in existence, the floras of several counties, previously almost unexplored, have been worked out, and a very large number of additions have been made to the flora of many others. Up to the present time the Reports have dealt only with the flowering plants

and vascular acrogens. In 1875, however, a suggestion was made that the Club should include in its field the other orders of Cryptogamia, and it is considered desirable that, if possible, this should be carried into effect. It is proposed to start with the Mosses, for which order Mr. C. P. Hobkirk, F.L.S., and Mr H. Boswell, have consented to act as Recorders. A list of the Mosses hitherto recorded in Great Britain, entitled "The London Catalogue of British Mosses," has been drawn up by Messrs H. Boswell and C. P. Hobkirk, as an aid to collectors, and to secure uniformity of nomenclature. A number of specimens have already been sent in by several members. At present, however, the funds in hand are not sufficient to allow of the publication of a Report on Mosses without seriously curtailing the Report on the Flowering Plants, which it is not considered desirable to do, especially seeing that bryologists constitute but a comparatively small proportion of the members of the Club. If more botanists interested in Mosses (say 30) could be induced to join the Club, the additional subscriptions (5s. each per annum), would suffice for the publication of a Report on Mosses.

The geographical distribution of the Cryptogamia is a field hitherto very little worked, yet full of promise. The Cryptogams are far less liable than the flowering plants to be introduced or exterminated by the direct agency of man, and though the lower Algæ and Fungi may depend for their occurrence rather upon the presence of their appropriate matrix or medium than upon geographical situation, there can be no doubt that the distribution of the perennial Mosses, Hepaticæ and Lichens, is largely governed by conditions of altitude, climate, rainfall, and geologic configuration; and the study of these conditions can hardly fail to yield valuable results. No one has hitherto attempted to work out the geographical distribution of the Mosses of Great Britain as Mr. Watson, in his "Topographical Botany," has that of the Phænogams, or as the Rev. W. A. Leighton, in his "Lichen Flora of Great Britain," has that of the Lichens.

Botanists wishing to join the Club are requested to send their names either to Dr. H. F. Parsons, Goole; or Mr. C. P. Hobkirk, Huddersfield.

The "London Catalogue of British Mosses" may be had of Mr. T. B. Blow, Welwyn. Price 4d.

F. Arnold Lees, Market Rasen,
Recorder for Flowering Plants.
Chas. P. Hobkirk, Huddersfield.
H. Boswell, Oxford.
H. Franklin Parsons, M.D., Goole.

SOME HIMALAYAN FUNGI.

By M. C. Cooke.

The following were communicated from the N.W. Himalayas, by J. Sykes Gamble, Esq. :—

Æcidium Solani. *Mont.*

On leaves of *Solanum*. Sutlej Valley.

Probably the same as Montagne's species from Chili.

Puccinia solani. *Cke.*

Caulicola. Soris atris, minimis, linearibus, subtus tomento insidentibus; pseudosporis ellipticis, leniter constrictis, fuscis (·035-·04 × ·018-·02 mm.), pedicellis gracilis, elongatis, hyalinis.

On stems of *Solanum*, associated with *Æcidium Solani*. Sutlej Valley, India.

Colæosporium pingue. *Lev.*

On leaves of *Astilbe*. Simla, 8,000 feet.

Æcidium urceolatum. *Cke.*

Epiphyllum vel caulicolum, deformans. Peridiis congestis, cylindrico-urceolatis, sub-sulphureis. Sporis aurantiacis, ovatis 025 0 3 × ·02 mm.

On *Thalictrum*, which is very much distorted. Kanawar, India, 8,000 feet.

This appears to be certainly distinct from *Æ. Thalictri*. Grev., the spores of which are ·022 × ·015 mm. The peculiar sulphur color of the peridia, independent of the color imparted by the spores, urceolate form, greater length, all indicate important differences, to say nothing of the twisting and distorting of the swollen peduncles and stems, which are not observed in *Æ. Thalictri*.

Lecythea epitea. *Lev.*

On leaves of *Salix daphnoides*. Simla, 6,500 feet.

Æcidium violæ. *Schum.*

On leaves of *Viola*. Simla, 6,500 feet.

Lecythea ruborum. *Lev.*

On leaves of *Rubus flavus*. Sutlej Valley, 3,000 feet.

Uredo Hypericorum. *D.C.*

On leaves of *Hypericum*. Simla, 6,500 feet. Spores immature.

WOOLHOPE ANNUAL FORAY.

The annual Foray of the Woolhope Club took place this year, as usual, at Hereford, throughout the week, from Oct. 1st to the 4th, and was well attended by mycologists from all parts of England. A general account of the proceedings having been published elsewhere, it is only necessary here to enumerate some of the principal species collected, and exhibited at the show.

Amongst Agarics were the following : Ag. (Amanita) strobiliformis. *Fr.;* strangulatus. *Fr.;* Ag. (Lepiota) metulæsporus. *B.;* Ag. (Tricholoma) equestris. *Fr.;* sulfureus. *Fr.;* sejunctus. *Sow.;* resplendens. *Fr.;* acerbus. *Bull.;* rutilans. *Schff.;* columbetta. *Fr.;* saponaceus. *Fr.;* Ag. (Clitocybe) fragrans. *Sow.;* Ag. (Collybia) maculatus. *A & S.;* Ag. (Mycena) pelianthinus. *Fr.;* pterigenus. *Fr.;* Ag. (Omphalia) atropunctus. *P.;* fibula. *Bull.;* Ag. (Pleurotus) dryinus. *P.;* Ag. (Pluteus) umbrosus. *P.;* chrysophæus. *Schff;* Ag. (Leptonia) euchrous. *P.;* Ag. (Claudopus) variabilis. *P.;* Ag. (Pholiota) caperatus. *Fr.;* radicosus. *Bull.;* heteroclitus. *Fr.;* unicolor. *Fl. Dan.;* Ag. (Inocybe) pyriodorus. *Fr.;* obscurus. *P.;* geophyllus. *Sow.;* Ag. (Naucoria) cucumis. *P.;* innocuus. *Lasch.;* Ag. (Crepidotus) mollis. *Schff.;* Ag. (Hypholoma) sublateritius. *Schff.;* velutinus. *P.;* Candolleanus. *Fr.;* Ag. (Psathyra) gossypinus. *Bull.;* Ag. (Psathyrella) disseminatus. *P.;* Coprinus comatus. *Fr.;* atramentarius. *Fr.;* Bolbitius titubans. *Fr.;* Cortinarius elatior. *Fr.;* collinitus. *Fr.;* arenatus. *Fr.;* cinnabarinus. *Fr.;* cinnamomeus. *Fr.;* armeniacus. *Fr.;* Paxillus panuoides. *Fr.;* Hygrophorus lacmus. *Fr.;* calyptræformis, *B. & Br.;* cossus. *Fr.;* metapodius. *Fr.;* Lactarius glyciosmus. *Fr.;* torminosus. *Fr.;* turpis. *Fr.;* volemum. *Fr.;* Russula lepida. *Fr.;* cyanoxantha. *Fr.;* fœtens. *Fr.;* alutacea. *Fr.;* Cantharellus tubæformis. *Fr.;* Marasmius urens. *Fr.;* ramealis. *Fr.;* rotula. *Fr.;* Panus torulosus. *Fr.;* Boletus luteus. *Fr.;* scaber. *Fr.;* Strobilomyces strobilaceus. *B.;* Fistulina hepatica. *Fr.;* Polyporus squamosus. *Fr.;* intybaceus. *Fr.;* dryadeus. *Fr.;* chioneus. *Fr.;* conchatus. *Fr.;* ulmarius. *Fr.;* molluscus. *Fr.;* Trametes mollis. *Somm.;* Hydnum variæcolor. *Fr.;* Thelephora. Sowerbei. *B.;* anthocephala. *Fr.;* caryophyllea. *P.;* laciniata. *P.;* fastidiosa. *Fr.;* Cyphella galeata. *Fr.;* Clavaria amethystina. *Bull.;* cristata. *P.;* Kunzei. *Fr.;* aurea. *Schff.;* abietina. *P.;* fusiformis. *Sow.;* pistillaris. *B;* Lycoperdon saccatum. *Fr.;* Helvella crispa. *Fr.;* lacunosa. *Fr.;* elastica. *Bull.;* ephippium. *Fr.;* Geoglossum viride. *P.;* Leotia lubrica. *P.;* Spathularia flavida. *Fr.;* Peziza succosa. *B.;* badia. *P.;* macropus. *P.;* firma. *P.;* aurantia. *Fr.;* cochleata. *Fr.;* onotica *P.;* saniosa. *P.;* constellatio, *B. & Br.;* cæsia. *P.;* nivea. *Fr.;* cerina. *P.;* benesuada. *Tul.;* Dermatea dryina. *Sp. nov.;* Hypocrea gelatinosa. *Tode.;* rufa. *Fr.;* Hypoxylon multiforme. *Fr.;* fuscum. *Fr.;* coccineum. *Fr.;* Eutypa spinosa. *Tul;* Sphæria pulveracea. *Ehr.*, and other species. Sphærella peregrina. *Sp. nov.;* Balsamia platyspora *B. & Br.;* Tuber puberulum. *B. & Br.;* Pachyphlæus melanoxanthus. *Tul.;* Phoma concentricum. *Mont.;* Torula hysterioides. *Corda.;* Mycogone cervina. *Ditm.* In addition to which the Rev. M. J. Berkeley sent specimens of Hygrophorus Wynniæ. *B.*, a new species, found in North Wales. Altogether the meeting was equally successful with that of preceding years. The first week in October has been appointed for the meetings in 1879.

FUNGI NOVI, IN FENNIA DETECTI.

Qvos Descripsit P. A. Karsten.

1. **Mycena coprinoides.** n. sp.

Pileus membranaceus, obovoidens, obtusus, sulcatus, pilosellus, gilvo-pallidus. Stipes fistulosus, apice incrassatus, pilosus flocculosoqve pruinellus, basi strigosus, hyalino albus. Lamellæ adnatæ, liberæ, subconfertue, discretæ, albæ.

In rimis corticis *Salicis Caprææ* in ditione Mustialensi, mensi ineunte Septembri, gregarie, crescens.

Mycena stylobates (Pers.), hinc proxime accedit. Pileus circiter 4 mm. altus, circiter 3 mm. latus. Stipes pilis erectis hirtellus, 1-2 cm. longus, circiter 1 mm. crassus. Sporæ minutissimæ.

2. **Galera viscidula.** n. sp.

Pileus campanulatus, striatus, viscidus, subochraceus, 6-8 mm. latus. Stipes æqvalis, ferruginascens, sursum pallidior, deorsum obscurior, albofloccolosus, circiter 3 cm. altus, 1 mm. crassus. Lamellæ adnatæ, distantes, ex albido ferruginascentes. Sporæ sphæroideo-ellipsoideæ, dilutissime flavescentes (sub lente), longit. 6-7 mmm., crassit. 3-6 mmm.

In culmis graminum emortuos prope Mustiala fine mensis Septembris, 1878, parcissime lecta.

3. **Collybia coracina.** *Fr.* var. **Cornui.**

Pileus submembranaceus, convexo-planus, disco depresso umbonato, striatus, glaber, hygrophanus. Stipes æqvalis, e farcto subtiliter fistulosus, basi adscendens, subundulatus, apice subpruinellus, pallidus. Lamellæ adnatæ, distantes, latæ, albidæ, pallescentes.

In qvisqviliis ad Mustiala m. Octobri, 1878.

Cæspitosa. Odor farinæ recentis. Pileus fusco-seu lividopallens, umbone nigrescente, siccus expallens, 1-2 cm. latus. Stipes 2-4 cm. longus, 1-2 mm. crassus, basi subvillosus. Lamellæ venoso-connexæ. Cum *C. coracina* confluere videtur ideoque pro forma ejusdea sat singulari consideranda.

4. **Coprinus inamoenus.** n. sp.

Pileus tenerrimus, demum expansus, furfure denso micaceo obrutus, cinereo-albus, disco subfusco, 2, 5 cm. latus. Stipes subæqvalis, hyalino-albus, sericellus, 7 cm., longus, 1, 5 mm. crassus. Lamellæ collario e stipite remotæ, nigræ. Sporæ ellipsoideæ, fuscæ (s.l.), impellucidæ, longit. 7-11 mmm., crassit. 4-6 mmm.

Supra folia coacervata putrescentia in Mustiala m. Octobri, 1878, specimen unicum invenimus.

Odore ingrato, gravi (fere *Trichol. inamoeni*), facillime distinctus.

N.B.—*C. inamœnum* nuperrime legi. Odore gravissimo quam maxime fætidissimo; stipiteque prolifero ab omnibus diversus.

5. **Cortinarius venustus.** n. sp.

Pileus carnosus, tenuis, convexus, obtusus, sericeus, dein disco innato-sqvamulosus, testaceo-pallens. Stipes æqvalis, cavus, fibrillosus, violaceus. Lamellæ adnatæ, distantes, angustæ, ochraceæ, demum croceo-ochraceæ.

In pineto medio m. Septembris, 1878, in paroecia Tammela prope lacum Salvisjärvi.

A *Cortinario suillo*, Fr., affini, stipite longo, æqvali, fere toto violaceo lamellisqve angustis, ochraceis differens. Caro pilei albida. stipitis sordide ochraceo-albida. Pileus vulgo irregularis, 7 cm. latus. Stipes subinde basi attenuatus, fibrillosus, vel floccoso-fibrillosus, basi alba excepta, violaceus, 12-19 cm. longus, 4 mm. crassus. Lamellæ basi venoso-connexæ. Sporæ ellipsoideæ, flavescentes (s. l.), longit. 7-8 mmm., crassit. 4-5 mmm.

6. **Hygrophorus grumatus.** *(Fr.)*

* **H. difformis.** *Karst.* n. subsp.

Pileus membranaceus, e plano-convexo versiformis, subumbilicatus, glaber, subinde demum rivuloso-sqvamulosus, lævis, aqvose albidus, siccus niveus, 1-4 cm. latus. Stipes e farcto cavus, æqvalis, haud raro superne aut inferne inflatus, undulatus, glaber aut demum pallescens, tenax, 2-5 cm. altus, 2-7 mm. crassus. Lamellæ adnatæ, distantes, crassiusculæ, albæ, demum albo-pruinosæ. Sporæ sphæroideæ, echinulatæ, hyalinæ, diam. 8-9 mmm.

In clivo sub umbra *Salicis*, m. Septembri copiose legimus, in horto Mustialensi.

7 **Peziza Roumegueri.** n. sp.

Apothecia gregaria, sessilia, carnosa, orbicularia, plana, nuda, aurantio-lutea, extus margineqve distincto, membranaceo, tenui, erecto pallidiora, latit. 3-4 mm. Asci cylindracei, longit. circiter 240 mmm. (pars sporifera 138 mmm.), crassit circiter 12 mmm. Sporæ 8: næ, monostichæ, fusoideo-oblongatæ, 2-guttulatæ, læves, hyalinæ, longit. 24-27 mmm., crassit. 9 mmm. Paraphyses sat numerosæ, simplices, apice curvatæ, clavatæ, dilute aurantio-fulvæ, ope jodi, coerulescentes.

Supra terram humosam in paroecia Tammela fine mensis Maji initio-qve in Junii.

Extus *Pezizæ gemellæ*, setis neglectis, simillima, partibus vero internis cum *Pez. fusispora* sat conveniens. Paraphysibus solis jodo coerulescentibus statim dignoscenda.

8. **Phacidium Pyrolæ.** n. sp.

Spermagonia sparsa, epiphylla, immersa, epidermide lacerata tecta, vix 0, 5 mm. lata. Spermatia cylindraceo, utrinqve obtusa, recta, hyalina, simplicia, longit. 13-16 mmm., crassit. 2-2, 5 mmm.

Ad folia sicca nigrefacta *Pyrolæ rotundifoliæ* prope Helsingforsian vere olim legimus.

Spermagonia *Dothideæ latitanti* similia ; fungus ascophorus nondum inventus.

9. **Exobasidium Ledi.** n. sp.

Receptaculum effusum, parenchymati foliorum innatum, in pagina superiori maculam flavescenti-pallidam efficiens, in inferiori hymenium flavescens, albopulverulentum explicans, orbiculare, ellipsoideum vel oblongatum, sparsum, raro confluens, latit. 1-4 mm. Sporæ fusoideo-elongatæ, rectæ, longit. 4-6 mmm., crassit. circiter 1 mmm. Prope Mustiala in foliis *Ledi palustris* m. Julio.

CRYPTOGAMIC SOCIETY OF SCOTLAND.

The fourth annual meeting of this Society was held at Edinburgh on the 9th, 10th, and 11th October, under the presidency of Professor Balfour. At a public meeting in the Lecture Hall of the Botanic Gardens, the President, in an opening address, gave a sketch of the life and labours of the late Dr. Greville, and a great number of his original drawings were exhibited. Subsequently papers were read on topics connected with the Society, notably one by Dr. Isaac Bayley Balfour on a new Myxomycete, which Professor de Bary had named *Cribraria Balfouri*, DBy. Specimens of the new *Hygrophorus Wynniæ*, B., were exhibited on behalf of the Rev. M. J. Berkeley. Other drawings and specimens were on the table, including those found in Inverleith House, the new residence of the Regius Keeper, viz., *Peziza Adæ*, Sadl., *Peziza cretea*, Cke., *Peziza tectoria*, Cke.

In the evening the members met at the annual dinner, and on the morrow an excursion was organised to Penicuik woods, which was highly enjoyed by all who took part in it.

The specimens collected and those sent in, including the contents of twenty to thirty boxes and hampers, were arranged in the Herbarium Hall and Winter Garden, at the Botanical Gardens, and the exhibition was visited on the Friday and Saturday by large numbers of the inhabitants of Edinburgh and its vicinity. It was the first exhibition of the kind ever held in that city, and consequently excited considerable interest.

Of species not previously recorded as occurring in Scotland were *Agaricus inamœnus*, Fr., *Agaricus inunctus*, Fr., *Agaricus Phillipsii*, B. & Br., *Cortinarius decoloratus*, Fr., *Russula Queletii*, *Hygrophorus russocoriaceus*, B. & M., *Cynophallus caninus*, Fr., *Peziza theleboloides*, A. & S., *Hypomyces rosellus*, Tul., *Nectria Albertini*, B. & Br., *Nectria Rousseliana*, M.

The Rev. Jno. Stevenson brought *Polyporus roseus*, Fr., and *Agaricus scobinaceus*, Fr., from Glamis. The Rev. James Keith sent *Hydnum imbricatum*, L., and *Hydnum fragile*, Fr., from Forres; and the Rev. Mark Anderson brought *Peziza ammophila*, D.R. & Lev., and *Agaricus ammophila*, Mont., from St. Andrews, The Rev. M. J. Berkeley sent the new *Hygrophorus Wynniæ*, B. & Br.

Amongst other specimens of interest was a very large *Lycoperdon giganteum*, Batsch. Some magnificent *Polyporus giganteus*, Fr., and one very fine mass of *Polyporus intybaceus*, Fr. Very large specimens of *Helvella lacunosa* were found at Penicuik, one of which was five inches high and six inches in circumference. Beautiful clusters of *Clavaria amethystina*, Fr., and a mass of *Clavaria stricta*, Fr., extending seven or eight inches in both directions, were exhibited. *Hygrophorus calyptræformis*, B. & Br., of the normal colour, was accompanied by a pure white variety.

Of species entirely new to the British Isles were *Agaricus* (*Crepidotus*) *calolepis*, Fr., and *Craterium Friesii*, R., the latter found by Mr. W. Phillips in Hawthornden. A species of *Nectria*, growing in large patches on the naked ground at Penicuik, is probably new. In order to facilitate study one portion of the collection was named and displayed in scientific sequence ; the other portion being grouped as a popular exhibition and displayed with a view to effect. In both sections there were also named collections of the edible and poisonous species.

Many species of interest were exhibited, and the whole mass of specimens sent in was exceedingly large. The whole available time between the arrival of the hampers and the opening of the exhibition was occupied by the experts in naming and labelling the specimens, and arranging them in their proper groups ; hence little or no time was left for them to look over, much less examine and decide upon critical or doubtful individuals. A few hours after the opening of the exhibition and most of the English mycologists were on their way home, their only regret being that the work of the meeting commenced so late in the week ; that it was impossible, in the two or three hours which intervened between the close of their work in preparing for the exhibition and the departure of inexorable trains, to study the mass of Fungi which had been brought together. As it was, the indefatigable local secretary, Mr. J. Sadler, to whom so much of the success of the exhibition was due, after working through two nights, broke down, and had to take to his bed, with an attack of pleurisy. This was the only circumstance which occurred to throw a shadow across the bright course of events during the few days of the first meeting of the Scottish cryptogamists with their English friends in "Auld Reekie."

Next year's meeting will be held at Forres, but there will be no exhibition on that occasion.

As an outcome of the meeting, we have heard intimations of the probability of a local Cryptogamic Club being started for Edinburgh and its vicinity. Of course, we wish the project every success, if attempted, on the principle of "the more, the merrier," or perhaps still better, "the more, the wiser."

NEW DIATOMS.

By Professor P. T. Cleve, with Notes by F. Kitton, Hon. F.R.M.S.

Professor P. T. Cleve, in a paper communicated to the Royal Swedish Academy of Sciences (Vol v., No. 8, 1878), has figured and described the following new species of Diatomaceæ. These forms, Herr Cleve informs us, were principally obtained during his travels (in 1868) in the West Indian Archipelago, from the Virgin Islands, and along the shores of St. Bartholomew. Those from Campeche Bay are figured and described by permission of Herr Grunow, of Vienna.

The number of species identified in these gatherings amounts to 177, of which 25 are considered by the author to be new.

1. **Navicula Virginea.** *Cl.*—This form varies somewhat as to outline, being often slightly constricted at the centre. Apices produced. Median pores* approximated. Striæ very fine, only visible in balsam-mounted specimens, by oblique light. The striæ are parallel, and not interrupted. This form seems to be closely allied to *N. Janischiana*, Rab. Virgin Islands (not rare).

2. **N. Regula.** *Grun. & Cl.*—S. V. rectangular, with parallel margins. Striæ coarse, radiant, reaching median line, abbreviate in the middle, about 7 in ·01 mm. Median pores somewhat distant, median lines almost straight. Length ·0884 mm., breadth ·0136 mm. Virgin Islands. Campeche Bay. Herr Grunow. (Professor Cleve thinks it may possibly be a var. of *N. rectangulata*, Greg. I have seen the Campeche Bay form, and do not observe any specific distinction to warrant its separation from Gregory's species.—F. K.)

3. **N. St. Thomæ.** *Cl.*—Valves undulate, apices produced, striæ coarse, radiant, marginal, shorter as they approach the central nodule, 5-6 in. L. ·01 mm., ·061 mm., B. ·0255 mm. This form, according to Herr Grunow, is allied to his *N. Botteriana*. Virgin Islands (one specimen only).

4. **N. Bartolomei.** *Cl.* — Valves strongly constricted at the middle ends, cuneate. Sculpture; large parallel costæ, not reaching either margin or median line. Short round the central nodule. The margins have a small row of small granules, L. ·075. St. Bartholomew. (Herr Cleve thinks this may be identical with my *N. Perryana*. T. M.S., 1873, with which I am inclined to concur.—F. K.).

5. **N. formicina.** *Grun. in* "*Litt.*"—Valve composed of two rhombic halves, connected by a very narrow isthmus, which is slightly enlarged in the middle. Striæ parallel, not reaching the

* By median pores is meant the nodules or openings which terminate the median lines, more or less near the centre of the valve.

median line, and wanting in the middle of the valve, very delicately punctate, 6in., ·01 mm. L. ·057 mm. B. of lobes ·012 mm., of isthmus, ·004-·005 mm. Campeche Bay.

(I have seen a similar form from the Sulu Archipelago, differing from the Campeche form by being about twice the size, and the striæ being interrupted.—F. K.)

6. **N. Goesii.** *Cl.*—Valves elliptical, with produced subcapitate ends. Striæ distinct, 14 in. ·04 mm, reaching median line parallel, slightly radiant at the apices, longitudinal striæ slightly wavy. L. ·07 mm. B. ·024 mm. St. Bartholomew.

7. **N. (Brebissonia) (?) Weissflogii.** *Grun. in "Litt."* — Valve broad, rhombic, lanceolate, with obtuse ends. Central nodule linear, oblong, slightly constricted in the middle; terminal nodules somewhat distant from the ends of the valve. Striæ radiating, punctate, 12.5-15 in. ·01 mm, reaching the narrow median line. L. ·085 mm. B. ·03 mm. Campeche Bay. (This form was not unfrequent in Capt. Perry's Colon gathering.—F.K.)

8. **Alloioneis (?) Gründleri.** *Cl. & Grun.*—Valve broadly linear, oblong, with cuneate apices; median line very excentric, somewhat arcuate, central nodule transversely dilated. Striæ distinctly punctate, transverse, reaching median line. 11 in., ·01 mm. L. ·075 mm. B. ·028. Virgin Islands (very rare). Campeche Bay, Grun. Colon, Kitton.

9. **A. (Navicula?) Antillarum.** *Cl. & Grun.*—Valve elliptic, oblong, median line a little excentric and curved. Striæ composed of large distinct puncta, arranged in somewhat irregularly decussating oblique lines. The striæ on one side of the valve nearly reaching the median line, leaving only a small area round the central nodule, on the other side the striæ are much shorter, leaving a semi-lanceolate blank space. L. ·12 mm. S. Bartholomew (rare). Gulf of Mexico, Grun.

10. **Navicula (Alloioneis?) Kurzii.** *Grun.*—Valve broad, lanceolate, median line excentric, curved surrounded by an excentric blank space, which is irregularly enlarged in the middle, and becomes narrower at the ends. The rest of the valve is covered with granules like those on *N. aspera*, forming decussating oblique lines, and more narrow transverse ones 10-11 in. ·01. The transverse lines reach as far as the median line, if seen under a high power. L. ·09-·105 mm. B. ·036 mm. Mangrove swamps, Elephant Point, East Indies.

11. **N. (Alloioneis?) curvinervia.** *Grun.*—Valve oblong or lanceolate, with obtuse ends, median line excentric. Striæ (costæ ?) slightly radiating, not reaching the median line, interrupted by two sharp longitudinal bends of the valve, smooth (under a very high power and favourable, delicately punctate), 8-9 in., ·01 mm. L. ·068-·115 mm. Br. ·022-·028 mm. Mangrove Swamps, Elephant Point, E. Indies.

12. **Rhoicosigma Antillarum.** *Cl.*—Median line sigmoid very elevated on the one half of the valve, where it forms a crest impressed on the other half. Striæ distinct, transverse, 14-15 in. ·01 mm. L. ·425 mm. Virgin Islands (rare).

13. **Plagiogramma (decussatum** var.?) **Antillarum.** *Cl.*—Valve elliptical, extremities broadly rounded; interior septæ 4, 2 near the ends, 2 in the centre; puncta in transverse and longitudinal rows; transverse, 8-9 in. ·01 mm. L. ·07-·08 mm. Virgin Islands (rare). *P. caribæum*, Cl. Outline resembling *P. lyratum*, Greville. Interior septæ 4, 2 near the ends, 2 in the middle. The two central septæ are connected with the end septæ by a strong median rib and by two others following the margin of the valve. Puncta or granules arranged in distinct parallel transverse rows, 8-9 in., ·01 mm. L. ·012-·088 mm. Virgin Islands.

14. **P. attenuatum.** *Cl.*—Valve small, lanceolate acute ends, slightly rounded. Septæ 2 central and 2 near the ends. The two central septæ form, in the middle, a rounded quadrangular annulus, puncta arranged in parallel transverse 10 in. ·01 mm. L. ·05 mm. St. Bartholomew (very rare).

15. **Nitzschia (Sigma** var.?) **valida.** *Cl. & Grun.*—Valves slender, almost straight, sometimes more or less sigmoid, with cuneate ends. Punctæ about 4 in. ·01 mm. Striæ distinct, 18 in. ·01 mm. Virgin Islands (very rare). Campeche Bay, Grunow. Sulu Archipelago, Kitton.

16. **N. (Jelineckii** var.) **acuta.** *Cl.*—This form greatly resembles *N. Jelineckii* of Grunow (= *N. decora*, Kitton. Grunow's sp. name having the priority, mine must be deleted), but its ends are cuneated and pointed. The ends are connected by a very sharp and visible keel. Striæ distinct, 11 in. ·01 mm. Virgin Islands (not rare).

17. **N. (longissimus** var.?) **curvirostris.** *Cl.*—(This form only differs from *N. longissima* by the horns being curved in the same direction, and from *N. ventricosa* by the fineness of the striæ; the curvature is of no distinctive value; in mounting selected specimens of *N. ventricosa*, the horns may be placed in any position.—F. K.) St. Bartholomew (only one specimen).

18. **N. (Perrya) Weissflogii.** *Grunow.*—Valves resembling a long and very narrow boat, with a sharp keel, smooth or covered with minute, irregularly-scattered granules, which form coherent longitudinal rows only on the keel, and near the margin of the valve; the keel is besides marked by a row of sharp transverse bars, which (as in all other Nitzscheæ) lie in the interior side of the valve, and are fastened to each side of it. L. ·155-·32 mm. Campeche Bay, Grunow. Colon, Kitton.

Var. α, subglabra, valves almost smooth.

Var. β, sparsa, valves covered with irregularly scattered minute granules.

Var. γ, *interrupta*, keel bars lengthened and interrupted two or three times. Colon, F. K.

19. **N. (Perrya) Gründleri.** *Grun.*—Resembles *N. Weissflogii*, but the valve seems more excentric and is covered with parallel transverse punctate striæ, 12-14 in . ·01 mm. The valves, which are more or less constricted in *N. Weissflogii* are straight in *N. Gründleri*. Campeche Bay, Da Gründler; Colon, Kitton.

The forms composing my genus *Perrya*, of which *P. pulcherrima* is the type, differ widely from the *nitzschiæ* in the structure of the frustule. A figure of the frustule is given in the M. M. J. vol., and an ideal section of the valve, the latter is incorrect. I have since succeeded in obtaining a correct outline ; the valves in Plate 120, Fig. 5, Figure 2, are reduced copies of a camera lucida drawing. Fig. 1 is also a reduced copy of a camera lucida drawing of the s. v., as seen at about *a*, Fig. 2. The granules are irregular in outline, and slightly hispid, by very careful focussing the extreme edge of the valve may be seen.

Fig. 3 is a diagramatic section of a frustule of *Nitzschia grandis*. —F. K.

20. **Tryblionella Lanceola.** *Grun.* — Valves lanceolate, costæ strong, pervious, 10 in. ·01 mm. L. ·05 mm. St. Thomas.

(In Cleve's figure the costæ are represented in pairs, which gradually approach each other until they unite at the centre of the valve.—F. K.)

21. **Denticula ? Antillarum.** *Cl. & Grun.*—Valves lanceolate, with acute ends. Costæ 7-12. Spaces between the costæ, with irregularly scattered puncta. L. ·05-·063 mm. Not very rare in the St. Bartholomew gathering ; it also occurs in brackish mud from Santos, Brazil. (Judging from the figure, I think this form may be a species of M. Petit's *Trachysphenia*. "Fonds de la Mer," Vol. iii., pl. v., fig. 19.)

22. **Grammatophora** (**macilenta** var.?) **caribæa.** *Cl.*—Valve with distinctly gibbous centre and ends. Septæ straight. Striæ fine, 28 in. ·01 mm., distinctly punctate. Virgin Island (common).

23. **Triceratium Campechianum.** *Grun. in "Litt."*—No description is given by Prof. Cleve of this beautiful little species, and his figure is copied from a photograph. It occurred somewhat plentifully in the Campeche Bay gathering. I also found one or two valves in that from Colon. The following are its specific characters :—

Valves polygonal (8-10 angles), processes on the alternate angles, cellules hexagonal, usually largest at the centre, diameter ·70-·107 mm. Campeche Bay. The 8-angled var. I found in some washings of Algæ from Barbadoes (one specimen only), diameter ·62 mm. The cellules resemble those in *T. Favus*.—F. K.

24. **T.** (or **Biddulphia**) **bicorne.** *Cl.*—Valve rhombic, two of the opposite angles much produced, upon which the processes are situ-

ate, the other angles being without them. Cellules irregularly hexagonal. Margins striate ; connecting membrane finely punctate. Distance between the angles ·059 mm. St. Bartholomew.

New Forms found in a Barbadoes Gathering.

25. **Nitzschia Graffei.** *Grun. MS.*—Valves broad, with cuneate and rounded ends, almost parallel sides, slightly constricted at centre. Striæ strong, 10 in. ·10 mm., moniliform. Marginal puncta 5 in. ·01 mm. L. ·127-·14 mm.

This form occurs in a gathering from Samoa and Port Jackson. (I have also found it in gatherings from the following localities : — Jamaica, Bahia and Pisagua.—F. K.)

26. **Biddulphia membranacea.** *Cl.*—Valve elliptic, with rounded ends. F. V. quadrangular. Valve very large and membranaceus. The markings consist of very small cellules, arranged in lines crossing each other in three directions ; the lines are about 8 in. ·01 mm., parallel on the middle of the valve, but somewhat radiant near the ends. The connecting membrane is covered by elongated puncta, arranged in lines somewhat coarser than those on the valve. L. 26. B. ·085 mm. I have also found it in a gathering from Honolulu. (? a variety of *B. balena*.—F. K.)

27. **Actinocyclus ? tenuissimus.** *Cl.*—Valve circular, with a row of marginal puncta. Marginal nodule distinct. Sculpture very delicate, granules arranged in lines, radiating from the centre. Diam. ·04-·08 mm.

(Prof. Cleve refers *Amphiprora? complexa* to Castracane's genus *Amphitrite ;* this form, however, does not belong to either genus, but is a true *Palmeria*. See " Grevillea," Vol. iii., p. 39.—F. K.)

CALIFORNIAN SPHÆRIÆ.

By Charles B. Plowright.

The following enumeration of Sphæriaceous fungi is the result of several parcels of specimens, collected in California by my friend, Dr. H. W. Harkness. The majority were obtained by this gentleman and Mr. J. P. Moor upon the Sierra Nevada Mountains. Many of the species occurred at a considerable elevation above the sea level—4,500 to 5,000 feet. Some very interesting species occur upon the celebrated " big trees " (*Sequoia gigantea*) in the Yosemite Valley, while others equally novel were found upon *Sequoia sempervirens*. Amongst the species new to science the more striking are *Sphæria megalocarpa*—a plant with very large perithecia —*Sordaria californica*, and *Gnomonia alni*. Several of the more common European species occur in apparant abundance, while the growth of *Sordaria bombardioides* indicates that our less common species are not confined to this hemisphere.

Hypocrea rufa. *Fr.*—No. 561. Pale form, with conida (*Trichoderma viride*), on alder (898).

Hypocrea lenta. *Fr.*—On wet fir chips (465).

Hypomyces aurantius. *Tul.*—On various *Polypori* (608, 616, 624).

Hypomyces rosellus. *Tul.*—No. 570.

Nectria cinnabarina. *Fr.*—On *Æsculus californica* (1048), the conidial form; on *Sambucus* (1055), on *Oreodaphne californica* (1047).

Nectria cucurbitula. *Fr.*—On fir bark (1007).

Nectria episphæria. *Fr.*—No. 924.

Nectria peziza. *Fr.*—Nos. 526, 527.

Hypoxylon malleolus. *B. & Rav.*—On *Populus pyramidalis* (1089).

Hypoxylon fuscum. *Fr.*—On oak (950).

Hypoxylon rubiginosum. *Fr.*—With brilliant orange conidia, on *Oreodaphne californica* (483).

Hypoxylon serpens. *Fr.*—On dead *Oreodaphne californica* (514).

Nummularia Bulliardi. *Tul.*—On oak (573, 613), on *Oreodaphne* (973).

Diatrypella tocciæana. *De Not.*—On alder (929).

Diatrype disciformis. *Fr.*—No. 574; on oak (906).

Diatrype bullata. *Fr.*—On black oak bark (959).

Valsa sordida. *Fr.* - On poplar (spermogonia) (295).

Valsa salicina. *Fr.*—On willow (749, 946).

Diaporthe arctii. *Nke.*—On wild parsnip (909).

Sordaria fimicola. *Rob.*—On old horse dung.

Sordaria bombardioides. *Awd.*—On horse dung. Mount Shasta (953).

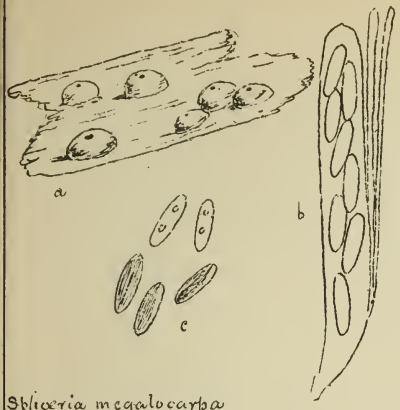
Sordaria californica. *Plow.*—Perithecia large, covered with a dusky brown felt, superficial, crowded or scattered, about 1 mill. high; ostiolum naked, rugose, often thrown into parallel-diverging striæ; sporidia elliptico-fusiform, lower end truncate, appendiculate, ·03-·035 × ·015-·018 mm.; asci about ·2-·3 mm. long. (Plate 120, fig. 2.)

On cow dung (513). A very well-marked and interesting species. The sporidia are developed from cylindrical bodies, as in *Sordaria coprophila*.

Sphæria canescens. *Pers.*—No. 880; on dead pine (964).

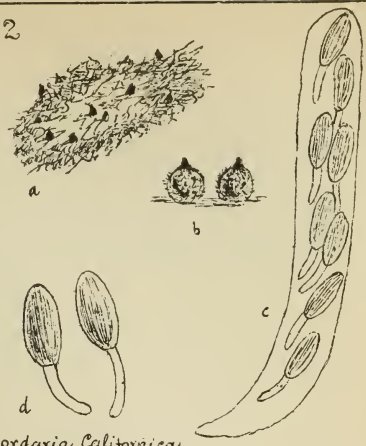
Sphæria moriformis. *Tode.*—On hazel (904), on dead *Oreodaphne* (975).

1



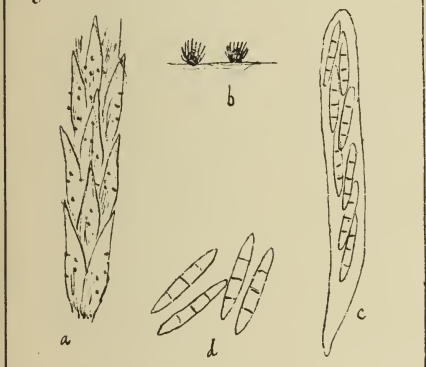
Spiceria megalocarpa

2



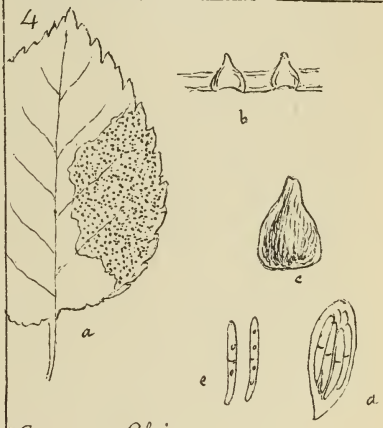
Sordaria Californica

3



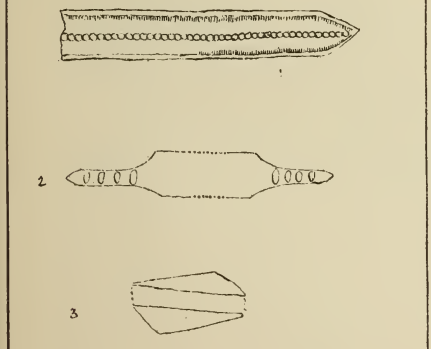
Venturia Sequoiæ

4



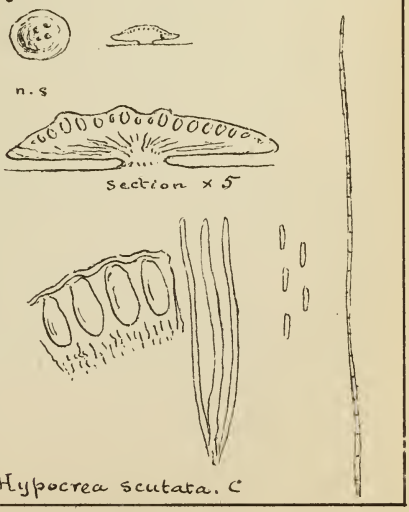
Gnomonia Alni

5



Diatoms (F. Kitton.)

6



Hypocrea scutata. C

Sphæria megalocarpa. *Plow.*—Perithecia superficial, very large, 3 mill. in diameter, spherical, dull black, slightly rough, becoming rugulose with age; ostiola very minute, scarcely prominent, surrounded by a paler areola; asci cylindrical or clavate, ·07-·13 × ·01-·015 mm.; sporidia dark brown, oval, colourless when young, then binucleate, ·012-·015 × ·003-·005 mm.; paraphyses numerous, flexuose. (Pl. 120, fig. 1.)

On the bark of dead maple (956).

This is a very remarkable species on account of the large size of its perithecia, which vary from $1\frac{1}{2}$ to 3 mm. in diameter, scattered or crowded; when occurring in latter condition the perithecia are mutually compressed.

Sphæria pulvis-pyrius. *Pers.*—On dead pine (986).

Sphæria myriocarpa. *Fr.*—No. 627; on *Sambucus* (944), on *Pinus contorta* (1015), on willow (1022), on decorticated black ash (1042).

Sphæria arctostaphylos. *Plow.*—Perithecia irregular, unequal in size, flattened, subrotund, collapsing, superficial; ostiola almost obsolete; asci clavato-pyriform, ·07 × ·015-·02 mm.; sporidia simple, ovate, somewhat curved, hyaline, ·015-·018 × ·004-·005 mm.

On bare wood of *Arctostaphylos glaucus* (617). Perithecia accompanied by pycnidia, which contain a mass of phoma-like spores, oval, hyaline, ·003-·004 × ·001 mm.

Sphæria sequoiæ. *Plow.*—*Pycnidia* rather large, gregarious, subimmersed; spores hyaline, oval, binucleate, ·003-·004 mk.

Perithecia rather large, immersed then suberumpent, seated on bleached spots; asci cylindrical; sporidia hyaline, oscurely triseptate, slightly unequal, the upper half being the larger, ·025-·03 × ·008-·01.

On dead bark of *Sequoia gigantea* (634). Nos. 654 and 665 appear to be conditions of the same fungus.

Sphæria confertissima. *Plow.*—Perithecia minute, densely crowded in patches, more scattered circumferentally, mutually compressed, subspherical; asci cylindrical, ·01-·008 × ·01-·015; sporidia biseriate, uniseptate, hyaline subequal, ·0015-·002 × ·005 mm.

On cones of *Sequoia sempervirens* (861).

Sphæria sustenta. *Plow.*—Perithecia immersed; ostiola bursting between the bleached fibres of the matrix; asci cylindrical, ·15 × ·015-·010; sporidia ovate, dark brown then black, ·02-·025 × ·01-·011 mm.

On bleached stems of *Arctostaphylos* (381).

Sphæria propagata. *Plow.*—Perithecia in lines, erumpent then superficial, middle sized sometimes confluent; ostiola distinct, papillate; asci cylindrical, ·05-·06 × ·008-·011 mm.; sporidia 8 hyaline, sausage-shaped, ·008-·01 × ·002-·003.

On grape cuttings (1053).

Sphæria commanipula. *B. & Br.* (?)—In bad condition, on stems of indigenous spikenard (960).

Sphæria herbarum. *Pers.*—On white sage (941), on soap plant stems with sixteen sporidia in each ascus (707).

Sphæria (Leleospora) sambuci. *Plow.*—Perithecia as in *Sp. herbarum;* asci cylindrical, ·08 × ·01 mm.; sporidia ovate, transversely triseptate, longitudinally incompletely uniseptate, pale yellow, ·012-·014 × ·004-·005 mm.

On *Sambucus* (939). The sporidia resemble those of *Pl. Bardanæ*, Niessl. Beitr., p. 18, t. iv., f. 4.

Sphæria permunda. *Cooke.*—No. 539.

Sphæria rubella. *Pers.*—On wild parsnip (909).

Gnomonia alni. *Plow.*—Parasitic. Perithecia minute, in clusters, buried in the substance of the leaf; ostiola elongate, slightly tapering at the apex; asci ovato-elongate, ·035-·04 × ·01-·015 mm.; sporidia 8 hyaline, curved, uniseptate, nucleate, ·022-·025 × ·003-·004. (Pl. 120, fig. 4.)

On living leaves of *Alnus* (743). The bases of the perithecia project slightly upon the opposite surface of the leaf, throwing the epidermis into minute tubercles.

Venturia sequoiæ. *Plow.*—Perithecia unequal, scattered, setulose superiorly; asci cylindrical, ·07 × ·01 mm.; sporidia 8, linear, triseptate, somewhat unequal in length, faintly triseptate, hyaline. (Pl. 120, fig. 3.)

On decaying foliage of *Sequoia gigantea* (650).

HYGROPHORUS FŒTENS. *Nov. spec.*

By William Phillips, F.L.S.

A very distinct species of *Hygrophorus* has occurred this autumn on the earth in the General Cemetery of this town (Shrewsbury), in considerable abundance, which appears to be hitherto undescribed. It may be distinguished as follows:—

Hygrophorus fœtens. D. S.—Fœtens, fragilis, pileo atro-brunneo, sub-carnoso, a convexo applanescente, glabro, demum diffracto-squamuloso; stipite farcto, nitido, deorsum attenuato, pallidiore; lamellis decurrentibus, distantibus, crassiusculis, pileo sub-concoloribus aut pallidioribus, sub glauco-pruinosus.

On the earth amongst grass. Shrewsbury, Nov., 1878.

The pileus is about one inch across, the stem from one to three inches long and two lines thick. The odour is very similar to that of *Thelephora fastidiosa*. The whole plant is of a dark-brown colour, the stem and gills somewhat paler. It is not at all viscid, and though fragile must stand in Fries' sub-genus *Camarophyllus*, in the first section, Tab. 121, fig. B.

Several species of *Hygrophorus*, usually considered rare, have occurred here abundantly this autumn, especially the beautiful *H.*

calyptræformis, the pretty *H. miniatus*, and the remarkable glutinous *H. unguinosus*.

Note on the Above.

As the opinion expressed by Dr. Quelet, that the *Hygrophorus fœtens* is the same as *Agaricus atropunctus*, Pers., seems to demand reconsideration, we offer these suggestions :—

I.—Is the *Agaricus* known to Dr. Quelet under the name of *atropunctus*, the same as that so known in this country ?

II.—If this be established, on what grounds is the identity maintained ?

The following differences must be reconciled :—*Ag. atropunctus*, P. ("Journ. Bot.," t. 161, f. 13), has flesh-coloured gills and pink spores. The *Hygrophorus* has pruinose brown (umber) gills, and white spores.

The *A. atropunctus* is always without appreciable odour, whilst the *Hygrophorus* in all stages is fœtid.

The *A. atropunctus* has a pallid pileus, with a cinereous tinge, the *Hygrophorus* is of a decided warm-brown. In the latter, the pileus, when old, cracks concentrically, so as to resemble scales, whilst the former remains entire and without fissure.

The stem in *A. atropunctus* is sprinkled with black punctate scales. That of *Hygrophorus* is quite smooth, only, when becoming old or dry, with a tendency to crack concentrically, so as to expose the paler flesh beneath the cuticle.

The greater thickness of the gills in the *Hygrophorus*.

The difference in the size of the spores, which are ·004 mm. in the one, and ·005 or ·006 mm. in the other.

The difference in habitat of the two species.

Dr. Quelet says that our *Ag. atropunctus* is his *Omphalia atropuncta* (junior), and the *Hygrophorus* is his *Omphalia atropuncta* (vetustior). But as the youngest specimens of the *Hygrophorus* have the colour and all the features of the mature plants, and *not* the colour or punctæ of the *Ag. atropunctus* (although some hundreds have been collected this year), that objection will not hold.

The difference in colour Dr Quelet attributes to different meteorological conditions which accounts for "the variable colour —pale yellow, grey, bistre-brown." This would entirely revolutionize our ideas of classification, if true that it means white spores or rosy spores are dependent on meteorological conditions ; as to the colour of the plant itself (the pileus and stem), we admit variation within reasonable limits. This variation, however, should be discussed in its relationship to same undisputed plant, and not brought forward as a plea for two species so different as the above. There are some much more important distinctions to be accounted for before we can accept the two species as identical.

If the colour of the spores in *Agaricini* is as mutable as Dr. Quelet would have us believe, then the whole classification of the *Hymenomycetes* rests on a false basis, and must be swept away. At

present the evidence is strongly in favour of their permanency, notwithstanding any meteorological *disturbances*.

We have prepared a plate containing the following figures, which will be issued in our next number :—

Pl. 121, fig. A. Hygrophorus Wynniæ, *B. & Br.*
B. Hygrophorus fœtens, *Phil.*
C. Agaricus atropunctus, *Pers.*
D. Agaricus Phillipsii, *B. & Br.* M. C. C.

CRYPTOGAMIC LITERATURE.

Pim, Greenwood. The Fungi of the Counties of Dublin and Wicklow.

Pim, Greenwood. The Lichens of the Counties of Dublin and Wicklow.

Garovaglio, S., and Cattaneo, A. Studi sulle dominanti malattie dei Vittigni.

Cattaneo, A. Sull' Acremonium Vitis.

Cattaneo, A. Sullo Sclerotium Oryzæ.

Cattaneo, A. Due nuovi miceti parassiti delle Viti.

Nylander, W. Symbolæ quædam ad lichenographiam Sahariensem, in "Flora," August 1, 1878.

Thumen, F. A. Fungi Austro-Africani, No. vi., in "Flora," August 11, 1878.

Arcangeli, G. Sulla Fistulina Hepatica, in "N. Giorn. Bot. Ital.," October, 1878.

Rabenhorst, L. Einege neue Pilze und Algen, in "Hedwigia," August, 1878.

Geheeb, A. le Philonotis capillaris ; Quelques Mousses des Montagnes Rhæn ; Mousses Nouvelles de l'Afrique Meridionale, in "Revue Bryologique," No. 5, 1878.

Rabenhorst, L. Fungi Europæi. Cent. xxv.

Cooke, M. C. and Quelet, L. Clavis Synoptica Hymenomycetum Europæorum.

Cooke, M. C. The Fungi of Texas, in "Annals of N. Y. Academy of Sciences," Vol i , No. 6.

Thuemen, F. de. de Fungis Entrerianis Observationes (reprint).

Thuemen, F. de. Mycotheca Universalis. Cent. xii.

Thuemen, F. de. Bietrage zur Pilz-Flora Sibiriens. Part ii.

Ellis, J. B. North American Fungi. Cent. i.

Karsten, P. A. Symbolæ ad Mycologiam Fennicam. iii. and iv.

Smith, H. L. New Species of Diatoms, in "Amer. Quart. Micro. Journal," No. 1.

Hine, F. B. Observations on Saprolegnieæ, in "Amer. Quart. Micro. Journal," No. 1.

Cooke, M. C. Fungi of Texas, in "Journ. Linn. Soc.," No. 99.

Stirton, Dr. J. Remarks on Mr. Crombie's paper on "Challenger" Lichens, in "Journ. Linn. Soc.," No. 99.

Schmidt, A. Atlas der Diatomaceenkunde. Parts xv., xvi.

A

Hygro. Wynnicæ

B

Hygro. fœtens

C

Ag: atrohunctus

D

Ag. Phillipsii

Grevillea,

A QUARTERLY RECORD OF CRYPTOGAMIC BOTANY AND ITS LITERATURE.

BRITISH SPHÆRIACEI.

By M. C. Cooke and C. B. Plowright.

So many additions and corrections require to be made to the Sphæriacei, published in the "Handbook of British Fungi," that we have deemed it expedient to prepare a synopsis of the additional species, with a few of the most important corrections and references to the descriptions. As to the vast number of new genera now in vogue with many of the continental mycologists, we regret that we cannot accept them. We prefer adhering to a *natural* system, with all its difficulties or failings, to reverting to an artificial system, or a medley of several systems, the most to be said in their favour being the facility they offer for the manufacture of new genera and species, which, if logically persevered in, must end in inextricable confusion. Such genera, or sub-genera, as we have introduced, are based on other than carpological characters, which latter we hold to be as insufficient as they may be seductive. When we state that we are not prepared to accept the sporidia as a basis of classification (except for the artificial grouping of the species in a genus), this must be held as sufficient apology for the absence of "startling novelties."

A. NECTRIÆI.

Gen. 1. **TORRUBIA.** *Tul.*—Cooke Hdbk., p. 769.

No additions, or corrections, except that

Torrubia pistillariæformis. *B. & Br.* was undoubtedly growing on a female *coccus*, transformed into a body resembling a sclerotium by the mycelium. We have received identical specimens from the United States, in which the *coccus* was less changed.

Gen. 2. **CLAVICEPS.** *Tul.*—Handbk., p. 772.

Gen. 3. **EPICHLÖE.** *Fr.*—Handbk., p. 773.

Gen. 4. **HYPOCREA.** *Fr.*—Handbk., p. 774.

Hypocrea contorta *B & C.*—Grev. iv., p. 123.—On oak stick.

Hypocrea pulchra (*Hypocreopsis Pulchra. Wint.*)—Grevillea iv., 123. Plow. S.B. ii., No. 100. On sheep dung.

The genus *Hypocreopsis* is supposed to differ from *Hypocrea* in having a tomentose surface to the stroma, but this is not an uncommon feature in many species of exotic *Hypocrea*, and is at best only a sectional distinction, or sub-generic. Old specimens become quite smooth, in which case the generic distinction would be lost, and hence confusion would ensue.

Gen. 5. **HYPOMYCES.** *Tul.*—Handbk., p. 776.

Gen. 6. **OOMYCES.** *B. & Br.*—Handbk., p. 776.

Gen. 7. **ACROSPERMUM.** *Tode.*—Handbk., pp. 430.

The long filiform sporidia are contained in asci, and, therefore, this genus is allied to *Oomyces*.

Acrospermum compressum. *Tode.*—Hdbk., No. 1,257. On nettle stems, &c.

Acrospermum graminum. *Lib.*—Hdbk., No. 1,258. On dead grasses.

Gen. 8. **NECTRIA.** *Fr.*—Handbk., p. 780.

Sub-genus I. *TUBERCURELLA. C.* Perithecia cæspitose, on an erumpent stroma, often at first some species of *Tubercularia*. Nos. 2,345 to 2,353.

Nectria citrino-aurantia. *Desm.*—Berk & Br. Ann. Nat. His. No. 1,493. On willow.

Nectria mammoidea. *Ph. & Pl.*—Grevillea iii., p. 126. Plow. S.B., ii. No. 5. On furze.

Sub-genus II. *BYSSONECTRIA.*—Perithecia seated on a more or less distinct subiculum. Handbook, No. 2,355, 2,364.

Sub-genus III *TRICHONECTRIA.*—Perithecia villose, or tomentose. Handbk., Nos. 2,354, 2,356, 2,357, 2,369.

Sub-genus IV. *GENUINA.*—Perithecia naked, superficial, scattered, or gregarious. Handbk., No. 2,358 to 2,368, 2,370.

Nectria Keithii. *Berk & Br.*—Ann. Nat. Hist. No. 1,625. On cabbage stalks.

Nectria Plowrightiana. *Sacc. in Michelia.*—Plow. S.B. iii., No. 15. On stems of *Arctium lappa.*

Nectria lecanodes. *Ces.*—Grevillea vi., p. 25. Plow. S.B. ii., No. 12. On *Peltigera.*

Nectria peltigeræ. *Ph. & Pl.*—Grevillea vi., p. 123. Plow. S.B. ii., No. 13. (=*Nectriella carnea.* Fckl.) On *Peltigera.*

Sub-genus V. *CRYPTONECTRIA.*—Perithecia at first covered, then erumpent.

Nectria caulina. *Cke.*—Grevillea v., p. 62, Fung. Britt., ii., No. 479. On twigs of *Buxus*.

Gen. 9. **MELANOSPORA.** *Corda.*

Included in Handbook as *Ceratostoma*, Fr., but as this latter name is applied also to a section of *Sphæria*, the above may be substituted, especially as it is in general use.

Melanospora caprina. *Fr.*—Handbk., No. 2,786.

Melanospora Zobelii. *Corda.*—Handbk., No. 2,787.

Melanospora Helvellæ. *Cke.*—Grevillea i., p. 175.

B. DOTHIDIÆI.

Gen. 1. **POLYSTIGMA.** *Pers*—Handbook, p. 803. Handbk., Nos. 2,410-2,411.

Gen. 2. **DOTHIDEA.** *Fr.*—Handbook, p. 804.

Sub-gen. 1. *GENUINA.*—Erumpent, pulvinate, growing on twigs and stems. Handbook, Nos. 2,422 to 2,425.

Dothidea sambuci. *Fr.*—Sys. Myc. ii., 551. Erumpent, orbicular, flattened, black, cinereous within ; sporidia oblong, uniseptate, ·018 × ·008 mm. On elder, near Aberdeen.

(*Fuckelia Plowrightii* Niesel is *Dothidea tetraspora*, B. & Br. Plow., S.B., ii., 18.)

Sub-gen. 2. *PHYLLACHORA. Nitschke*—Innate, growing on leaves, grasses, &c. Handbook, Nos. 2,426, 2,427, 2,428.

Dothidea Angelicæ. *Fr.*—Grevillea iii., 126. On Angelica.

Dothideæ epityphæ. *Cke.*—Black, shining, oblong, or irregular, rather tuberculate; asci clavate; sporidia narrowly elliptical, attenuated towards each end; binucleate, ·012 × ·004 mm. On flower stalks of *Typha*. Kings Lynn.

Gen. 4. **ISOTHEA.** *Fr.*—Handbk., p. 931. Species, Nos. 2,801 to 2,804.

Gen. 3. **MELOGRAMMA.** *Tul.*—Handbk., p. 801. Species, Nos. 2,405 to 2,409.

Melogramma rubricosum. *Tul*—Grevillea iv., p. 25. On beech.

C. XYLARIÆI.

Gen. 1. **XYLARIA.** *Fr.*—Handbk., p. 789. Species, No. 2,372 to 2,378.

Xylaria Scotica. *Cke.*—Grevillea iv., p. 112. On the ground.

Dr. Nitschke has separated the small form of *Xylaria pedunculata*, which grows on rabbit's dung, from the larger form, under the name of *Xylaria Tulasnei*. The difference seems to be hardly specific. The small form is most common in Britain.

Gen. 2. **PORONIA.** *Fr.*—Handbk., p. 791. Species, No. 2,379.

Gen 3. **THAMNOMYCES.** *Ehr.*—Handbk., p. 792. Species, No. 2,380.

Gen. 4. **USTULINA.** *Tul.*—Handbk., p. 793. Species, No. 2,381.

Gen. 5. **HYPOXYLON.** *Fr.*—Handbk., p. 793.

Sub-gen. 1. *DALDINIA.* *Not.*—Stroma superficial, subglobose, smooth, concentrical within. Handbk., No. 2,384.

Sub-gen. 2 *PULVINATA.* *Fr.*—Stroma convex, somewhat hemispherical, papillate. Handbk., Nos. 2,385 to 2,390.

Hypoxylon majusculum. *Cke.*—Globose, often confluent, reddish brown, then black ; perithecia ovate ; stroma sooty black ; ostiola at length prominent; sporidia elliptical, often curved, slightly narrowed at each end, dark brown. ·018 × ·007mm. *Hyp. multiforme.* var. ; *Cooke, F. Britt.* i., 374.—On decayed wood and bark.

This is the *Hypoxylon fragiforme* var. *major*, of Berkeley, but the sporidia in that species are only ·01-012 × ·005-·006 mm., hence it is proposed as a distinct species.

Sub-gen. 3 *EPIXYLON.*—Stroma superficial, effused. Species, No. 2,391 to 2,394.

Hypoxylon miniatum. *Cke.*

Effused, irregular, convex, tawny brown; perithecia connate, ovate, slightly papillate; stroma bright orange-red ; sporidia broadly elliptical, flattened on one side, brown, ·01 × ·005-·006 mm.

On decorticated sticks.

It is difficult to refer this to any known species, the bright stroma being so very distinct.

Gen. 6. **NUMMULARIA.** *Tul.*—Handbk., Nos. 2,382, 2,383, 2,395.

Gen. 7. **EUTYPA.** *Tul.*—Handbk., p. 798. Species No. 2,396 to 2,404.

Eutypa aspera. *Fr.*—B. & Br. Ann. Nat. Hist., No. 1,726 ; Grevillea vi., p. 128.

Gen. 8. **DIAPORTHE.** *Ntke.* (in part).

Stroma formed of the discoloured matrix ; perithecia gregarious in definite spots, or broadly effused, often circumscribed by a black line ; when covered, forming definite discoloured patches, rostellate, erect, not convergent, or united into a disc ; sporidia hyaline, often narrowly fusiform and quadrinucleate.

This genus is not accepted in the sense usually adopted on the continent, that is, including within it all species, whether of *Diatrype* or *Valsa*, having quadrinucleate sporidia, but—having

regard first to the characters above indicated, irrespective of the sporidia—associating such species of which *Sphæria spiculosa* and *Sphæria inquilina* may be regarded as the type.

Section I. CORTICOLÆ.

Diaporthe pulla. *Nke.*—Handbk., No. 2,647. On ivy.

Diaporthe inæqualis. *Curr.*—Handbk., No. 2,440. Under *Diatrype*.

Diaporthe Badhami. *Curr.*—Handbk., No. 2,446. Under *Diatrype*.

Diaporthe nucleata. *Curr.*—Handbk., No. 2,445. Under *Diatrype*.

Diaporthe Laschii. *Nke.*—Grevillea iii., p. 68. On *Euonymus*.

Diaporthe protracta. *Nke*—Grevillea vi., p. 26. On *Acer campestris*.

Diaporthe sarothamni. *Nke.*—Grevillea vi., p. 26. On broom.

Diaporthe Wibbii. *Nke.*—Grevillea vi., p. 26. On *Myrica*.
Probably hardly a good *Diaporthe*, as limited by us.

Diaporthe putator. *Nke.*—Grevillea vi., p. 26. On poplar.
Often very much like a *Valsa*, probably its true condition.

Diaporthe Ryckholtii. *Nke.*—Grevillea vi., p. 26. On *Symphoricarpus*.

Diaporthe scobina. *Nke.*—Grevillea iii., p. 67. On ash.

Diaporthe spina. *Fckl.*—Grevillea iii., p. 126. On *Salix*.

Diaporthe ilicina. *Cke.*—Fungi Britt. ii., 490. On holly.

Diaporthe aucubæ. *Sacc. in Michelia.*
Forming elliptical or irregular cinereous spots, covered by the discoloured cuticle, which is pierced by the ostiola. Stroma blackened; perithecia semi-immersed; sporidia narrowly fusiform, quadrinucleate.
On *Aucuba japonica*. Forden, Rev. J. E. Vize.

Diaporthe occulta. *Nke.*—Grevillea iii., p. 68. On scales of fir cones.

Diaporthe samaricola. *Ph. & Ph.*—Grevillea iii., p. 126. On ash keys.

Diaporthe Phillyreæ. *Cke.*
Forming definite elliptical or irregular discoloured spots; perithecia scattered; ostiola slender, piercing the cuticle; asci clavate; sporidia 4 nucleate then uniseptate.
On twigs of *Phillyrea*.

Section II. HERBICOLÆ.

Diaporthe inquilina. *Fr.*—Handbk., No. 2,648. On *Umbelliferæ*.

Diaporthe lirella. *M. & N.*—Handbk., No. 2,685. On *Spiræa*.

Diaporthe acus. *Blox.*—Handbk., No. 2,686. On dock.

Diaporthe pantherina. *Berk.*—Handbk., No. 2,689. On *Pteris.*

Diaporthe pardalota. *Mont.*—Handbk., No. 2,690. On *Convallaria.*

Diaporthe Epilobii. *Fckl.*—Grevillea v., p. 63. On *Epilobium.*

Diaporthe Vincæ. *Cke.*—Grevillea v., p. 63. On *Vinca.*

Diaporthe Euphorbiæ. *Cke.*—Grevillea iii., p. 67. On *Euphorbium.*

Diaporthe Labiatæ. *Cke.*—Grevillea v., p. 63. On *Prunella.*

Diaporthe orthoceras. *Fr.*—Grevillea v., p. 64. On ragwort.

Diaporthe obsoleta. *Sacc.*—Grevillea vi., p. 26. On *Hypericum calycinum.*

Diaporthe arctii. *Lasch.*—Grevillea vi., p. 26. On burdock.

Diaporthe dulcamaræ. *Nke.*—Grevillea vi., p. 26. On bittersweet (*Solanum dulcamara*).

D. VALSEI.

Gen. I. **DIATRYPE.** *Fr.*—Hdbk., p. 809.

Sub-Gen. I. DIATRYPELLA. Not.—Asci polysporous. Species, Handbk., Nos. 2,429 to 2,433.

Diatrype Tocciæana. *Not.*—Grevillea i., p. 155. On *Alnus.*

Sub-Gen. II. STICTOSPHÆRIA. Tul.—Asci octosporous, effused broadly. Species, Handbk., No. 2,434.

Sub-Gen. III. DISCOSPHÆRIA. C.—Pustules discoid. Species, Handbk., Nos. 2,435, 2,436.

Sub-Gen. IV. GENUINA. Pustulate. Species, Handbk. Nos. 2,437 to 2,444 and 2,447 to 2,453.

Diatrype ceramblycola. *B. & Br.*—Ann. Nat. Hist., No. 1,725; Grevillea.

The *Myrmœcium* of continental botanists is *Diatrype*, with uniseptate sporidia, and only an artificial genus.

Gen. 2. **MELANCONIS.** *Tul.*—Handbk., p. 818. Species, No. 2,454 to 2,459.

Melanconis modonia. *Tul.*—Grevillea iii., p. 67. On *Castanea vesca.*

Gen. 3. **VALSA.** *Fr.*

Without attempting to disturb the arrangement adopted in the "Handbook" for this genus—at least for the present—we would suggest the grouping of the series *Valsella*, p. 821, into three sub-sections, viz.:—

I. *ASTROSTOMA.* Ostiola sulcate. Species, Nos. 2,478, 2,461, 2,460.

Valsa microspora. *Cke. & Plow.*

Disc erumpent, orbicular, furfuraceous, brown, pierced by the circinating sulcate ostiola. Perithecia 12-20; asci subclavate,

·03-·04 mm. long; sporidia very minute, hyaline, sausage-shaped about ·005 mm. long.

On branches of Beech (C. B. P.)

The asci and sporidia are the smallest in any British *Valsa*.

II. *LEUCOSTOMA*. Ostiola even, disc white. Species, 2,463, 2,464, 2,465, 2,476.

III. *LEIOSTOMA*. Ostiola even, disc coloured or obsolete. Species, 2,460 to 2,483, except as above.

Valsa Curreyi. *Nke.*

Sporidia ·012-·016 × ·003 mm., or twice as large as those of *Valsa Abietis*, Fr.

On fir branches. Perth, N.B.

Valsa ceuthospori. *Cke.*—Grevillea iv., 113, as *Valsa Laurocerasi*, Tul., but the sporidia differ from the species described by Tulasne. See Fungi Britt. ii., 468.

Valsa cypri. *Tul.*—Grevillea i., 155. On privet twigs.

Valsa abrupta. *Cke.*

Pustules orbicular, flattened. Perithecia immersed in a brownish pulverulent stroma, necks short. The cuticle being deficient around the pustules leaves a distinct brown ring formed by the inner bark round the disc; asci clavate; sporidia sausage-shaped, about ·012 mm. long.

On twigs of *Salix capræa*. Shere.

Valsa cornicola. *Cke.*

Disc erumpent, orbicular, brown; perithecia small, black, with converging necks; ostiola forming a more or less regular ring; asci clavate; sporidia sausage-shaped, ·012 mm. long.

On twigs of *Cornus*. Darenth.

Quite distinct from *Valsa fallax*, Nke.

Valsa resecans. *Nke.* (*Valsa Syringæ*, Fungi Britt. i., 492).—Grevillea iv., p. 124.

On *Syringa vulgaris*.

Valsa Fuckelii. *Nke.*

Perithecia 10-20, small, crowded, with small black shining ostiola, which are closely collected into an erumpent disc; asci clavate; sporidia sausage-shaped, hyaline, ·009-·012 × ·0025 mm.

On *Corylus avellana*. Shere.

Genus 4. **CUCURBITARIA.** *Gray.*—Handbk., p. 840. Species, Handbk., Nos. 2,516 to 2,524.

Cucurbitaria rhamni. *Fckl.*—Grevillea vi., p. 26. On branches of *Rhamnus*.

Cucurbitaria euonymi. *Cke.*—Grevillea iii., p. 67. On *Euonymus*.

Cucurbitaria dulcamaræ. *Fr.*—Grevillea ii., p. 188. On *Solanum dulcamara*.

Cucurbitaria syringæ (*Otthia syringæ. Niessl*).—Hedwigia, 1876, p. 2. On lilac twigs.

Genus 5. **GIBBERA.** *Fr.*—Handbk., pp. 843. Species, Handbk., Nos. 2,525 to 2,526, 2,344.

Gibbera flacca. *Wallr.*—Grevillea vi., p. 25. On *Solanum dulcamara.*

E. SPHÆRIÆI.

Genus 1. **MASSARIA.** *Not.*—Handbk., p. 844. Species, Nos. 2,527 to 2,535.

Massaria rhodostoma. *Tul.*—Grevillea vi., p. 26. On *Rhamnus frangula.*

Genus 2. **LOPHIOSTOMA.** *Not.*—Handbk., p. 848. Species, 2,537 to 2,548.

Lophiostoma hederæ. *Fckl.*—Grevillea iii., 27. On ivy.

Genus 3. **CERATOSTOMA.** *Fr.* (p p.).

Perithecia superficial, or semi-immersed, scattered or gregarious; ostiolum elongated, cylindrical, free, longer than the perithecium, emergent. Species, Handbk., Nos. 2,625 to 2,630.

Ceratostoma crinigera. *Cke.*—Grevillea i., p. 156. On pine wood.

Genus 4. **BYSSOSPHÆRIA.** *Cke.*

Perithecia superficial, free, seated on a tomentose subiculum of interwoven threads, at first veiled. (*Sphæria, Byssisedæ*, Fr. S. M. ii., 440.) Species, Handbk., 2,549 to 2,552, 2,556.

Although this includes the greater part of the genus *Rosellinia* of De Notaris, it corresponds to none of the numerous genera recently proposed, because it is not restricted on account of the form of the sporidia.

Byssosphæria Keitii. *B. & Br.* — Ann. N. H., No. 1626. On a piece of cord.

Genus 5. **PSILOSPHÆRIA.**

Perithecia superficial, gregarious or crowded, naked, black, carbonaceous, often corrugated or tuberculate; ostiolum scarcely prominent. (*Sphæria, Denudatæ*, Fr. S. M. ii., 452.)

Species, Handbk., 2,575 to 2,577, 2,580 to 2,582, 2,586, 2,587, 2,589, 2,590, 2,597, 2,598, 2,600, 2,601, 2,612 to 2,617, 2,619, 2,620.

Psilosphæria parmeliarum. *Ph. & Pl.*—Grevillea iv., p. 124. On *Parmslia saxitilis.*

Psilosphæria ostioloidea. *Cke.*—Grevillea iv., p. 113. On *Diatrype quercina.*

Psilosphæria caninæ. *Ph. & Pl.*—Grevillea vi., p. 27. On *Peltigera canina.*

Psilophæria Stevensonii. *B. & Br.*—Ann. N. H., No. 1,728. On dead wood.

Psilosphæria carbonaria. *Ph. & Pl.*—Grevillea ii., p. 188. On burnt ground.

Psilosphæria lichenicola. *Not.*—Grevillea i., p. 156. On *Solorina crocea.*

Psilosphæria cetrariicola. *Nyl.*—Grevillea iii., p. 68. On *Cetraria Islandica.*

Genus 6. **LASIOSPHÆRIA.** *Not.* (in part).

Perithecia superficial, more or less villous, hairy, or strigose, sometimes seated amongst Dematioid threads. (*Sphæria, Villosæ*, Fries.)

Species, Handbk., Nos. 2,553 to 2,555, 2,557 to 2,561, 2,563 to 2,574, 2,578, 2,584, 2,585, 2,592.

Lasiosphæria felina. *Fckl.*—Ann. N. H., No. 1,332. On *Rubus.*

Lasiosphæria cupulifera. *B. & Br.*—Ann. N. H., No. 1,333. On rotten elm roots.

Lasiosphæria helicoma. *Ph. & Pl.*—Grevillea vi., 26. On ground and sawdust.

Lasiosphæria membranacea. *B. & Br.*—Ann. N. H., No. 1,493. On rotten wood.

Genus 7. **SORDARIA.** *Not.*

Perithecia crowded or scattered, coriaceo-membranaceous, semi-immersed, attenuated above or papillate, covered at first with an evanescent tomentum, or hairy above, sometimes nestling in a pseudostroma.

Species, Handbk., 2,536, 2,562, 2,594 to 2,596, 2,622.

Sordaria merdaria. *Fr.*—Grevillea iv., p. 123. On horse dung.

Sordaria equorum. *Fr.*—Grevillea iv., p. 124. On horse dung.

Sordaria fimiseda. *Ces. & Not.*—Grevillea vi., p. 28. On horse dung.

Sordaria minuta. *Winter.*—Grevillea vi., p. 28. On rabbit's dung.

Sordaria platyspora. *Ph. & Pl.*—Grevillea vi., p. 28.—On horse dung.

Sordaria microspora. *Ph. & Pl.*—Grevillea vi., p. 28. On horse dung.

Sordaria discospora. *Awd.*—Grevillea ii., p. 187. On rabbit's dung.

Sordaria curvula. *Awd.*—Grevillea ii., p. 187. On dung of cows, &c.

Sub-genus. DELITSCHIA. Spores septate.

Sordaria Winteri. *Ph. & Pl.*—Grevillea ii., p. 188. On rabbit's dung.

Sordaria bisporula. *Hans.*—Grevillea vi., p. 28. On horse and rabbit's dung.

Sordaria minutella. *Fckl.* (sub. *Delitschia minuta*).—Grevillea vi., p. 29. On goat's dung.

Genus 8. **SPORORMIA.** *Not.*

Perithecia minute, membranaceous, immersed in dung. Sporidia breaking up into joints.

Sporormia intermedia. *Awd.*—(*Sphœria sporormia*, Handbk., No. 2,593.) On dung.

Sporormia megalospora. *Awd.*—Grevillea vi., p. 29. On horse dung.

Sporormia octomera. *Awd.*—Grevillea vi., p. 29. On grouse dung.

Sporormia lignicola. *Awd.*—Grevillea vi., p. 29. On rotten ash.

Sporormia Notarisii. *Ces.*—Grevillea iv., p. 113. On grouse dung.

Genus 9. **CONISPHÆRIA.** *Cke.*

Perithecia smooth, naked, conical, flattened at the base, or semi-immersed, pierced at the apex. (*Sphœria*, *Pertusœ*, Fries, in part.)

Species, Handbk., Nos. 2,604 to 2,611.

Conisphæria pædida. *B. & Br.*—Ann. N. Hist., No. 1,396. On beech.

Genus 10. **XYLOSPHÆRIA.** *Cke.*

Perithecia innate, immersed in the naked wood, with a short narrow erumpent ostiolum. (*Sphœria*, *Immersœ*, Fries.)

Species, Handbk., No. 2,631 to 2,637.

Xylosphæria parallela. *Fr.*—Grevillea i., 174. On pine wood.

Xylosphæria nigrofacta. *Cke.*—Grevillea ii., p. 164. On old cabbage stems.

Xylosphæria surrecta. *Cke.*—Grevillea v., p. 119. On pine rails.

Genus 11. **SPHÆRIA.** *Fr.* (p.p.)

Perithecia scattered or gregarious, at first covered, piercing the cuticle with the erumpent neck rarely concealed. (*Obtectœ*, Fr. S. V. S.)

a CORTICOLÆ—

Species, Handbk., Nos. 2,639 to 2,646, 2,649 to 2,660, 2,662 to 2,684, 2,687, 2,688, 2,691, 2,694 to 2,724, 2,726 to 2,734.

Sphæria rhodobapha. *B. & Br.*—Ann. N. Hist., No. 1,334. On decorticated branches.

Sphæria mamillana. *Fr.*—Grevillea i., p. 175. On oak twigs.

Sphæria applanata. *Niessl.*—Grevillea iii., p. 126. On raspberry canes.

Sphæria acerina. *Rehm.*—Grevillea vi., p. 27. On *Acer campestris.*

b CAULICOLÆ—

Species, Handbk., Nos. 2,694 to 2,734.

Sphæria devexa. *Desm.*—Grevillea vi., p. 27. On *Polygonum persicaria.*

Sphæria bryoniæ. *Fckl.*—Grevillea iii., p. 68. On *Bryonia dioica.*

Sphæria aparine. *Fckl.*—Grevillea vi., p. 27. On *Galium aparine.*

Sphæria heleocharis. *Karst.*—Grevillea vi., p. 27. On *Eleocharis.*

(**Sphæria maculans.** *Desm.*—Ann. N. Hist., No. 1,727 = *Sphæria Alliariæ, Awd.*)

Sphæria refracta. *Cke.*—Grevillea v., p. 119. On *Scirpus.*

Sphæria Michotii. *West.*—Grevillea v., p. 119. On *Juncus.*

Sphæria epicarecta. *Cke.*—Grevillea v., p. 120. On leaves of *Carex.*

Sphæria marram. *Cke.*—Grevillea v., p. 120. On *Ammophila.*

Sphæria maritima. *C. & Plow.*—Grevillea v., p. 120. On *Juncus maritimus.*

Sphæria pontiformis. *Fckl.*—Grevillea v., p. 120. On straw.

Sphæria nardi. *Fr.*—Grevillea v., p. 120. On *Nardus strictus.*

Sphæria norfolcia. *Cke.*—Grevillea v., p. 120. On *Juncus* and *Eleocharis.*

Sub-genus. PLEOSPORA.

An artificial section founded on the sporidia, which are large, coloured, and septate, usually with transverse divisions.

Species, Handbk., Nos. 2,650, 2,692, 2,693.

Sph. (Pleospora) culmorum. *Cke.*—Grevillea iii., p. 68. On straw and grass.

Sphæria rubicunda. *Niessl.*—Grevillea vi., 27. On *Juncus.*

Sphæria vulgaris. *Niessl.*—Grevillea vi., p. 27. On *Senecia Jacobæa.*

Sphæria donacina. *Fr.*—Grevillea vi., p. 27. On *Arundo donax.*

Sphæria rubelloides. *Plow.*—Grevillea v., p. 120. On *Triticum repens.*

Sphæria clara. *Awd.*—Grevillea v., p. 121. On *Sparganum.*

Sphæria typhæcola. *Cke.*—Grevillea v., p. 121. On *Typha angustifolia.*

Sphæria subriparia. *Cke.*—Grevillea v., p. 121. On *Carex riparia.*

Genus 12. **SPHÆRELLA.** *Not.*—Handbk., p. 912.
Species, Handbk., No. 2,742 to 2,777.

Sphærella Euphorbiæ. *Ph. & Pl.*—Grevillea vi., p. 28. On *Euphorbia amygdaloides.*

Sphærella Taxi. *Cke.*—Grevillea vi., p. 128. On leaves of *Taxus.*

Sphærella Iridis. *Gonn. & Rab.*—Grevillea ii., p. 188. On leaves of *Iris pseudacorus.*

Sphærella ditricha. *Fr.*—Grevillea iii., p. 68. On leaves of birch.

Sphærella hederæcola. *Fr.*—Grevillea iii., p. 69. On living ivy leaves.

Sphærella atomus. *Desm.*—Grevillea iii., p 69. On dead beech leaves.

Sphærella juncina. *Awd.*—Grevillea v., p. 121. On *Juncus.*

Sphærella scirpi-lacustris. *Awd.*—Grevillea v., p. 121. On *Scirpus lacustris.*

Sphærella chlouna. *Cke.*—Grevillea v., p. 121. On *Phalaris arundinacea.*

Sphærella perpusilla. *Desm.*—Grevillea v., p. 122. On leaves of grass.

Sphærella brachytheca. *Cke.*

Spots orbicular, whitish, surrounded by a dark line; perithecia punctiform, collected towards the centre of the spots; asci clavate or ovate; sporidia subfusiform, straight or curved, uniseptate, hyaline, ·014-·015 × ·003 mm.

On the upper surface of living leaves of *Vaccinium Vitis Idæa.* Forres (Rev. J. Keith).

Similar to *Sphærella Gaultheriæ*, Cke., which is a North American species, with larger sporidia.

Sphærella peregrina. *Cke.*

Scattered over the stems and leaves, sometimes densely gregarious; perithecia punctiform, papillate; asci broadly clavate; sporidia crowded, shortly fusiform, uniseptate, hyaline, ·015-·018 × ·004 mm.

On dead stems and leaves of *Rubia peregrina.* Symond's Yat, near Ross.

Genus 13. **GNOMONIA.** *Not.*
Species, Handbk., Nos. 2,735 to 2,741.

Gnomonia graphis. *Fckl.*—Grevillea v., p. 64. On leaves of *Rubus fruticosus.*

Gnomonia pinophylla. *Ph. & Pl (Diaporthe).*—Grevillea iv., p. 124. On pine leaves.

Genus 14. **VENTURIA.** *Not.*—Handbk., p. 922.
Species, Handbk., Nos. 2,778 to 2,784.

Venturia atramentaria. *Cke.*—Grevillea i., p. 175. On leaves of *Vaccinium uliginosum.*

Venturia glomerata. *Cke.*—Grevillea iii., p. 69. On leaves of *Geranium dissectum.*

Venturia alchemillæ. *B. & Br.*—Ann. Nat. Hist., No. 1,493*. On leaves of *Alchemilla.*

Genus 15. **PYRENOPHORA.** *Fr.*—Handbk., p. 925. Species, Handbk., No. 2,785.

Pyrenophora trichostoma. *Fr.*—Grevillea v., p. 122. On rotting straw.

[*Cephalotheca sulphurea*, Fckl., belongs to the Perisporiacei.]

RECENT EXPERIMENTS BY DR. MINKS.

"LICHENS NOT PARASITICAL FUNGI ON ALGÆ."

I have demonstrated in my two publications, "Cryptogamic illustrée, Famille des Lichens," 1868, and "Famille des Champignons," 1870-72, p. 54), the impossibility of fusing together the two classes of lichens and fungi as they were understood by Linnæus and his contemporaries. Any one who has read my arguments, which are supported by numerous facts, will have been able to judge of the little value which can be placed on M. Schwendener's system, which declares that the gonidia of Lichens are Algæ enveloped in a parasitical fungus. I had insisted on a much more rational doctrine—that of M. Tulasne—which is explained in his excellent memoir, "Histoire organographique et physiologique des Lichens," 1852, according to which the gonidia belong to the Lichens.

Cryptogamists have had before them, since the year 1868, the date of M. Schwendener's first memoir, two contrary systems. Each of these systems has been supported or combatted by learned observers. The conscientious and complete treatise published in 1877 by M. Th. Brisson, of Lenharrée, under the title of "Examen critique de la théorie de M. Schwendener," will be read with great interest. It must be recorded here to his credit, that M. Th. Brisson is the only French botanist who has protested against this algolichenic theory, and who, while noticing that none of the supporters or opponents of M. Schwendener's ideas had brought forward M. Tulasne's doctrines, has expressed the very just opinion that the author of the organographic history of lichens is the clear-sighted physiologist who has approached most closely to what now seems to be the truth.

In the camp of the German experimentalist, Mons. de Bary, Max-Reess, E. Bornet, and Treub range themselves. In the opposite camp, that is to say, among those who combatted M. Schwendener's theories, although with reserve, figure Messrs.

Cohn, Caspary, and J. Muller, and we find nine authors who completely reject the theory. In the front rank of these we must place Mr. Crombie, then Messrs. de Krempelhuber, Th. Fries, W. Nylander, Franck, Caruel, Kœrber, Archangeli and Weddel.

The learned world is at the present moment discussing two works on this algolichenic question, which are as yet but little known. The earlier in date is that of Dr. Sthal, " Culture complète jusqu à la fructificatior ;" although interpreted favourably to M. Schwendener's theory, this work is not devoid of interest, but it is impossible to avoid recognising by the very results of the culture, as reported by the author—notably *àpropos* of a little Pyrenocarp (*Thelidium minutulum*)—that the algolichenic theory has had its day.

Dr. Sthal is in contradiction to M. Schwendener, since the latter asserts that the captive algæ are compelled to produce nourishment for themselves and their sovereign (fungo-lichen), while Dr. Sthal, on the other hand, has perceived that the hymenial gonidia take their nutriment from the constituent parts of the hymenium which surround them ; and he even adds that the gonidia owe their greater dimensions to the influence of the Ascomycetes. Would not this contradiction suffice to cause the recognition of the falsity of the proposed system ?

The observations based on the cultivation of the spores of *Thelidium minutulum*, with the spores of *Endocarpon pusillum*, are valueless.

If the author had cultivated the spores separately, he would have observed the same phenomena, but he thought this was unnecessary, since he began by that which he wished to prove—the singular genesis of the gonidia.

The labours of Dr. Minks are of very great importance, for they definitely decide the algolichenic question, while, at the same time profoundly modifying the anatomical notions which were entertained concerning the thallus of lichens. In his Memoir entitled, " Culture et viè des Lichens," this clever observer treated especially of the origin and development of the gonidia—an important point which is neglected by the schools of Messrs. Schwendener-Bornet. In his recent publication (" Flora," 1878), Dr. Minks not only confirms M. Tulasne's theory, establishing the fact that the gonidia decidedly have their origin in the hypha and cortical cells, but he proves from his experiments—experiments which have already been checked by other Cryptogamists, and principally by Dr. Müller, (Professor at the University of Geneva)—that the microgonidia, which are transformed into gonidia, exist in the hypha, rhizines, cortical cells, paraphyses, young thecæ, and even in the spores and spermatia—that is to say, in all the vegetative and reproductive cells. The transformation of the microgonidia into gonidia can easily be seen under the thin cortical layer, and in those parts of the bark which are contiguous to the medulla.

The Rev. J. Crombie, one of the most energetic, and also one

of the most clear-sighted opponents of the algo-lichenic theory, has noticed, and unsparingly criticised an assertion of Dr. de Seynes, which was not sufficiently well-founded, and which was developed during the session of the Clermont-Ferrand Congress (*Association Française pour l'avancement des sciences*, 1876, p. 495). "I permit myself to bring to notice," said Dr. de Seynes, "the analogy which exists between the tissue of the thick-sided cells of the lignicolous fungi and that of the filaments of certain lichens, which have appeared to certain authors, on account of their thickness, or their peculiar structure, to differ from the fungi cells, and to overthrow the algolichenic theory. The observations which I have just made appear to me to be of such a nature as not to permit the existence of this objection."

Dr. Leveillé first ("Traité de botanique," by Messrs. Decaisne and Le Maoût), and more recently M. Th. Brisson ("Exam. crit. de la théorie de Schwendener," p. 35 and 36), and Dr. W. Nylander, have pointed out the difference of structure in question. This structure exists not only in certain lichens but in all. Dr. Leveillé has shown the difference which exists between the germinative filaments of lichens and the fungi mycelium. Why does Dr. de Seynes compare other tissues about which there is no question? Has he established the slightest resemblance of structure between the exceptional fungi cells and the ordinary filaments of lichens?

Dr. W. Nylander ("Flora," 1877, No. 23, p. 256), refutes M. Tulasne's observation ("Mémoire Lich.," p. 20), in which it is stated that the cells (gonidia) *sprung directly from the filaments of the medulla*. The author of the "Synopsis Lichenum" declares that in no case do the filaments themselves give birth to gonidia. "The latter," says he, "have their origin in the parenchymatous cortical cells, which are observed on the prothallian filaments of germination."

This is a contradiction of the new discoveries of Dr. Minks, and of other naturalists who have confirmed the facts advanced by him. Thus, the microgonidia which are transformed into gonidia, would seem to exist, not only in the hypha, but in all the cells of vegetation and reproduction of lichens.

I will sum up in a few words some other observations which, from other points of view, are calculated to define the very clear separation between the two neighbouring families, and which observations Dr. Minks's discovery decide to be well founded.

Thecasporous fungi may be developed everywhere, in damp or dark places; lichens, on the other hand, love plenty of light.

Fungi are always provided with hyphæ, while these are wanting in certain species of lichens.

The anatomical elements of the filaments of lichens may be distinguished by numerous characteristics from the hyphæ of fungi. They are firmer, more elastic, and may be at once recognised in the texture of lichens, and by the lichenin which may already be seen in the first germ-filaments. On the other hand, the hyphæ of

fungi are very soft, with thin sides, not at all gelatinous, and dissolve immediately under the action of potash.

The thallus of lichens is never viscous, while this is a very common property of the large species of fungi.

The fructiferous receptacle of fungi generally differs from that of lichens, especially in the *Pezizæ ;* its surface (epithecium) is bare in fungi; the extremity of the paraphyses, which is often prominent and colours the disc, passes rapidly and disappears in the fungus. In lichens, on the other hand, the epithecium is constant; it is formed not only by the swelling of the prominent extremity of the paraphyses, but often also by a granular and persistent matter. Moreover, the receptacle of fungi has only a limited duration; even in the *Sphæriæ*, which lasts a long time, although not perennial, the conceptacles do not last more than a year at the outside. Once the Sphæriæ have developed and fructified, they have accomplished their existence ; we do not see them vegetate anew. The suberous Polypores seem to extend their life to 14 or 15 years, still they really renew themselves every year, for the new fungus is developed on the old one, which serves it as a support, and, indeed, in some measure, as nourishment. Lichens, on the other hand, have a slow and intermittent growth. Their receptacle is perennial, and may last for several years, and always be in a state of nascent fructification.—C. Roumeguère. (*Translated from* "Revue Mycologique," No. 1, 1879).

DISEASES OF PLANTS CAUSED BY *PERONOSPORÆ*, MODE OF TREATMENT, &c.

By Dr. Maxime Cornu.*

The *Peronosporæ* are the cause of a series of diseases which infest, or may infest, our crops. In order to prevent their ravages, one must consider first the nature and life-history of these parasites, secondly, that of the plant attacked, and the cultivation it requires. The subject is a difficult one, and requires extreme attention.

P. gangliiformis will often be taken as an example, but most of the conclusions drawn from this are general, and applicable to other species, with some slight modifications.

A. *In order to prevent either the extension or the local production of the parasite.*

1°. *The period of the existence of the parasite should be noticed.* Some occur early (*P. Cyparissiæ, P. Viciæ*). In this case endeavour should be made to retard the crops until their disappearance. Others occur late (*P. infestans*). In this case the crops should be got in before their appearance. This last method may be adopted for potatoes, but not for tomatoes in our climate.

* Translated from "Comptes Rendus," December, 1878, by T. Howse.

These observations cannot be applied to *P. gangliiformis.*

2°. *When the entire plant is attacked by the disease, it should be got rid of at once;* it is a hotbed of infection; it is generally more elongated, paler, and more weakly than others.

3°. *The infected leaves should be removed,* so that the plant may not contaminate itself or other plants; this should be done with precaution, in dry weather, when there is neither wind nor dew.

4°. *Destroy without exception, as far as possible, all the seeds* which may harbour the parasite; in the case of *P. gangliiformis,* take away the composite plants, such as *Circium arvense;* it is necessary to watch attentively *chicory, artichokes,* &c.; consider them as a hotbed of infection, and, if necessary, give up their cultivation.

5°. *All plants, or portions of plants,* whether green or withered, infected by the *Peronospora* or its mycelium, *should be removed;* the green portions left on the ground may, in damp weather, produce fresh spores; the withered portions may contain resting spores, and so become a source of danger.

6°. *They should be plunged at once into a solution* which destroys the parasite (chlorate of lime, sulphate of potassium, etc.); otherwise the Peronospora may be spread.

7°. *They should be entirely destroyed,* either burnt or deeply buried. In no case should they be used as manure or as food for domestic animals, as is often done; the resting spores (oospores) do not lose their vitality or their hurtful properties.

By following these instructions, which are general, and are easily applied to a large number of vegetable parasites, it will be possible both to neutralize the centres of infection and to prevent them spreading. The more valuable the crop, the more care should be given to their application.

B. *Mode of protecting the plant from the spores, and killing the parts attacked.*

In this case the peculiarities of the plant have to be considered. We will take the lettuces as an example; many facts, however, applicable to them are general, and not restricted to them.

It is known that this problem has reference to early crops only; these are produced under the following special conditions:—

The plant is—1°, annual, and comes from seed; 2°, it is pricked out; 3°, it is cultivated under frames during winter and spring; 4°, it is planted in rich earth; 5°, the crop is of short duration.

1°. In sowing the seeds, *rubbish* should be removed, which might contain *resting spores;* the seeds should be carefully picked, or, better still, taken from healthy plants.

2°. *Pricking out.* Healthy seedlings only should be used. *Leaves bearing the parasite generally perish later on,* as I have seen in a great number of crops attacked by various parasites (*Uredo, Æcidium, Puccinia, Stigmatea, Dothidea, Cystopus, Peronospora,* and among them, *P. gangliiformis.* This does not apply entirely to

plants provided with bulbs, rhizomes, or transplanted with a large quantity of earth.

3°. *Exposed to frost, the leaves attacked by the parasite are the first killed.* This advantageous result is known to market gardeners. It is necessary, both in this and the preceding case, to remove the withered leaves. It is probable that any weakening cause produces the same effect; the decay, through damp of plants prepared for sale, is thus explained. Hence the use of solutions of sulphate alcalines, or solutions saturated with nourishing principles is to be recommended; these would for the time slightly weaken the plant. *It is dangerous to open the frames;* wind, which propagates the spores, should be avoided.

Any infected or suspected frames should be opened *separately.* The frames should not all be placed all in order, that a general infection may be avoided.

4°. *Every year the situation of the crops should be changed;* fresh earth should be always used.

The soil only should be watered; the leaves should never be wetted, to avoid the attachment and germination of spores.

5°. When the plant is in the young state it should be carefully protected, so that it may have the start of the parasite, which, later on, is less to be feared, owing to the imbrication of the leaves.

The evil will be much lessened by following these recommendations. Independently of these precautions, is it possible to prevent the putrefaction of lettuce leaves attacked by *Peronospora?* These leaves die through exhaustion; to oppose this, one may endeavour—

a. By keeping the plants gathered at a very low temperature until they are required, so that the parasite may be destroyed.

b. By gathering the lettuces with their roots, so as to prevent the exhaustion of any leaves already infected.

Practical men must judge which of these two methods is the best. Further details and explanations on this subject will be given in a more extended publication.

SOME EXOTIC FUNGI.

By M. C. Cooke.

The following few species have been received from various correspondents, as indicated in each instance.

Melanogaster durissimus. *Cke.*

Subglobosus, compressus, difformis aut sulcatus, lævis, durissimus, atro fuscus, demum nigrescens. Peridio crasso, subnitido; carne mire lacunoso, ochraceo albo; lacunis majusculis, creberrimis, atris. Sporis oblongo-ellipticis, inæqualibus, brunneis ·005-·008 × ·003-·005 mm. Odore fortissimo.

On the ground. Chakrâta, North of Delhi, India. (Baden Powell, Esq.)

They occur a few inches below the surface of the soil, only during the rainy season, at about 8,000 feet. They are occasionally

cooked and eaten, and the natives say that a little piece keeps off thirst in crossing high passes. This is always a point with the natives, who in other parts eat a fragment of a cake of the hill apricots, crushed together and dried for the purpose. All agree that these truffles are found singly, or one or two together, not attached to any root. Truffles are often spoken of in the hills of Kangra, and also in the Upper Chenâb Valley. The above notes are communicated by Mr. Baden Powell, with the specimens.

They are not a true truffle, but a Gasteromycetous fungus, which for a long time were confounded with truffles, but the spores are not produced within asci as in the genuine truffle. This does not accord with any of the species of *Melanogaster*, described by Tulasne, but probably is most nearly allied to *M. variegatus*. It is nevertheless larger, more irregular, of a different colour, very much harder, and the inner cavities are larger. When dry it has a strong odour when cut, in some respects resembling powdered rhubarb. The specimens were an inch and a half in diameter, and nearly an inch thick.

Diplodia gossypina. *Cke.*

Gregaria, erumpens. Peritheciis sub-conicis, atris, subtus applanatis, fibrosis. Sporis ellipticis, olivaceo-brunneis ·022 × ·012 mm.

On old capsules of *Gossypium*. Bombay (India). Washington, U.S.A. (*Mr. T. Taylor.*)

Diplodia Andamensis. *Cke.*

Gregaria, erumpens. Peritheciis applanatis, nigris, supra de pressis, pallido-cinctis. Sporis ellipticis, brunneis, nec constrictis ·028 -·03 × ·012 mm.

On stems of creeping plant, called by the natives "Pilita Dak." Andaman Islands.

Septoria Pipula. *Cke.*

Macula purpureo-brunnea, irregularis, amphigena. Peritheciis immersis, indistinctis, tenuis, epiphyllis. Sporis filiformibus, multinucleatis ·05-·06 mm. long.

On leaves of Peepul, or Pipula (*Ficus religiosa*). Belgaum, India. (Col. Julian Hobson.)

Trichobasis exasperata. *Cke.*

Hypophyllis. Soris purpureo-brunneis, minimis, pulverulentis, hinc illic confluentibus, epidermide cinctis. Sporis ovato-globosis, supra papillato-asperulis, læte brunneis ·028 × ·02 mm.

On leaves of unknown tree. Belgaum. (Col. Julian Hobson.)

Sphærotheca pannosa. *Lev.*

On leaves of Roses. Belgaum, India. (Col. Julian Hobson.)

Colonel Hobson complains that the roses in India are suffering very much from this pest, as they suffer in Europe.

Sphæropsis subglobosum. *Cke.*

Sparsum, lirellæforme. Peritheciis immersis, emergentibus, cuticulâ elongato-fissuratis. Sporis subglobosis, brunneis ·01-·012 mm. diam.

On culms of *Bambusa*. Demerara. (*R. McLachlan.*)

Dothidea chamæropsidis. *Cke.*

Atra, sub-hemisphærica, nitida, in maculis brunneis insidens. Cellulis paucis. Sporidiis amygdaloideis, brunneis ·02 × ·01 mm.

On living leaves of *Chamærops*. Tangiers. (In Kew Herbarium.)

The specimens are very old, and the asci seem to have dissolved, but it is evidently an Ascomycetous fungus. The black shining pustules are not larger than half a grain of rape seed.

Coniothyrium Phormium. *Cke.*

Gregaria, minima, semi, immersa, elongato-fissurata. Sporis hyalinis, ovalibus ·004 × ·003 mm.

On leaves of *Phormium tenax*, in Botanic Gardens, Brussels; (in University Herbarium, Edinburgh).

Sphæria (Villosæ) subambigua. *Cke.*

Peritheciis gregariis, subglobosis, papillatis, atro-villosis. Ascis clavatis. Sporidiis cylindricis, hyalinis, nucleatis, dein uniseptatis, superne inflatis, demum dissilientibus, loculo inferno evanidis.

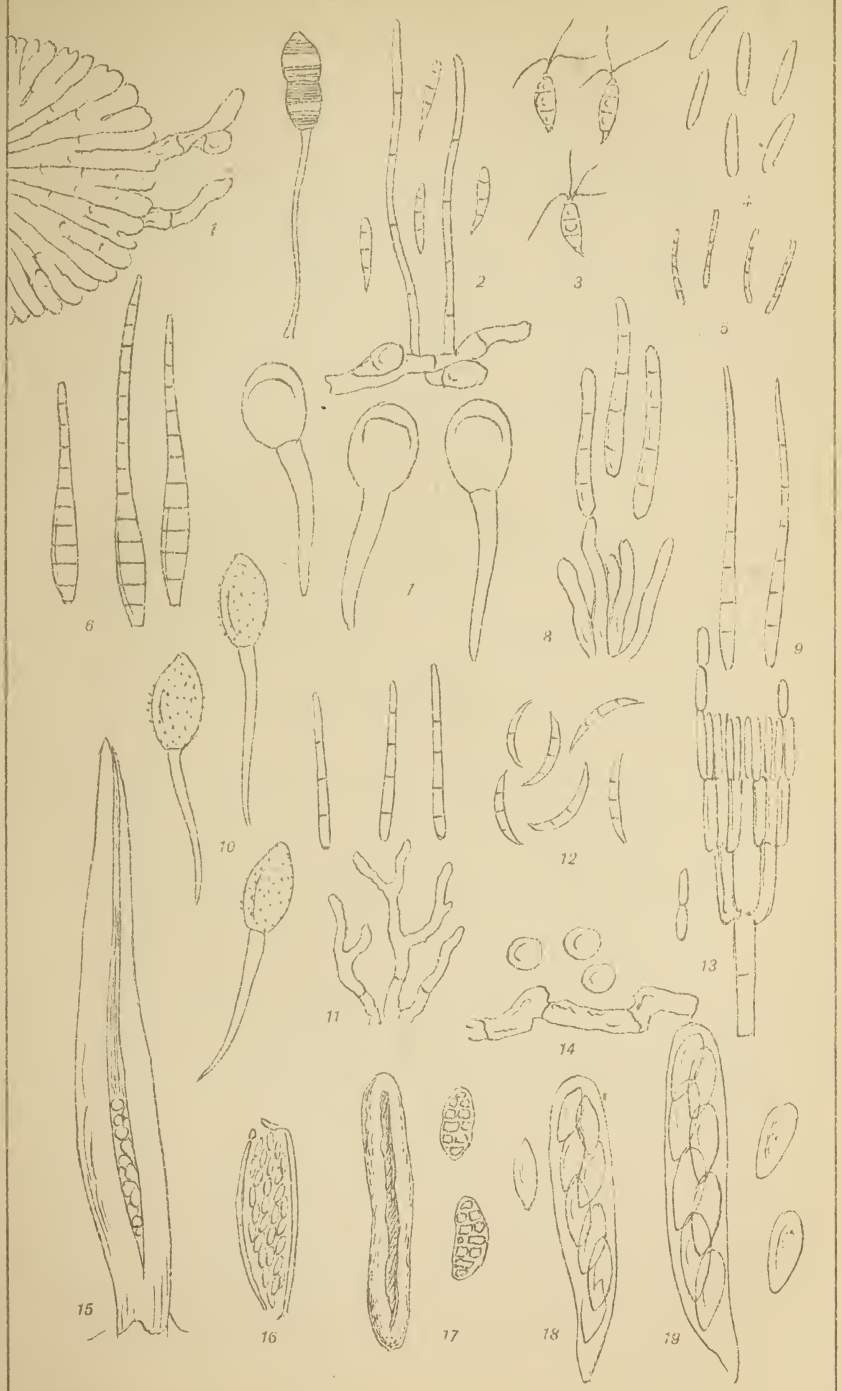
On sawdust, chips, &c. France. Communicated by T. Howse.

The ultimate form of the sporidia seems to be elliptical, truncate at one end, ·025 × ·01 mm. At first they are cylindrical or fusiform, and ·05 mm. long. The upper portion swells, becomes nucleate, a septum is formed in the centre, and ultimately the lower portion, or tail, falls away.

DESCRIPTION OF PLATE 101.

1. Asterina clavuligera, with conidium.
2. Meliola Mitchellæ, hyphæ and conidia.
3. Pestalozzia brevipes, spores.
4. Vermicularia rectispora, spores.
5. Septoria Magnoliæ, spores.
6. Sporidesmium obclavatum, spores.
7. Uromyces tomentella, spores.
8. Cercospora Polygonorum, hyphæ and spores.
9. Cercospora sphæriæforme, spores.
10. Uromyces Desmodii, spores.
11. Cercospora Lupini, hyphæ and spores.
12. Fusisporium leguminum, spores.
13. Penicillium atrobrunneum, tip of hypha and spores.
14. Zygodesmus lævisporus, portion of thread and spores.
15. Ræstelia hyalina, peridium enlarged.
16. Ascomyces quercus, asci and sporidia.
17. Hysterium lineolatum, perithecium and sporidia.
18. Sphæria argyrostoma, B. & C., asci and sporidia.
19. Sphæria Ludwigiæ, asci and sporidia.

By some error this was omitted at page 138 of vol. vi.


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19

NEW BRITISH LICHENS.

Communicated by the Rev. J. M. Crombie, F.L.S.

Dr. Nylander has recorded in the "Flora," 1878, pp. 241-246, the following *new species* of Lichens, which have been detected in N.W. Ireland by Mr. Larbalestier:—

1. **Pycnothelia apoda.** *Nyl.*—Thallus white or whitish, thin, thinly granuloso-crustaceous (K+ yellow), podetia few, abortive, small, erect, ellipsoideo-vesciculose or subgranuliform; apothecia sessile, often aggregated, rusty-red or red-ochraceous, opaque, plain, immarginate or somewhat convex; spores fusiformi-oblong, 0,007-0,010 mm. long, 0,004 mm. thick; paraphyses moderate; epithecium reddish-brown; thecæ bluish and then yellowish and dark at the apices, with iodine.

On the ground. Kylemore, Galway. It has been gathered also in Central France.

As observed by Nylander, the spermogones of this Lichen are very singular. They usually occur enclosed in the hymenium, without any distinct conceptacle, with spermatia slightly arcuate, 0,008-12 mm. long, 0,0005 mm. thick.

2. **Lecidea demarginata.** *Nyl.*—Apparently a subspecies of *Lecidea expansa*, Nyl., with the thallus whitish or greyish, very thin, subleprose, and the apothecia convex.

On rocks. Kylemore, Galway. It has been gathered also in Finland.

3. **Lecidea rusticella.** *Nyl.*—Thallus whitish-ochraceous, thin, subleprose; apothecia black, opaque, convex, immarginate, dark within; spores 8 næ, suboblong, simple, 0,006-9 mm. long, 0,0025-35 mm. thick; paraphyses not discrete; epithecium and hypothecium brown or brownish; hymenial gelatine bluish, and then tawny wine-coloured or reddish wine-coloured, with iodine.

On rocks. Kylemore, Galway.

This differs from *L. rusticula*, Nyl., in the different thallus and the smaller spores.

4. **Opegrapha xanthodes.** *Nyl.*—Thallus yellowish or greyish-yellow, thin, subsmooth, rimose; apothecia black, oblong; epithecium rimiform; spores 8 næ, fusiformi-oblong, 3-septate, 0,015-18 mm. long, 0,005-6 mm. thick; hypothecium (with the perithecium) blackish; hymenial gelatine tawny, reddish wine-coloured, with iodine.

On quartzose rocks. Kylemore, Galway.

The spermatia are straight, 0,004 mm. long, scarcely 0,001 mm. thick.

5. **Verrucaria subinumbrata.** *Nyl.*—Thallus greyish, very thin or subevanescent; apothecia brownish in thalline verruculi; spores 0,022-30 mm. long, 0,015-18 mm. thick; otherwise as in *V. inumbrata*, Nyl., of which it may be a subspecies.

On mica-schist. Kylemore, Galway.

6. **Verrucaria elachistophora.** *Nyl.*—Thallus white, unequal, rimoso-diffract (perhaps not proper); apothecia (probably parasitic) black, slightly emersed, pyrenium entirely black, above somewhat impressed; spores 8 næ, colourless, oblongo-ellipsoid, simple (or sometimes spuriously 1-septate), 0,007-8 mm. long, nearly 0,0035 mm. thick; paraphyses moderate; hymenial gelatine not tinged with iodine.

On quartzose rocks. Kylemore, Galway.

A peculiar parasitical species, which may belong to the section of *V. epidermidis*.

I.—Note on **Parmelia horrescens**, *Tayl.*

The plant so named by Taylor, in Mack. Fl. Hib. ii., p. 144, has hitherto remained unknown in consequence of no authentic specimen having been seen. It is no doubt true that Leighton, in his Lich. Fl., p. 138, identifies it with *Parmelia saxatilis* f. *furfuracea* (Schær.), but as he quoted no authority for this, he was evidently guided merely by Taylor's description. In a series, however, of Irish Lichens, in Herb. Brit. Mus., received from Taylor himself, a sterile specimen occurs of *P. horrescens* in his own handwriting. This shows it to be entirely referable to *Platysma diffusum* (Web.), with which his diagnosis sufficiently corresponds. Indeed, Taylor seems latterly to have become aware of this, for, beneath his own name, he writes = *Parmelia aleurites*, Ach., the true synonymy of which has elsewhere been pointed out by Nylander. There is also in Hb. Salwey, a specimen from N. Wales named by Taylor *P. horrescens*, which also = *Platysma diffusum*, though singularly enough Salwey refers to the same plant a specimen of *Parmelia saxatilis* f. *furfuracea*. Both the Irish and the Welsh plant are muscicole, and do not occur on *bare* rocks, as might be inferred from the habitat assigned by Taylor. J. M. C.

II.—Note on the Synonomy of **Parmelia alpicola**, *Fr. fil.*

In some of the older British Herbaria in Herb. Brit. Mus., this plant occurs under different names, *e.g.*, in hb. R. Brown s.n. *Lichen stygius*, and in hb. Sowerby s.n. *Lichen encaustus* (non Sm.). In more recent times also, when distinguished by authors as being either a distinct variety or species, it has had various trivial names given unto it. Dr. Lindsay, in "Trans. Roy. Soc. Edin," xxii. (1857), has termed it *Parmelia encausta* var. *stygioides*, in which he is followed by Mudd Man., p. 96. Nylander, in his "Synopsis," pt. II. (1860), has called it *in pt. Parmelia Mougeotii* f. *discreta*, and it appears in my "Enum.," p. 36, as *Parmelia discreta*, and in "Leight. Lich. Fl.," p. 127, as *Parmelia physodes* var. *discreta*. It is also, as proved by a specimen in hb. Carroll, *Parmelia stygia* f. *minor*, Nyl., in "Cromb. Enum.," p. 35. In Th. M. Fries' "Lich.

Arct." (1860), p. 57, where it is rightly separated alike from *P. stygia* and *P. encausta*, to both of which it is closely allied, it is named *Parmelia alpicola*, in which he is now generally followed by authors. There is, however, another trivial name older than any of the above. In recently looking over a portion of Salwey's Herbarium, now in the possession of the British Museum, I found a specimen of this plant marked *Parmelia encausta;* and on still more recently referring to "Schærer's Enum.," p. 42-3, I found this same specimen quoted as seen by him, and named *Parmelia ceratophylla* var. *atro-fusca*, as distinct from var. *multipuncta* (= *P. encausta*, Sm.). There is, therefore, no doubt that Schærer's name has priority, and that the plant should be called *Parmelia atro-fusca* (Schær.). J. M. C.

TWO SPECIES OF PERONOSPORA.

By Prof. Passerini.

1. Peronospora tribulina.

Hypophylla, cæspitibus densis, effusis, candidis; stipitibus erectis, apice parce ramosis, ramis primariis alternis subpatentibus breviusculis, ultimis subulato-arcuatis. Conidia subglobosa, hyalina.

Ad folia "*Tribuli terrestris*," L., Parmæ in R. Horto Botanico, Augusto, 1878.

2. Peronospora Setariæ.

Forma conidiophora.—Hypophylla, late effusa, candida, tandem sordidule cinerea; stipites crassi, primo simplices subclavati, dein superne parce ramosi, ramis primariis brevibus subopppositis, ascendentibus, apice incrassatis et palmatifido-ramulosis. Conidia subglobosa, hyalina.

In foliis junioribus jam explanatis, pallescentibus, *Setariæ verticillatæ*, P.B., prope Parmam (*Vigheffio*) æstate, 1878.

Forma oogoniophora (Protomyces graminicola, Sacc., M. V., n. 496, Fungi Veneti novi vel critici ser. v., n. 91. *Ustilago* (?) *Urbani*, Magnus, Sitzungsberichten der Botanischen Vereins der Provinz Brandenburg). Oosporæ globoso-angulosæ, episporio crasso, intense ochraceo-fulvo.

Ad folia juniora utplurimum convoluta et ferrugin ascentia *Setariæ verticillatæ*, P.B. Parmæ (*Vigheffio*), jam ab æstate anni 1876, reperta absque ullo *Peronosporæ* vestigio; et æstate nuper elapsa iterum observata, vel solitaria, vel in formæ conidiophoræ consantio, in eisdem plantis et foliis.

Hedwigia.—This journal has changed hands, and will have for its editor Dr. George Winter.

THE MAPLE DISEASE (*RHYTISMA ACERINUM*).

By Dr. Maxime Cornu.*

During the summer black spots produced by a parasitic fungus are frequently seen on Maple leaves. This is *Xyloma acerinum*, a special type of disease. *Xyloma* is but the imperfect and summer form of the fungus; when the leaves fall to the ground in autumn, a new growth appears in these spots; the plant produces asci and becomes *Rhytisma acerinum*.

These phenomena coincide with the germination of the young maples, which takes place early in April. These spots appear every year in the same locality. Is the parasite perennial, as in some Urediñeæ (*Ædidium Euphorbiæ sylvaticæ*, and a large number of Pucciniæ)? Is it annual, as are *Rœsteliæ* and most *Ædidia?* Sown on one spot, does it spread over the whole plant, as *Endophyllum Sempervivi*, *Peronospora Papaveris*, etc.?

Very young seedlings of Maples were placed in several flower pots; two pots containing each eight plants, and others smaller containing each four, were used for the purpose.

The 1st April, 1874, some ripe patches of *Rhytisma* were cut up into narrow segments, like smoking tobacco, and moistened with water; small portions of the parasite were brought into contact with the young Maples. Every part of the seedling is not equally suitable for its introduction: *Ustilago Carbo* penetrates by the neck (collum), *Cystipus candidus* by the cotyledons. Direct research, anatomically, into the mode of introduction of the germs is rendered very difficult by the shape of the spores. These are much elongated, and their diameter and that of the germinating filaments exceedingly small; the germination is besides very irregular.

Four trials were made in order to ascertain the manner of penetration by the spores:—

(A.) A small portion of *Rhytisma*, as described above, was placed all round the collar, on a level with the earth.

(B.) A portion was placed within a cotyledon, which had been folded and kept in that position by a pin. Each of these two pots was covered with another pot, which had been moistened to prevent desiccation and the entrance of spores from the wind; the leaves did not produce *Rhytisma*, either in 1874 or in the following years.

(C.) A portion was placed between the two cotyledons, on the leaves of the undeveloped terminal bud.

(D.) A portion was placed between the leaves of the terminal bud after they had been raised by the stem; the cotyledons were covered with tallow to their base, in order to isolate them; they soon withered and fell off; the plants, although vigorous at first, became more weakly than the others.

* Translated from "Comptes Rendus," July, 1878, by T. Howse.

In the two last cases, *Rhytisma* appeared after two months and a half. The patches were at first white and greenish-grey, then turned partially, and at last entirely black; by the middle of July the patch was completely formed.

These plants were shown to M. Brongniart, M. Duchartre, M. Roze, and several other botanists. The leaves, which had all fallen, were gathered in the autumn. The parasite did not appear the next year, or subsequently; it must, therefore, be annual. It does not seem to spread. Of the plants experimented upon, merely the lower leaves, which were the only ones developed at the time of the experiment, were spotted; the spots were all in the same state; the mycelium did not spread.

In 1876 I endeavoured to trace on the leaves when they had attained their complete size, lines and crosses by means of the *Rhytisma*. The spots began to show, but the tissue dried up in all the leaves; the parasite was very incompletely developed, and did not re-appear the following year. So the fungus is altogether confined to the deciduous foliaceous organs; it is only fully developed on the organs when they are in a young state.

It appears, then, in order to destroy *Rhytisma*, that it is enough to remove all the spotted leaves which fall in autumn; that is, supposing that the corpuscles (*spermatia* of M. Tulasne), which are produced in enormous numbers on the living leaves (*Xyloma*), cannot reproduce the parasite.

The red spots on Plumtrees, produced by *Polystigma rubrum*, an ascomycetous fungus of quite another group, and much more dangerous, have probably an analogous life history.

CALIFORNIAN FUNGI.

By M. C. Cooke.

The following few remaining numbers of a collection made by Dr. Harkness are supplementary to our previous record :—

Hydnum Stevensoni. *B. & Br.*

On *Oreodaphne*. Sierra Nevada. No. 1073.

No. 1044, on oak, seems scarcely distinct.

Irpex paradoxus. *Fr.*

On *Oreodaphne*. Sierra Nevada. No. 1047.

Stereum muscigenum. *B. & Br.*

On Locust bark. Sierra Nevada. No. 1060.

Corticium. sp.

On decaying culms. No. 1042.

Not sufficient to determine; the white species are numerous, and closely allied, so that without the margin little certainty can be assured.

Glæosporium carpigenum. *Cke.*

Innatum, sparsum, cuticulâ tectum, demum perforatum. Sporis elongato-ellipticis, hyalinis, ·013-·018 × ·0035 mm., in cirrhis albidis exudentibus.

On fruit of *Æsculus californica*. Sierra Nevada. No. 1066.

Colæosporium Madiæ. *Cke.*

Læte aurantium. Soris epiphyllis, ovatis, erumpentibus. Sporis concatenatis, aurantiacis, globoso-compressis, læve, ·023 × ·018 mm.

On living leaves of *Madia Nuttallii*. Sierra Nevada.

Cytispora salicis. *Rabh.*

On willow twigs. Sierra Nevada. No 1023.

Not a good *Cytispora*, probably better referred to *Phoma*.

To the above may be added the following species from New York:—

Stereum scriblitum. *B. & Cke.*

Coriaceum, pileo effuso reflexoque, rugoso-striato, obscure concentrico zonato, fuligineo-nigrescente; hymenio nudo, glabro, pallido subcinereo, demum rimoso.

On branches. New York, Gerard (171).

A very distinct species, externally nearly black and faintly zoned and striate; the hymenium pallid, with a cinereous tinge, soon cracked. Whole substance brittle when dry, curling inwards.

THE DUAL-LICHEN HYPOTHESIS.

"That hypothesis which is based on sound scientific knowledge is sure to have a corresponding value, and that which is a mere hasty random guess is likely to have but little value."—*Prof. Huxley, Lectures* (1863), p. 67.

Truth has often been discovered by the aid of a hypothesis, hence the proposition of a hypothesis for the advancement of science is perfectly legitimate. Some hypotheses which have been proposed in the past have proved utterly untenable when they have been assailed, therefore before any hypothesis is accepted it should be subjected to all possible tests. Any hypothesis which cannot suffer criticism is not worthy of acceptation. The dual-lichen hypothesis is worth very little if unable to meet all the objections which such an assailant as the present can urge against it.

Without contenting myself with reviewing the remarks of single individuals, I will rather go direct to the main source of the theory of which Schwendener is the author. In a few brief sentences the whole gist of the hypothesis may be summarized. Although at first only the group called the *Collemaceæ* were included, ultimately as his views extended, he included all Lichens in the category of Algo-fungi. These are his words, "As the result of my researches all these growths (Lichens) are not simple plants, not

individuals in the ordinary sense of the word, they are rather colonies, which consist of hundreds and thousands of individuals, of which, however, one alone plays the master whilst the rest in perpetual captivity prepare the nutriment for themselves and their master. This master is a fungus of the class *ascomycetes*. a parasite which is accustomed to live upon other's work, its slaves are green algæ, which it has sought out, or indeed caught hold of, and compelled into its service. It surrounds them, as a spider its prey, with a fibrous net of narrow meshes, which is gradually converted into an impenetrable covering, but whilst the spider sucks its prey and leaves it dead, the fungus incites the algæ found in its net to more rapid activity—nay, to more vigorous increase."*

In the volume "Fungi" in the International Scientific series, from page 10 to page 16, the theory in question is explained in a manner which I believe perfectly fair and just, with the principal objections to be urged against it. This was printed in 1875, but is still as applicable as it was then. Perhaps it errs in partaking too much of the character of a summary, and too little of an argument. Had I not been challenged to give more distinctly the grounds of my opposition, that protest would have sufficed me. The hypothesis is thus briefly stated :—

"The two great points sought to be established are these, that what we call Lichens are compound organisms, not simple, independent vegetable entities ; and that this compound organism consists of unicellular algæ, with a fungus parasitic upon them. The coloured gonidia which are found in the substance or thallus of lichens, are the supposed Algæ, and the cellular structure which surrounds, encloses, and imprisons the gonidia, is the parasitic fungus, which is parasitic on something infinitely smaller than itself, and which is entirely and absolutely isolated from all external influences."†

In plain words, the gonidia are algæ, and all the rest of the plant is Fungus. At first sight it would appear that the whole controversy centered itself upon the definition of two words. A certain plant, with a peculiar organisation, has been hitherto by general consent represented by the term *Lichen*, whereas some modern writers contend that it should be called a *Fungus*, differing only from other Fungi in its power of enclosing certain unicellular algæ within its substance. Shall these organisms still retain the name of *Lichens*, or shall they be called *modified Fungi ?* This is really one aspect which the hypothesis assumes, that of the value of two words. The theorists, on their part, maintain that it is something more than a mere definition of terms which is required, but they claim to have it accepted that *Lichens* (as they are called) are identical with *Fungi* (as commonly understood), but with the addition of certain extraneous bodies called "gonidia," which are truly microscopic Algæ.

* Schwendener, "Die Algentypen der Flechtengonidien," p. 3, 1869.

† "Fungi, their nature, use,' &c., pp. 11-12, 1875.

In the following observations the words "Lichens" and "Fungi" are used in the sense in which they are used and applied by Lichenologists and Mycologists. They represent two large groups of cryptogamic plants, holding close relationship to each other, but sufficiently distinct to be recognised by practical men, as amongst insects the Diptera are recognised from the Hymenoptera.

Whether we call them orders, or sub-orders, it matters not, we group them together for purposes of study into species, genera, families, &c.—mere arbitrary distinctions. Perhaps in nature there may be no such things, nothing more than *individuals*.

The lichenologist studies lichens, and groups them in a certain way, upon a definite plan, for the purposes of his study.

The mycologist does the same with Fungi. Each strives to comprehend his own particular group, and from the years of unceasing labour which many devote to the study they acquire a large amount of experience, which is their knowledge.

Whether a certain plant or series of plants—call them species or genera, or even families—belong to Fungi or Lichens these specialists have always been considered competent to judge for themselves, upon the principle that those who possess the largest amount of experience, and consequently of practical knowledge, upon these subjects, are best able to judge of their relationships and affinities. But, on the principle, I presume, that—

> Some people must see their own farthing dip shine,
> Though they stick it right under a gunpowder mine,

certain of those who may be termed "all round men," who study all things in general, and nothing in particular, have propounded a theory to account for certain phænomena which are puzzles to themselves, although not very mysterious to those in the habit of contemplating them.

Setting aside this preliminary assumption of superior knowledge on purely technical points, which the dualists assume, it must be conceded that if the hypothesis is proved sound, the specialists must accept it, from whatever source it originated, but if unsound, and incapable of standing the tests which may be applied to it by the Cryptogamists, not all the advocacy of the promoters, or the adherence of the most esteemed and talented men of science in other departments of Botany will compel the Cryptogamists to accept and apply a theory which is to them unsound and contrary to their experience and judgment.

Some general objections to the hypothesis will afford evidence that there is still a broad space between the theorists and some of their opponents.

Are Lichens Autonomous Plants? Is it, or is it not, possible from the structure or the development of a plant to predicate with tolerable certainty whether that plant is within itself a perfect or complete plant or not? If we sow a seed under favourable conditions, preserving it from all external influences, and that seed germinates, produces a root, a stem, ultimately leaves, the flowers,

with stamens and pistil, then in course of time, as the ovary matures, seed in all respects identical with that from which the plant originally developed; in such a case we should certainly conclude that the plant under examination is a complete and perfect plant, possessed of all the essentials for the reproduction of its species.

If instead of following the plant through all its stages, we bring experience to our aid in judging of probabilities, we examine a plant possessed of root, stem, leaves, and complete reproductive organs, bearing perfect seeds, we may safely conclude that we are examining a complete and perfect plant. All these organs we know by experience are not essential to the perfection of fruit in all plants, in some the stem will be almost obsolete, as in the daisy, or without true leaves, but with leaves and stem fused into a foliaceous expansion, as in the duckweed; and yet there will be no suspicion that the plant is incapable of reproducing its species, thus proving itself a perfect plant (using the term perfect, as in the sense of completeness). Hence we may conclude that if a plant is capable of reproducing its species, when excluded from all external influences, by means of its own proper organs, we may assume such an one to be a complete plant, whatever modifications in structure may be present, and whatever secondary organs may be absent. Such plants, however minute or simple in structure, are entitled to rank as autonomous plants.

The spore of a species of *Peziza* germinates, producing root-like fibrils of great delicacy, and upon these arise small globose bodies, which as they grow become perforated at the apex, ultimately expanding into a cup, which completes the vegetation of the little plant; it is simply a minute fleshy cup, with a fibrous base, by means of which it is attached to the matrix. A section of this cup exhibits the reproductive bodies, the ova (if such a term may be permitted) contained in elongated tubes, closed at the apex, and packed side by side. These spores when matured, are capable of reproducing the form and character of the parent. Yet simple as such a plant may be, no one has yet raised a doubt as to its being a complete plant.

Another simple plant, with similar cup-shaped organs, or receptacles, enclosing similar reproductive bodies, contained also in cylindrical tubes, but with other organs superadded, such as a foliaceous expansion, analogous to leaf and stem, or it may be some other bodies characteristic of the group to which it belongs; and at once analogy leads us to the conclusion that this also represents a complete plant.

If we concede that the Duckweed is a perfect plant, and the *Peziza* also a perfect plant, then also the *Lichen* must be a perfect plant.

Are Lichens (exclusive of their Gonidia) identical with Fungi? The hypothesis in question assumes that the lichen consists of a fungus, enclosing certain foreign bodies, called gonidia. Hence

then lichens, irrespective of the gonidia, should correspond in all respects to the Fungi to which they are referred. The presence of these small organisms may be ignored in our comparison of the supposed fungus with the real fungus of our experience.

In comparing the general character of Lichens with the general character of Fungi, we may assume that we can arrive at some definite conclusion as to the probability of their identity. We can predicate nothing of fungi except what is confirmed by fact; and any other organisms to be affiliated to them must agree in all main features with the known characters of the Fungi, or they can have no claim to be considered identical.

It will facilitate this comparison if we are enabled to limit the area, which may be done by accepting the limitation fixed by the Schwendenerian hypothesis that the Ascomycetous Fungi are meant when the term Fungi is used, and as the *Sphæriacei* have been virtually excluded by all advocates of the theory, it may be assumed, as has been admitted, that the *Discomycetes* are the special group of Fungi to which the Lichens are referred.

The *Discomycetes*, in their cup-like forms are assumed to be identical with the apothecia of certain lichens, nay, more than this, all Lichens, to whatever genus they may belong, in their totality, excepting only their gonidia, are affirmed to be Discomycetous Fungi.

"Lichens are perennial; they grow very slowly, but they attain an extreme age. Some species growing on the primitive rocks of the highest mountain ranges in the world, are estimated to have attained an age of at least a thousand years; and one author mentions, after the lapse of nearly half a century, having observed the same specimen of *Sticto pulmonaria* on the same spot of the same tree."*

On the other hand the Discomycetous Fungi are annual, very short-lived, their whole existence being limited to a few weeks, rapid in growth, and rapid in decay, not a trace of some species remaining after a few days.

Lichens will exist under conditions of aridity which no other vegetables could support. Some are peculiar to calcareous rocks, a few are found on arenaceous rocks, many are common on the granitoid series, including micaceous, gneissic, granitic and quartzose rocks, and *Lecidea geographica* is frequent on the purest and smoothest quartz.

Fungi, on the contrary, must have moisture for their very existence sake, are mostly found in damp and shaded situations, and could never exist under the conditions just enumerated for Lichens.

The highest mountains, beyond the snow-line, at 16,000 feet on Chimborazo, the extreme limits of vegetation at the North and South Pole are occupied by Lichens. Dr. Hooker found

* Dr. Lauder Lindsay, "Lichens," p. 52.

three species of Discomycetes in the Falkland Islands, to 116 Lichens. The Reindeer Moss and species of *Umbilicaria* flourish amongst the snow. On the other hand, frost and snow are fatal to Discomycetous Fungi, which disappear long before the snow-line is reached on mountains, and even before phanerogamic vegetation in the direction of the Polar regions. Of all plants, Lichens support extreme cold most successfully, whilst Fungi succumb at the approach of frost.

Lichens which grow upon the bark of trees may be seen flourishing in profusion during the life and vigour of the tree. It has been affirmed that the portions of Cinchona Bark which have been covered with Lichens during growth, abound in the Alkaloids on which their medicinal use depends,* whereas the portions attacked by Fungi are valueless from the tissue being destroyed by the ramifying mycelium. Indeed, Fungi do not, and cannot flourish on growing and vigorous bark, but on diseased, dead or decaying spots.

Lichens obtain the greater portion of their pabulum from the atmosphere, and only their mineral constituents from the matrix. Hence they cover the trunks and branches of forest trees, without apparent injury, and many species habitually flourish on the hardest granite. Fungi, on the other hand, obtain their chief support from the decaying vegetable matter on which they flourish, gathering up a large store of the nitrogenous results of putrefaction and decay, and disintegrating the matrix on which they prey.

Lichens, in their chemical composition, contain a large number of substances which are wholly unknown amongst fungi. Colorific principles, such as obtain in the Orchella weeds, Orcellic, Cetraric, Lecanoric, Tannic and Gallic Acids, Lichenin, and even a peculiar and characteristic odour, all of which cannot be attributed to the gonidia they contain.

Lichens contain but a small percentage of water as compared with Fungi, so that in dessication they do not shrivel, collapse or perceptibly diminish in size, whereas Fungi shrivel up and collapse so as scarcely to be recognised, becoming liable constantly to the attack of insects, or, if damp, subject to the development of mould, whilst Lichens may be preserved for years under like conditions without fear of insect or mould.

Lichens, when collected and cast aside without the slightest care or precaution, do not exhibit the least tendency to putrefy, whilst Fungi, with the utmost care in drying, can scarce be preserved from unmistakable evidences of incipient putrefaction.

* Pharmacologists are aware that the most valuable kinds of Cinchona Bark, as, for instance the "Crown Bark," are habitually covered with Lichens, and that this covering favours the development of the Alkaloids. Regarding this fact, the late Mr McIvor, of Ootacamund, introduced the plan of covering the growing branches of Chinchona plants with moss, and the bark thus mossed produced a larger percentage of Alkaloids than the naked bark. The operation may be purely mechanical, such as obstructing the light. However this may be, certainly no injury is inflicted, but benefit is conferred by the growing lichens.

Any one who has examined the thallus of such a Lichen as *Peltigera canina*, and compared it with any known species of the Discomycetes, must come to the conclusion that amongst them there is no such structure to be found as that which prevails in the Lichen thallus, altogether irrespective of gonidia.

It is sometimes useful and instructive on doubtful points to consult the instincts of the lower animals, and this course may be adopted with advantage in the present instance. Amongst *Coleoptera*, there is an entire family called the *Mycetophagidæ*, many of which live upon Fungi, and yet do not attack Lichens. There are also some of the *Bostrichidæ*, and some species of *Anobium* very fond of Fungi, but they do not attack Lichens. The insects which destroy Lichens are few in number, and quite different in their relationships from those which prey on Fungi.

There is also amongst the *Diptera* a family called *Mycetophilidæ*, with like propensities, as evidenced by the genera *Mycetophila*, *Boletina*, *Mycetobiæ*, *Bolitophila*, and yet there are none so equally destructive or parasitic on Lichens.

These insects must have come to a sounder conclusion than some men, that Lichens are *not* Fungi, with the addition of an innocuous green Alga. Surely if they had the same grateful food to offer, these insects would patronise the Lichens; but as they attack all kinds of Fungi, and do not attack Lichens, insects certainly have not yet become converts to the Schwendenerian hypothesis.

In concluding these comparisons, the only inference which appears feasible is, that all these differences are so many reasons against the identity of Fungi with Lichens. There must be a most essential difference between them, beyond the gonidia, for the gonidia are not sufficient causes to produce all these divergencies. It is quite erroneous to state, as some have done, that the gonidia constitute the only difference between Lichens and Fungi, whereas the presence of gonidia is only one out of many differences which exist between them.

(To be continued.)

LICHEN FLORA.

We are happy in being able to announce that Rev. W. A. Leighton has nearly completed the printing of the *third* edition of his "Lichen-Flora of Great Britain, Ireland, and the Channel Islands," which it is expected will be ready for issue early in March. This new edition is rendered necessary by the marvellous discoveries of Mr. Larbalestier in the West of Ireland, those of Mr. Crombie, Dr. Stirton, and others in the North of Scotland, and his own researches in North and South Wales, whereby the Lichen-Flora of the former editions, amounting to 1,156, has been raised now to 1,706, thus rendering our Lichens, in number, rarity and novelty, quite equal to those of any country in Europe.

OBSERVATIONS ON SOME SPECIES OF NEAPOLITAN FUNGI.

By Dr. O. Comes.

1. **Agaricus cæruleo-viridis.** *Brig.*—Hist. Fung. Neap., p. 9, t. 3, f. 1-2.

Fries did not quote in his work, "Hymen. Europ. Upsal., 1874," this species of fungus that was described by Briganti, and he in l.c., p. 43, gave the following reason :—"A. cæruleo-viridem, Brig., omitto, quum descriptio ad unguem cum A. æruginoso conveniat, exceptis lamellis albis; sed inter Pratellos sæpe vidi lamellas steriles persistenter albas, v.c. apud A. obturatum, udum, etc." At p. 9 of our preceding publication : "Funghi del Napolitano," we have clearly stated, in speaking of this fungus, that "le spore nei soggetti da me esaminati sono bianche" Briganti, moreover, in l.c. does not speak in a special manner of the spores; at most their white colour might be inferred from his having classified this fungus amongst the *Leucospori*. In the samples we examined we find spores, which are "ovato-ellittiche" and white, and have the dimensions of mm. $0{,}00608 \times 0{,}00365$. Cooke gives to the spores of the *A. æruginosus*, Curt., the dimensions of m. $0{,}00028 \times 0{,}0002$, equivalent in mm. $0{,}00711 \times 0{,}00508$. In this species, it not being the case of ascribing the white colour of the gills to their sterility, as Fries suspected, we believe that the species of Briganti ought to be put in the catalogue of "Hymenomycetes Europæi," as it cannot be mistaken for *A. æruginosus*, Curt., because of the incompatibility of the colour of the spores.

2. **A. neapolitanus.** *Pers.*—(Pers. Myc. Eur. iii., p. 23, No. 112; Inzenga Fung. Sic. i., p. 14:—*A. coffeæ*, Brig., Hist. Fung. Neap., p. 81, t. 23-26).

This fungus of large dimensions lives in very special conditions, exclusively on coffee-mark, and it seems exclusively limited in the southern parts of Europe. Persoon himself described it from dry samples sent to him by M. Tenore, in 1876, accompanied by a letter published by Persoon, in a note in l.c., p. 74. Briganti in his work described fully this fungus, giving four plates of it, and having examined the fresh samples he was able to describe it better than Persoon; he preferred changing the old name into that of *A. coffeæ*. Therefore meanwhile these two names do not refer but to one single species and design exclusively the coffee fungus; yet there have been ascribed the above said names to two species which are *without* affinity between themselves, and quite different from the coffee fungus. In fact, in Fries' "Hym. Eur., p. 99, No. 300," the *A. neapolitanus*, Pers., is considered as a form of *A. catinus*, Fr., which lives between the leaves of the beech tree; and at p. 86, l.c., is found the *A. coffeæ*, Brig., referred to the *A. difformis*, Schum., which lives on the ground in a rich soil; both species are

common to Northern Europe. We have obtained fine clusters of coffee fungus on the coffee-mark kept in a damp locality, and we have observed that the characters given by Persoon and Briganti are entirely reconfirmed. These characters are always easily recognised, for from 1876 we have preserved a cluster in alcohol. Considering the constancy of form, and the special substratum on which this fungus lives, we believe that the species called *A. neapolitanus*, Pers., ought to be retained in the list of European Fungi.

3. **Ag. tuberaster.** *Brig. jun.*—(Comes, Fung. Nap., p. 113, tav. xiv., f. 4.)

The coffee fungus is very similar to the *Pietra fungaia* fungus, which Briganti jun., once observed on *Pietra fungaia*. But although from his unpublished works we have not been able to have an exact idea of the colour of the spores, yet from the characters given by Briganti we believe that the said species ought to be classified amongst the Clitocybe. We also have observed a very little fungus on the *Pietra fungaia*, very different from the *A. tuberaster*, Brig., and which we have named *A. Severini* (Fung. Nap., p. 92, tav. xiv., f. 7-8). Moreover, at p. 144, l.c., we wrote that also Micheli and Battarra had mentioned some fungi belonging to the *Pietra fungaia*, and which had gills; but we are sorry that they have not given the characters of these fungi, therefore we cannot make comparisons. We do not wonder, however, at the variety of forms of the fungi, which may live on the *Pietra fungaia*, because when the latter begins to decompose, it may certainly receive spores of the other fungi, and comport itself towards them as would any other decomposing organic substance.

4. **A. cardarella.**—(Fr. S. M. i., p. 84; Ejusd. Hym. Eur., p. 80.—Cooke et Quêlet Cl. syn., p. 19, No. 240.)

Fries made this species by the characters that were assigned by Battarra to a fungus commonly known as *Cardarella nostrana*, and which lives in the pastures of the Adriatic coast. It is collected in autumn, when ripe and when dry, and is esculent (Battarra, Fung. Arim. Hist., p. 38, t. xvi., G., *Omphalomyces fuscus*). We may, without further proof, assert that the fungus to which Battarra alluded is precisely the field *Eryngo Agaric* (*A. Eryngii*, DC.), which is collected in the pastures along the Adriatic, and which is sent from the Abruzzi (where it is called *Carderella*), and the Puglia (where it is called *Cardoncello*) to Naples, where it is sold dried, and strung in bundles on threads. But we prefer giving other direct proofs of our assertion. Fries had considered these species so closely allied, that he had placed them near, and had marked the *A. cardarella* with the No. 12, and the *A. Eryngii* with the No. 14 (Fr. S.M. i., p. 84, No. 12, 14). Also the diagnostic phrases correspond substantially the one with the other, differing in some secondary points, which refer to characters which are neglected in the *A. cardarella*, because the

description made by Battarra is incomplete. The latter neglected, in fact, to mention the irregularity of the pileus, although this irregularity is not constant, as Vittadini, speaking of the *A. Eryngii*, says only "di forma bene spesso irregolare" (Vitt. Fung. Mang, p. 71); and Fries himself says—"Pileus....varians centralis et lateralis" (Fr. Hym. Eur., p. 171). Battarra does not speak of the slight roughness of the pileus; but also Vittadini, at the l.c., says—"la superficie è un pò scabra.....e tal fiata..... affatto liscia." If the skin is denoted as "crassa secernibile" in the diagnostic phrase of Fries (Hym. Eur., p. 80), Vittadini himself says, speaking of the *Eryngo Agaric* at the l.c., p. 72, that "l'epidermide è grossa e difficilmente sollevabile dalla carne sottoposta." There remains only, therefore, the proof of the substratum, on which the *A. cardarella* lives. But, if Battarra does not speak of the root of the *Eryngo* (which abounds at Rimini and along all the Adriatic), we ought to remember that in autumn, if the root after the rains becomes rotten, the whole fungus may be gathered without any trace of the root, on which it grew, remaining attached to it. Moreover, the common name of *Cardarella nostrana* quoted by Battarra is sufficient to show us, that he is speaking exclusively of the *Eryngo Agaric*. In fact the said name in the Abruzzo and on all the Adriatic coast is given to that Agaric which lives on herbaceous plants with prickly leaves like those of the thistle. We have no doubt, therefore, that the species named *A. cardarella*, Fr., ought to be put between the synonymous names of the *A. Eryngii*, DC.—To the *A. Eryngii*, DC., marked with the No. 608 in the "Clavis. Hym.," p. 49 (Cooke et Quêlet), follows, with the No. 606, the *A. nebrodensis*, Inz., and with the No. 607, l' *A. ferulæ*, Q. Concerning this last species we refer entirely to what we have written in N.B. at p. 20 of our publication. Therefore we believe that this species might be considered as a variety of the *A. Eryngii*, DC. But observing also that Cooke and Quêlet, in l.c., suspect that the *A. ferulæ* is a variety of the *A. nebrodensis* ("an varietas prioris?"), and that Fries retains it as a synonymous name (Fr. Hym. Eur., p. 703), therefore it seems that the *A. Eryngii*, DC., assumes a larger size when it lives on the other larger Umbelliferæ, as the *Ferula communis*, L., *Pragnos ferulacea*, DC., *Opoponax chironium*, Koch., *Eleoselinum Asclepium*, Bert.; therefore the *A. ferulæ* and the *A. nebrodensis* represent the largest form of the common *A. Eryngii*, DC. For this reason we have considered this form as a variety of the *A. Eryngii*, DC.; that is why we believe that it is not an independent species (Fung. Nap., p. 20).

5. **A. Aegirita.** *Brig.*—Fasc. I. di funghi litogr. Nap., 1824, tab. 1. Ejusd. Hist. fung. Neap., p. 68, et p. 131, tab. 32-33.

This species has been quoted under the name of the *A. Aegerita*, Fr. (Fr. Hym. Eur., p. 219; Ejusd. Epicr., p. 164.—Cooke et Quêlet, l.c., p. 67, No. 840.) In our publication at p. 28, we have evidently demonstrated the priority of the name given by Briganti.

There we have shown tha the *A. strobiloides*, Brig, jun., is an abnormal form, having a pileus "rimoso-tessulato" of the *A. Aegirita*, Brig., qualified by Fries, who had no opportunity of examining fresh samples, with the following words :—"Species admodum singularis" (Hym. Eur., p. 219). Therefore we have considered this species as a variety of the *A. Aegirita*, Brig. (Fung. Nap., p. 25, t. vi., f. 1-8). Then also the species of *A. Briganti*, Fr. (Hym. Eur., p. 219 ; Cooke et Quêlet, cl., p. 67, No. 841), correspondent with the *A. strobiloides*, Brig. jun., with the changed name, ought to be considered as a synonymous name of the *A. Aegirita*, Brig., var. *strobiloides*.

6. **Lentinus auricolor.** *Fr.*—(Fr. Hym. Eur., p. 473, No. 10; Cooke et Quêlet, ee. syn., p. 187, No. 4). Fries has ascribed to the genus Lentinus the species of Agaric named by Briganti *A. auricolor* (Fasc. I. di funghi litogr. Napoli. 1824, tav. Q. ejusd. Hist. fung. Neap., p. 23, tab. 13.), an agaric which, living on several plants, and chiefly on the olive tree, in the countries of Southern Europe, in summer and in autumn. Yet the subjects we collected in the same locality named by Briganti correspond perfectly to the description of the *A. olearius*, DC. If Briganti had examined the subjects in the dark, he would have noticed the phosphorescence, as we in all cases have observed, and he would not have been induced into the error of making another species for an agaric already described. He therefore named this species *A. auricolor*, from the golden colour of the whole fungus. Micheli, in fact, says—"Fungus perniciosus, intense *aureus*, ex uno pede multiplex, ad oleam nascens. . . . . Fungo olivo, *dorato*, malefico ; Majo, Septembri, at Novembri mensibus per sylvas ad sepes, et in agris, præcipue ad oleas." (N. pl. gen., p. 191). And Fries says—"A. olearius, varius, rufo-*aureus*." . . . . . (S. M., I., p. 273). There remains, therefore, no doubt as to the identity of the two species *A. auricolor*, Brig., and *A. olearius*, DC. In consequence of which also the *Lentinus auricolor*, Fr., ought to be retained as synonymous of the *A. olearius*, &c., as we had proposed in our publication at p. 17.

7. **Polyporus Ceratoniæ.**—Risso in Barla Champ Nic., p. 60, t. 30, f. 1-3 ; Fr. Hym. Eur., p. 552, No. 109 ; Cooke et Quêlet Cl. syn., p. 179, No. 108.)

The diagnostic phrase of Risso in l.c., for the definition of this species, corresponds substantially with that quoted by Fries for the *P. sulphureus* (S. M., i., p. 357, No. 6) ; and Risso himself adds that the species he described has a great resemblance with the *Boletus sulphureus*, Bull., which he suspects may be a variety of this form, from which, however, it differs in the colour of the flesh, which is white. We are doubtful in giving too great an importance to the colour of the flesh, following the example of Fries, who, in Epic. Syst. Myc., p. 450, adds, in speaking of the P. sulphureus, "carna flavida, dein albicante." Having had the opportunity of examining many fresh samples of the Polyporus that

live on the locust tree (*Ceratonia Siliqua*), we did not find sufficient characters to make it a distinct species ; but, observing the tendency in the examined samples towards the simple form, and wanting to distinguish the latter, we prefer considering it as the simple and not cæspitose form of *Polyporus sulphureus*. We have continued during the present year our researches, and have found on the locust tree itself examples of Polypori no more simple, but cæspitose, and which, in form, spores, and colour of flesh, resembled other samples found on the Almond (*Amygdalus communis*) and other trees. The latter samples belong, without doubt, to the species *P. sulphureus*, Fr. It follows, from what has been said, that the only differential character of the simplicity of form of the locust tree polyporus being yet doubtful, we must conclude that the *P. Ceratoniæ*, Risso, corresponds essentially with *P. sulphureus*, Fr., which is so polymorphous. But, moreover, to the samples collected on the locust tree corresponds the other characters given by Insenga to his *P. Todari*, for the aforesaid locust tree polyporus presents "il margine acutissimo, sporgente, ondeggiante, e serpeggiante," as Insenga himself wrote to me (Fung. Nap., p. 107), "rivoltato un poco indietro nella sua estremità, di color miniato, molto carico . . . . . e formante una zona colorata e distinta per tutta la circonferenza del fungo" (Fung. Sic., I., p. 38.) As a last proof, we may add that the fungus of which Clusio speaks, exactly interpreted by Fries as *P. sulphureus*, is coloured in the following manner :—"Colores flavus et ruber simul mixti · · · · · · extimæ oræ satura rubedine nitent" (Clus. Rar., pl. Hist., p. 278.) Therefore, if the same diagnostic characters are common to the three species of Polypori : *P. sulphureus*, Fr., *P. ceratoniæ*, Risso, *P. Todari*, Ins., we are obliged to conclude that the said three species must be reduced to one, viz., to the old species, to the *P. sulphureus*, Fr. ; and the *P. ceratoniæ*, Risso, and the *P. Todari*, Ins., ought to be considered amongst the many synonymous names of the *P. sulphureus*, Fr. !

Conclusion.

We propose that the following species, of which we give the abbreviated diagnostic phrase, be considered in the list of the Hymenomycetes Europæi :—

1°. **A. cæruleo-viridis.**—*Brig. jun.*—Neap., p. 9, t. 3, f. 1-2 (sect. Armillaria).

Pileo carnoso, e campanulato expanso, lævi, viscoso, glauco ; lamellis confertis, amoene lacteis ; stipite ab annulo ad basim squamulis obducto, dilute glauco.

2°. **A. Neapolitanus.** *Pers.*—Myc. Eur., iii., p. 73 ; *A. coffeæ*, Brig. Nap. t. 23-26 (sect. Clitocybe).

Albus, cæspitosus, raro gregarius ; pileo carnoso e plano depresso infundibuliformi, limbo tumidulo et incurvo ; lamellis albis, inæqualibus, decurrentibus ; stipite subicentralis, solido.—Provenit ex Coffeæ potus fæce.

3. **A. Tuberaster.** *Brig. jun.*—(Sc. ined.; Comes, fung. Nap., p. 113, t. xiv., f. 4). Sect. Clitocybe.

Pileo carnoso, flavescente, centro e depresso infundibuliforme, lamellis albis, inæqualibus, subdecurrentibus; stipite brevi, incurvo, crasso, basi rufescente.—Provenit e matrice Polypori Tuberastri.

We propose, moreover, to modify the said list in regard of the following species:—

1°. **Agaricus Cardarella.** *Fr.*—To be considered as a syn. of the *A. Eryngii*, DC.

2°. **A. Ferulæ.** *(Lanzi.)*—Q. id. id. id. *A. Eryngii*, DC., var. *Ferulæ*.

3°. **A. nebrodensis.** *Ins.*— id. id. id. id.

4°. **A. Aegerita.** *Fr.*—To which the preceding name (*A. Aegirita*, Brig.), ought to be substituted.

5°. **A. Brigantii.** *Fr.*—(Syn. *A. strobiloides*, Brig., jun.), to be considered as a syn. of the *A. aegierita*, Brig., var. *strobiloides*.

6°. **Lentinus (Agaricus** *Brig.***) auricolor.** *Fr.*— Id. id. id. *A. olearius*, DC.

7°. **Polyp. Ceratoniæ.** *Risso.*
8°. **P. Todari.** *Ins.*
} Id. id. id. *P. sulphureus*, Fr.

Portici, Gennajo, 1879.

MYCOGRAPHIA.

The sixth part of this work, completing the first volume, is just issued, with the Title page and three Indices for binding. First, there is an Index of the figures in the order of publication. Next, a Systematic Index, placing the genera and species illustrated in systematic order; the large genus *Peziza*, in so far as it has yet been illustrated, being divided into subgenera, based on their natural affinities. Finally, there is an Alphabetical Index of all the species and synonyms which occur throughout the volume.

This first volume includes such of the Discomycetes as were termed by Fries the *Pileati*, and the commencement of the *Cupulati* with *Wynnea* and *Peziza* as far as the end of the section *Sarcoscypha*—that is, nearly all the species of *Peziza* with large sporidia.

The second volume is proposed to be issued in parts in the same manner, and it is anticipated that this will include all the species of *Peziza* which remain to be figured, with perhaps some small allied genera, if the former are not too numerous.

Whether the systematic arrangement will satisfy the inordinate craving for new genera, which has of late characterised Mycology, is doubtful; nevertheless, we could not accept the various genera already proposed upon the Continent on the basis of carpological characters only, in the face of the declaration of one of the

greatest naturalists of the age, that "it has been found that a classification founded on any single character, however important that may be, has always failed."

Any further observations on the scope or execution of the work it is not our province to offer. As interested parties we must rest content with an announcement of facts, leaving the volume to have its value determined by the test of experience.

NEW DIATOMS.

By Prof. P. T. Cleve, *with Notes by* F. Kitton.

Addenda et Corrigenda.

No. 11, p. 68, after favourable, insert "illumination."

No. 13, p. 69, *P. caribœrum*, should commence a fresh paragraph. (No. 14a.)

No. 19, p. 70, after M.M.J. vol., insert "xii."

To follow No. 23, p. 70, 23a., *T. Antillarum*, Cl.—Small, 4 to 5 produced angles. Sculpture small, pearly granules, 7-8 in., ·01 mm., arranged in straight radiating lines. The middle of the valve seems to be elevated and the angles obliquely projecting. Diam. ·053 mm. Virgin Islands, St. Bartholomew. Rare.

[Herr Cleve's figure resembles the pentagonal var. of *Amphitetras antediluviana*, but it is very much smaller than any specimen I have seen of that species.—F. K.]

CRYPTOGAMIC LITERATURE.

Oudemans, C. J. A. Fungi Neerlandici Exsiccati, cent. ii.

Saccardo, P. A. Mycotheca Veneta, cent. xiv.

Ravenel, H. W. Fungi Americani Exsiccati, cent. iii. and iv.

Cooke, M. C. Fungoid Diseases of the Vine, part iv. and v., in "Journ. Roy. Hort. Soc.," vol. v., pt. 6.

Cooke, M. C. Enumeration of "Polyporus," in "Trans. Bot. Soc. Edin.," 1878.

Abbay, Rev. R. Observations on *Hemileia vastatrix*, in "Journ. Linn. Soc.," No. 100.

Thumen, F. Fungi Pomicoli.

Vines, S. H. The Praembryo of *Chara*, in "Journ. Bot.," Dec., 1878.

Holmes, E. M. Cryptogamic Flora of Kent (*continued*), in "Journ Bot.," Dec., 1878.

Thuret G., and Bornet, E. Etudes Phycologiques.

Saccardo, P. A. Fungi Italici, fasc. ix-xii.

Saccardo, P. A. Michelia, No. 4, 1878.

Cox, M. J. D. On Isthmia nervosa, in "Brebissonia," Nov., 1878.

Husnot, M., and others. Bryological Notes, in "Revue Bryologique," No. 1, 1879.

Krempelhuber, A. Lichenes Argentinæ, in "Flora," Oct., 1878.

Thumen, F. Symbolæ ad floram Mycologicam Australiæ, "Flora," Oct., 1878.

Nylander. W. Circa Lichenes Corsicanos adnotationes, in "Flora," Oct 11, 1878.

Borzi, A. Morphologi und Biologie der Nostochaceen, in "Flora," Oct. 21, 1878.

Schulzer, S. Mycologisches, in "Flora," Oct. 21, 1878, and Dec. 21, 1878.

Muller, J. Lichenologische Beitrage, in "Flora," Nov. 1, 1878.

Cooke, M. C. Some Fungi from the N.W. Himalayas, in "Indian Forester," vol. iv., No. 2.

Baglietto, F. Lichenes Insulæ Sardiniæ, in "Nuovo Giorn. Bot. Ital.," Jan., 1879.

Moore, Dr. D. On Isöetes Morei, in "Journ. Bot.," Dec., 1878.

Cornu, Dr. Max. Maladie des taches noires de l'Erable, in "Comptes Rendus," July, 1878.

Cornu, Dr. Max. Maladies des plantes determinées par les *Peronospora*, "Comptes Rendus," Dec., 1878.

Cornu, Dr. Max. Causes qui determinent la mise en liberté des corps agiles chez les Vegetaux Inferieurs, "Comptes Rendus," Nov., 1877.

Cornu, Dr. Max. Maladies des Laitues (*Peronospora gangliformis*), "Comptes Rendus," Nov., 1878.

Cornu, Dr. Max. Remarques sur quelques Saprolegniees nouvelles, "Bullet. de la Soc. Bot. Fr.," t. xxiv.

Cornu, Dr. Max. Developpement de *l'Agaricus cirrhatus*, "Bull. Soc. Bot. Fr.," 1877.

Thumen, F. de. Vossia, a new genus of Ustilagines.

Roumeguere, C. Recentes experiences du Dr. Minks, in "Revue Mycologique," No. 1, Jan., 1879.

Quelet, Dr. L. Les Myxogastres, in "Revue Mycologique," No. 1.

Kalchbrenner, C. Fungi e Sibiria, &c.

Wright, Dr. E. P. On the Cell Structure of *Griffithsia setacea*, in "Trans. Roy. Irish Acad.," Jan., 1879.

Wright, Dr. E. P. On the formation of the so-called "Siphons," and on the development of the tetraspores in *Polysiphonia*, in "Trans. Roy. Irish Acad.," vol. xxvi., Jan., 1879.

Winter, Dr. Geo. Ueber ein Natürliches System der Thallophyten, in "Hedwigia," No. 1, 1879.

Petit, P. Sur la vie Vegetale des Diatomées, in "Brebissonia," No. 6.

Vize, J. E. Micro-Fungi Britannici, cent. iv.

Fries, E. Icones Selectœ Hymenomycetum, parts ii and iii.

Grevillea,

A QUARTERLY RECORD OF CRYPTOGAMIC BOTANY AND ITS LITERATURE.

THE DUAL LICHEN HYPOTHESIS.

(Continued from Page 108.*)*

Are Gonidia a part of the Lichen-structure?—The thalli ol Lichens enclose within them peculiar cellules, forming a sub-corticaf layer, which are sub-globose, of a greenish colour, and to these the name of *gonidia* has been given. They frequently burst through, and appear on the surface, in the form of powdery masses. The lichenologist believes, and as he thinks has good reason for believing, that they form part of the plant itself. One says, " They may be regarded as intermediate in function between the vegetative and reproductive cell, assuming the offices and partaking of the characters of both."* The justly celebrated Tulasne considered them to be parts of the Lichen, and also to perform important functions. On the other hand, the theorists contend that they are no part of the plant, but that they are a form of Algæ, upon which the residue of the Lichen is parasitic. The grounds of the belief are supposititious, and the proof is still defective.

In the first place, it is argued that they are free cells, resembling in size, form, and colour certain low forms of unicellular Algæ, and hence, as they are out of place in Lichens, they must be unicellular Algæ.

Any one who has had any experience amongst the low forms of of vegetable life, in which the organism consists of a single cell, are exceedingly well aware that it is almost an impossibility, from the observation of these cells, to arrive at any satisfactory conclusion as to what they are, and what their ultimate development may be. Let them compare, if they please, what are known to be the earliest stages of Mosses and Algæ with the gonidia of Lichens, and draw up characteristic diagnoses if they can. All are globose cells containing a greenish protoplasm, and about equal in size. By what occult power can the theorists distinguish that which, it is admitted, they cannot describe? Yet the best and most experienced Algalogists affirm that of all these forms the gonidia of Lichens are the most distinct and permanent in their character.

* Lindsay, " Loc. Cit.," p. 41.

The only safe method by which these low forms can be determined, is by watching their development. In their simple condition of cells they are no more than mere buds, the ultimate form of which only the rash or foolish would predicate.

If the gonidia of Lichens are true Algæ, it is insufficient to state that they so closely resemble Algæ that they might be mistaken for such ; there must be some undoubted evidence produced that they are Algæ in fact, and not in appearance.

Nylander, on the contrary, holds that they are organs belonging to the Lichen. He says, " I have adduced that the gonidia and gonimia of Lichens constitute a normal organic system necessary, and of the greatest physiological importance, so that around them we behold the growing (or vegetative) life chiefly promoted and active." Again he says, " The absurdity of such an hypothesis is evident from the very consideration that it cannot be the case that an organ (gonidia) should at the same time be a parasite on the body of which it exercises vital functions."*

Now, it must be admitted that Dr. Nylander is the *facile princeps* of Lichenologists If it can be shown that these green cells perform an active part in the life of the lichen—in fact, that they are organs possessed of certain functions, then they cannot at the same time be foreign to the plant in which they occur. Nylander has shown that, whenever they are few in number, a proportionate decrease of vitality takes place. That the most vigorous functions of life are carried on in their proximity.

As the Schwendenerian theory is wholly based on the belief that there is no genetic relationship between the hyphæ and the gonidia of the Lichen thallus, any proof that such a genetic relationship does exist is fatal to it. Dr. Minks, of Stettin, has directed his attention specially to the investigation of this point with very important results. He discovers in the hyphæ of Lichens two new organs, which he has designated *geonangium* and *gonocystium*, which produce gonidia within the walls of the hyphæ themselves. These gonidia, because of their minuteness, he names *micro-gonidia*. He has seen these *micro-gonidia* in all the cells of the hyphæ, whether in the vegetative or the reproductive parts. He sees them in the cortical layer, the medullary layer, the paraphyses, the young asci, the sporidia, &c. Thus he has established their existence, not only within the hyphæ-cells of all parts of the Lichen, but also in all stages of its life-history.

These facts, so utterly subversive of the Schwendener theory, have likewise been observed and confirmed by Dr. Muller, of Geneva, who says, " My results have surpassed my highest expectations. Not only have I proved the existence of micro-gonidia in all the organs mentioned above, after having treated them with caustic potash, sulphuric acid, and tincture of iodine, but I have also seen them with my excellent immersion objectives, without any

* Nylander, in " Grevillea," ii., p. 146, 147.

chemical preparation; and in favourable cases, I have even seen them with the non-immersion lower powers of Hartnack." He proceeds to say that these micro-gonidia are paler than the ordinary gonidia, and disposed in moniliform series in the axes of the hyphæ, having a diameter of ·001 mm. In certain tropical species, which had been exposed to a more vivid light than those in more northern latitudes, these micro-gonidia attained a brighter green; for example, in *Parmelia prolixa*, var. *erythrocardia*, Müll., sent by Dr. Schweinfurth from Lake Nyanza, in Africa. In this Lichen they were so green that little difference of colour existed between them and the gonidia.*

If the "parasite" can produce within itself all which it requires for its existence, then Nature has made a mistake in making it dependent on another being for its existence.

Here, then, we have clear demonstration that the gonidia are developed within the substance of the Lichen itself in a determinate and uniform manner; that, instead of being altogether foreign from the Lichen, they are generated within it, and hence (according to the hypothesis) the parasite produces from its own substance the host upon which it is parasitic.

The admirable Memoir of Tulasne should be consulted in conjunction with Dr. Minks's contributions to the "Flora," and it will be seen that the latter confirms and amplifies the former, adding thereto new facts, and thus, doubtless, establishes the true relationship of gonidia to the residue of the Lichen.

I am compelled to be suggestive, rather than exhaustive, in dealing with such an expansive subject, which I scarcely regret here, because it bears less intimately than others upon that phase of the subject in which I am naturally most interested.

Is Parasitism proven?—A parasite is usually defined as an animal or plant which lives upon or attaches itself to another, and derives therefrom sustenance and support. The mistletoe, which attaches itself to poplar and other trees, is a parasite. The mould which attacks and destroys potatoes, is a parasite, entozoa are parasites, and so also are the pediculi, and other insects which infest the higher animals. In ordinary conversation there is seldom likely to be any misconception of what is a parasite. In all known instances of parasitism, it is, I presume, admitted that the parasite thrives and flourishes at the expense of its host. In every known instance of parasitic fungi the fungus lives at the expense of its host, which it injures and ultimately destroys. Schwendener himself says, "the vine and potato fungus, as well as *all other fungi* which vegetate in living organisms, destroy their host plant, or host animal, in the unequal struggle." This universality of destructive parasitism in fungi knows no exception, and is, therefore, equivalent to a natural law. Any hypothesis which depends upon fungal parasitism, *must* of necessity recognize this fact, and conform to it. The fact cannot be reversed to save the hypothesis.

* Consult Minks on Micro-gonidia, in the "Regensburg Flora," for 1878.

Our experience of fire, in whatever form it occurs, is that it burns or consumes that upon which it operates. We have no experience of fire which does not support itself by causing that change of form and condition which we term combustion. Hence we are justified by experience in rejecting any theory based upon a reversion of this fact, that is, on the assumption that fire does not consume.

Inasmuch as the supposed fungus, said to be parasitic upon the gonidia, does not "destroy its host plant, in the unequal struggle," it cannot be a fungus, since, if it were a fungus, the gonidia would be destroyed, as demonstrated by experience. Or, if it were proven to be a fungus, then, not being parasitic, the gonidia are not foreign to it, but a portion of its substance; and again a dilemma occurs, for no fungus is known persistently to enclose green granules. Relative size is another strong presumption against parasitism. In the Lichen we have a supposed parasite many times larger than its host. It is an elephant parasitic upon a flea, and not a flea upon an elephant. The parasite in the romance encloses and cherishes its host, which is buried within its substance, reminding one strongly of an entozoon, enclosed in the body of an animal, horse, dog or man. In such a case it is not usual to call the man or the animal the parasite, and the entozoon the host, but the reverse. If it is urged that this is not an analogy, because the entozoon is known to subsist upon the animal in which it is found, then, in like manner I would urge that it is not proved that the gonidia do not subsist at the expense of the so-called fungus. In other words, it is more feasible to suppose that the assumed green algæ are parasitic than that they should be the host.

Again, if it can be shown that gonidia are part of the whole plant, they cannot be distinct from the plant. If they are produced *by* the healthy and normal action of the plant, then they are attributes of the plant. If they are beneficial to the plant, acting as organs, performing useful functions, then there is no more parasitism than in the leaves of an oak or the tendrils of a vine.

It is needless to recapitulate what has already been alleged that the gonidia *are* generated by the plant itself, and hence there can be no parasitism.

Dr. Nylander writes: "The absurdity of such an hypothesis is evident from the very consideration that it cannot be the case that an organ (gonidia) should at the same time be a parasite on the body of which it exercises vital functions; for with equal propriety it might be contended that the liver or spleen constitutes parasites of the mammiferæ. Parasitic existence is autonomous, living upon a foreign body, of which nature prohibits it from being at the same time an organ."*

All conclusions as to the general character of Lichens, based upon experiences of the Collemaceæ, are essentially unsatisfactory.

* "Grevillea" ii, p. 146.

It is widely admitted, and has been for many years, that the Collemaceæ are aberrant forms of Lichens, even if they be Lichens at all. The genera *Collema*, *Leptogium*, *Synalissis*, *Myxopuntia*, *Omphalidium*, *Paulia*, *Lichina*, and *Myriangium* have been named together, as forming a group with the thallus of an Alga and the fruit of a Lichen. Some have excluded them from Lichens altogether, others have accepted them with reserve, as aberrant forms, and all this was done before any Schwendener hypothesis was dreamt of. Montagne and the Rev. M. J. Berkeley at one time were disposed to include all these genera under the name of *Collemaceæ*, as distinct from Lichens proper. (See "Lindl. Veg. King.," p. 49). Cohn afterwards excluded them in a proposed arrangement. Hence we may conclude, that whether they are included with Lichens or not, they are aberrant forms, in no sense typical of Lichens, and cannot be held as evidence in any dispute as to the character of Lichens as a whole.

Weighed and found Wanting.—It only remains to sum up the evidence and apply it to the purpose for which the foregoing remarks were designed.

It is perfectly legitimate to construct an hypothesis with the view of ascertaining the truth, but it appears to me that such an hypothesis should be tested in three ways. It should be considered as demonstrated, on the one hand, or be rejected, altogether, on the other, if it stands or falls by these three tests:

I.—We should be prepared to ascertain whether our hypothesis is consistent with existing scientific facts.

II.—Whether the hypothesis is sufficient to account for the phænomena in question.

III.—Whether the phænomena can be produced in any other manner.

I.—As to the harmony of the hypothesis with existing scientific facts. The assumption that two separate and distinct organisms are combined in one plant, which, by its own proper system of reproduction, is capable of continuing its species, each individual of its progeny also exhibiting the same phænomena of assumed dual existence, is inconsistent with known scientific facts, because, whilst one supposed plant proceeds from its proper germ, the other has none, and is, therefore, spontaneously evolved.

Thus, if the Lichen, by means of sporidia, is capable of producing plants which are, in all respects, like the parent, then the sporidium of the fungus element reproduces also the algal element, and the same spore, or ovum, is the origin of two distinct and widely diverse organisms, *i.e.*, a fungus and an Alga, which is inconsistent with scientific fact.

The seed of the maple reproduces the Maple tree only, its parasite, the *Rhytisma*, establishes its parasitism afterwards by means of its own proper spores. Thus it is with other hosts and other parasites. If *one* germ is the origin of *both* the dual

elements in a lichen, then these elements must both be considered as parts of a single individual.

The theory assumes, further, that a fungus is parasitic upon a smaller and weaker organism, which it does not injure or destroy. This, again, is contrary to scientific fact, as it confers upon, or assumes for, a destructive force, conservative powers.

The hypothesis assumes also that *all* the substance of *all* lichens, except the gonidia, are fungi, whereas, as has been shown, their structure, composition, habits, &c., &c., all differ materially from fungi, to such a degree, that they cannot be regarded as identical.

The hypothesis assumes also that the gonidia are certain forms of other plants, which they externally somewhat resemble, whereas the gonidia are organs of the lichen, performing definite functions in its behalf.

Hence, briefly, there remains no other conclusion but that the hypothesis fails to support the first test, because it is not consistent with existing scientific facts.

II.—Whether the hypothesis is sufficient to account for the phænomena in question. That is, whether the combination of a fungus and alga is sufficient to account for the production of a lichen, or to state the hypothesis in the phraseology of its advocates, whether a fungus parasitic on an alga is a sufficient cause to account for a Lichen.

Unless it can be shown that the fact of its parasitism is sufficient to alter the entire character of a fungus, it is *not* a sufficient cause to account for the existence of Lichens. Unless it can be admitted that parasitism will convert a fugitive, short-lived fungus into a perennial lichen, induce it to live on a dry, barren rock, which, as a fungus, it could never accomplish, to support great extremes of heat and cold, to submit to frost and snow without destruction, to flourish on growing trees, whilst still vigorous, and without inducing decay, to assume a fibrous structure instead of a cellular, to produce certain acids within its tissues, which are unknown to it in other conditions, to exchange a putrefactive tendency for a persistent one, to abandon for ever a career of pertinacious destructiveness for one of inoffensiveness. in short, to reverse its entire character, unless it can do all these things as a result of parasitism on the minute green cells of an Alga, then the fact of such a parasitism is insufficient for the production of the phænomena.

Inasmuch as we have no experience of such a total change in the essential characters of fungi under any conditions of climate, or local circumstances, we cannot admit that simple parasitism will cause such a change. Numerous instances of parasitism are found habitually to occur amongst fungi. Many species exist in no other form than as parasites, and yet no alteration in the direction of lichens is known to take place. Therefore we are compelled to adopt the conclusion that the hypothesis is insufficient to account for the phænomena in question.

III.—Whether the phænomena can be produced in any other

manner. It is almost needless to say much under this head, having already shown, as we proceeded, that all the phenomena of lichen life are wholly compatible with the assumption that these organisms are, in themselves, true, simple, autonomous plants. If, also, we are right in the conclusion that the hypothesis fails when submitted to the two preceding tests, the natural inference will be from the arguments already adduced, that all the phenomena which any Lichen exhibits are compatible with a simple organism. The Theorists admit, by their hypothesis, that all the phenomena, except the gonidia, are wholly compatible with a plant which they call a Fungus. Although we do not admit that *Fungus* is the correct name to be given to the plant, we also affirm that it affords evidence of being a simple plant, but with the addition of the gonidia, which we hold to be as possible as gonidia enclosed within the substance of a *Fistulina* or a *Polyporus*, and not only possibly, or even, probably, organs of the Lichen, but that *positively* such is the case. We require no counter hypothesis, therefore, to support our view, but urge, on the contrary, that where an organism is seen to exist, and continues to reproduce itself in conformity with a certain type, it is folly to attempt, by multiplying causes, to account for phenomena in an abnormal manner, which can be readily accounted for by normal causes.

When we see an organism in possession of certain organs, which organs perform certain functions, however small, and these organs and functions are inherited and transmitted, there is a pretty strong presumption that all our efforts to demonstrate external causes, to account for phenomena already well accounted for, we shall only embark on a profitless speculation. At present there are still a few who are content with this view of the Lichens, and do not crave the novelty of a dual hypothesis.

I cannot forbear indicating what I consider so often a source of error in questions of this kind, which is, the mistaking of *analogy* for *identity*. Unless I am much mistaken, that error is not absent from this hypothesis. Fungi of that division known as the Ascomycetes, have a certain kind of reproductive organs. The sporidia, normally eight, are contained in elongated sacs, called asci, which are placed side by side, mixed with other thread-like bodies, called paraphyses, and these together constitute the hymenium. Because, in Lichens, a like system of reproductive organs prevail; instead of accepting Lichens as analagous to Fungi in their reproduction, it is assumed, without proof, that they are identical.

Again, certain Fungi, called the *Discomycetes*, have these reproductive bodies enclosed in an open receptacle, like a cup; because certain lichens have also their reproductive organs enclosed in a receptacle of a similar form, though not of the same internal structure, instead of recognising this as an analogy, the theorists at once assume identity, and, practically, they argue thus. Certain Fungi have spores enclosed in asci, so have the Lichens, ergo the Lichens are Fungi. Certain Fungi have their reproductive organs

enclosed in cup-shape receptacles, so have certain Lichens, ergo, Lichens are Fungi. But lichens enclose in their thallus green bodies not found in Fungi, hence the Lichens are Fungi, enclosing green bodies which are foreign to it. There must be something wrong somewhere, what are these round, unicellular, greenish, free vesicles. Some of the unicellular Algæ consist of round, unicellular, greenish, free vesicles. Ergo, these gonidia are algæ. There must be parasitism somewhere with a Fungus, and a Lichen in the same plant, and thus the dual Lichen hypothesis is ushered upon the world, based on a tissue of analogies, mistaken for identities.

How aptly may an observation, made by Professor Huxley, when considering another hypothesis, be applied here : " In a scientific enquiry a fallacy, great or small, is always of importance, and is sure to be, in the long run, constantly productive of mischievous, if not fatal results."*

It is, undoubtedly, a fallacy to assume that things which are only analogous are identical, as if there were no real difference between analogy and identity. In the present instance no more decided evidence need be given than in the case of the gonidia. It has been deemed unnecessary to demonstrate that they are Algæ, but simply on the faith of their analogy has identity been assumed. The interests of truth demand that fallacies should be encountered, and not accepted on the faith of any authority whatever, be that authority ever so great, or ever so highly esteemed amongst men. Broken-down theories are, by no means, unknown in the Annals of Science, and the addition of another will create no great surprise. Some may remember the elaborate treatise of Professor Meneghini, in 1845, translated for the Ray Society in 1853, in which he essayed to prove the animal nature of Diatoms, a theory which at once found adherents, and it came nigh to being pronounced one of the great discoveries of science, and yet no one believes it now.

Or even the more recent theory of spontaneous generation, supported by the overwhelming evidence of the experiments of M. Pouchet. Yet the evidence and the theory collapsed, thanks to the indomitable perseverance of M. Pasteur, but not before it had acquired many adherents, and even in England scientific journals, of no small repute, announced it as one of the great discoveries of the age.

And not many years since the theory of the animal nature of the Myxogasters obtained the support of some botanists and many zoologists, although the mycologists generally declined to accept it. Perseverance has established the fallacy of the theory, but the lesson it suggests is evident, when we remember that the same individual who propounded that theory was the first to announce and propose the Algo-lichen hypothesis, which was taken up by Schwendener and afterwards by Bornet. A third proposition from the same source died without a friend.

* Huxley, " Lectures " (1863), Hardwicke, pp. 67.

Truly we may say—

> "Science has bubbles, as the water hath,
> And these are of them."

Despite the announcement of the President of the Royal Society, for whom personally no one has a greater esteem than myself; despite the flourish in the pages of the "Nineteenth Century," I not only dare to call in question, as vigorously as I can, the soundness of this doomed hypothesis, but to prognosticate its dissolution. Doomed, I say, advisedly, because, being illogical and unsound, it must, sooner or later, the sooner the better, go "into liquidation."

It is worthy of note how conclusions are assumed without examination or enquiry, but entirely, as one might say, developed out of inner consciousness. Thus in the "Gardener's Chronicle" (Feb. 1, 1879, p. 146), it is said: "Some of Reinsch's observations include some curious instances of one alga parasitical in the thallus of another, thus strengthening the algo-lichen theory of Schwendener and others." Now this is a logical fallacy. Parasitism is, probably, not at all uncommon in Algæ. It is very possible that the fact is true, but how does it follow from the premises that this conclusion is to be arrived at?

I.—One alga may be parasitic in the thallus of another.

II.—A fungus is parasitic on an alga in Lichens.

III.—Therefore the fungus is an Alga. Is this the argument? or what is it? because it is not affirmed that an Alga is parasitic in the thallus of a lichen, but that the Alga is the host. Some things seem to have got a little mixed somewhere when the above paragraph was written. I have not appealed to authorities, or marshalled the names of those who refuse to be parties to the "scare," because of the weakness of such a course of argument; but, as I draw to a close, I may justify my position by again enquiring how it is that this hypothesis is not accepted either by the lichenologists or the mycologists. Why are its strongest advocates and most persistent supporters those who, from their own writings, give evidence that they have but an exceedingly small practical acquaintance with either lichens or fungi? The whole controversy, in so far as its advocacy is concerned, teems with errors such as practical lichenologists and mycologists could not have made. There can be no truer test of a man's knowledge than to permit him to write away at his own sweet will. Believe me, it is not by any means difficult to determine the shallowness of a man's knowledge, if he is only permitted to write and talk as he pleases. I have very little doubt, indeed, that the great reason why this theory has been so little opposed, lies in the conviction which I have shared with others, that if only it is let alone it will commit suicide. The internal evidence is so strong, be the theory true or false, that its chief advocates have not had the practical knowledge which they ought to have possessed, that I am not in the least surprised that those who are best acquainted with fungi and lichens did not deem

such opponents either dangerous, on the one hand, or worthy foes for personal combat on the other.

Whether that hypothesis be true or false which he originated, we have, at least, the honour of having produced in England the greatest master of the art of expounding and constructing an hypothesis which any country has produced. Had the Schwendenerians studied carefully the "Origin of Species," they would have less signally failed. His sternest opponents credit Darwin with the production of a marvellous work of art in the elaboration of his hypothesis. Their best friends are silent in their commendations of Schwendener and Co.

As to the assertion that the hypothesis is now generally received and adopted, come from what quarter it may, must be accepted for what it is worth; even if endorsed by the "Nineteenth Century" it will certainly be forgotten in the twentieth. Such an hypothesis cannot practically be accepted whilst it is rejected by the Lichenologists and Mycologists. It must resolve itself into a question of classification, and so long as the best classificatory books are written by the best men, Lichens will continue to be Lichens, and Fungi much the same as they are.

The discontented lawyer may desire to extend his sphere of operations for the benefit of the community, and elaborate some theory of his own that "Measles" is only incipient "Gout," or "small-pox," a degenerate perspiration, to be corrected by copious draughts of cold water. Still, it would avail nothing to the medical man if all the scientific journals in London were to declare it a marvellous discovery in science. The physician would have his own opinion in the midst of the chaos, even of the capacity of the man of law to decide for the man of physic, and whether, as Carlyle expresses it: "Oceans of horse-hair, continents of parchment, and learned sergeant eloquence, were it continued till the learned tongue wore itself small in the indefatigable learned mouth," could not make measles gout.

So is it with this hypothesis, which has been constructed to set right the wrong-headed Cryptogamists, it may get a little false popularity from those who know no better. But, as for my friends, they may rest assured that when I have shuffled off this mortal coil they will be able to say, with confidence, that amidst all my follies and crimes, I was never the advocate of the theories of Table-turning, Tichborne, or Schwendener.

M. C. Cooke.*

Fries's Icones.—We omitted to state in our last that the publication of this work has been resumed, since the death of the venerable Elias Fries, under the editorship of his sons.

* Communicated to the "Quekett Microscopical Club," March 28, 1879; in reply to recent advocates of the Theory.

NEW BRITISH FUNGI.

By M. C. Cooke.

(Continued from Vol. vi, p. 128).

Agaricus (Lepiota) amianthinus. *Scop.* var. **Broadwoodiæ.**
Pileus hemispherical, yellow, delicately tomentose; margin inflexed; stem equal, and, as well as the ring, mealy; gills white, adnate, sometimes decurrent.—*B. & Br. Ann. N. Hist., No.* 1730*.
On the ground. Lyne (Sussex).
A very distinct variety, if not species.

Agaricus (Lepiota) mesomorphus. *Bull, t.* 506, *f.* 1.
Pileus rather fleshy, campanulate. Stem fistulose, short, thin, even and smooth as well as the pileus; ring erect, persistent; gills free, ventricose, white.—*Fr. Mon., p.* 38. *B. & Br. Ann. N. H., No.* 1731.
On the ground. Hereford.

Agaricus (Lepiota) medullatus. *Fr. Hym. Eur.*, 38.
Pileus fleshy, convex, plane, umbonate, smooth, viscid, margin dentate with fragments of the veil; stem at length fistulose, obsoletely squamulose below the ring; gills free, crowded, ventricose. —*Fr. Ic., t.* 16, *f.* 2. *B. & Br. Ann. N. H., No.* 1732.
On the ground. Glamis, N.B.

Agaricus (Tricholoma) inamænus. *Fr. S.M.*, 1, *p.* 111.
Var. *a.* Gills decurrent, very distant.—*B. & Br. Ann. N. Hist., No.* 1733*.
On the ground. Coed Coch.
"The smell is so precisely like that of the normal *A. inamænus*, that I follow Fries in considering it a mere variety."—*M. J. B.*

Agaricus (Clitocybe) rivulosus. *P. Syn.*, 369.
Pileus convex, then plane, depressed, rather compact, obtuse, becoming pale, smooth, at length rivulose; stem stuffed, tough, elastic, subfibrillose; gills adnato-decurrent, broad, rather crowded, flesh coloured, then white.—*B. & Br. Ann. N. H., No.* 1734.
By the grassy side of a road. Coed Coch.

Agaricus (Clitocybe) Sadleri. *Berk.*
Cæspitose, strong scented, pileus plano-depressed or umbilicate, yellow, centre brownish, at first silky, then growing smooth in the centre; stem thickened downwards, yellow, clad with brownish fibrils, becoming smooth; gills lemon-yellow, thin, very much crowded, decurrent, margin quite entire.—*B. & Br. Ann. N. H., No.* 1734 bis.
On an oak tub in conservatory. Edinburgh.
Pileus 2-2½in. Stem 3-4in., $\frac{1}{6}$in. thick, except at the base. Allied to *A. illudens*, Schwz. Taste intensely acrid.

Agaricus (Clitocybe) aggregatus. *Schæff., t.* 305, 306.
Flaccid. Pileus fleshy, convex, then expanded, equal, repand, shining, at length becoming pale, rather silky streaked; stem stuffed, unequal, rather fibrillose, attenuated downwards; gills unequally decurrent, crowded, becoming yellowish flesh colour.—*B. & Br. Ann. N. H., No.* 1735.
Abundantly on sawdust. Coed Coch.

Agaricus (Clitocybe) tuba. *Fr. Hym. Eur.*, 99. *Icon.*, 51, *f.* 2.
White. Pileus fleshy, thin, convexo-plane, umbilicate, when dry becoming whitish with silky shining particles, margin even; stem equal, soon hollow, and compressed, naked above; gills deeply attenuated and decurrent, broad, much crowded, white, then pallid. —*B. & Br. Ann. N. H., No.* 1736.
Amongst leaves. Coed Coch.

Agaricus (Clitocybe) pausiacus. *Fr. Hym. Eur.*, 104. *Icon., t.* 58. *f.* 2.
Strong scented. Pileus rather fleshy, convex, then plane or depressed, even, hygrophanous; stem somewhat hollow, equal, striate, whitish pruinose above; gills obtusely adnate, semi-circular, crowded, becoming somewhat olive coloured.—*B. & Br. Ann. N. H., No.* 1737.
In pine woods. Coed Coch.

Agaricus (Clitocybe) obsoletus. *Batsch, f.* 103.
Slightly fragrant Pileus rather fleshy, convex, then plane or depressed, even, smooth, hygrophanous, stem stuffed, then hollow, elastic; gills obtuse, adnate, broad, crowded, whitish.—*B. & Br. Ann. N. H., No.* 1738.
Grassy side of road. Coed Coch.

Agaricus (Collybia) semitalis. *Fr. Hym. Eur.*, 111.
Pileus between fleshy and membranaceous, convexo-plane, obtuse, smooth, moist; stem fibrous, stuffed, fibrillose striate, with a membranous cartilaginous cuticle; gills obtusely affixed (with a decurrent tooth) distant, distinct, white, becoming blackish when touched.—*B. & Br. Ann. N. H., No.* 1739.
By the bare side of the road. Coed Coch.

Agaricus (Collybia) hariolorum. *Bull, t* 585, *f.* 2.
Pileus rather fleshy, campanulate, then hemispherical, plane, or depressed, smooth; stem hollow, attenuated upwards, rufescent woolly; gills adnexed, nearly free, rather crowded, narrow, white, becoming pallid.—*B. & Br. Ann. N. H., No.* 1740.
In woods. Coed Coch.

Agaricus (Collybia) ventricosus. *Bull, t.* 411. *f.* 1.
Pileus rather fleshy, campanulate convex, umbonate, smooth, stem hollow, even, naked, rufescent, ventricose at the base and rooting; gills arcuate adnexed, ventricose, rather crowded, undulate, at length rufescent.—*Fr. Hym. Eur.*, 120. *B. & Br. Ann. N. H., No.* 1741.
In woods. Coed Coch.

Agaricus (Collybia) nitellinus. *Fr. Hym. Eur.*, 120. *Icon., t.* 65, *f.* 1, 2.
Pileus rather fleshy, convex then expanded, even, tawny, shining, hygrophanous; stem slightly fistulose, unequal, rigid, smooth, tawny; gills adnate, thin, rather crowded, white, becoming pallid.—*B. & Br. Ann. N. H., No.* 1742.
By roadsides. Shrewsbury.

Agaricus (Collybia) nummularius. *Bull, t.* 56.
Pileus rather fleshy, almost plane, obsoletely depressed around the umbo, even, pallid; stem stuffed, then hollow, smooth, pallid, incrassated above; gills free, rather distant, white.—*B. & Br. Ann. N. H., No.* 1743.
Amongst leaves. Glamis, N.B.

Agaricus (Collybia) stolonifer. *Jungh. Lum.* 1830, 396.
Pileus rather fleshy, somewhat plane, obtuse (almost depressed) smooth, margin slightly striate, stem fistulose, equal, smooth, becoming brownish, with a creeping root; gills rounded adnexed, ventricose, rather distant, whitish.—*B. & Br. Ann. N. H., No.* 1744.
Amongst fir leaves. With *Marasmius porreus.*

Agaricus (Collybia) tosquorum. *Fr. Hym. Eur. p.* 128.
Pileus rather fleshy, convex, then plane, obtuse, even, dark brown, becoming pale; stem fistulose, thin, brown, pruinose above; gills free, ventricose, rather distant, greyish-brown.—*B. & Br. Ann. N. H., No.* 1745.
In open pastures. Ascot.

Agaricus (Mycena) tintinabulum. *Fr. Hym. Eur., p.* 140. *Icon, t.* 80, *f.* 4.
Pileus rather membranaceous, campanulate convex, somewhat obtuse and smooth, of one colour, viscid when moist; stem rigid, tough, even, smooth, pallid, with rooting threads; gills with a decurrent tooth, crowded, plane, thin, whitish.—*B. & Br. Ann. N. H., No.* 1746.
On trunks. Glamis N.B.

Agaricus (Mycena) leptocephalus. *Pers. Ic. et Desc., t.* 12, *f.* 4.
Fragile, with a nitrous odour. Pileus rather membranaceous, campanulate then expanded, repand, umbonate, sulcate, pruinose, opaque; stem equal, striate, opaque, dry; gills emarginate, whitish grey.—*B. & Br. Ann. N. H., No* 1747.
On trunks and the ground. Laxton Park.

Agaricus (Mycena) plicato-crenatus. *Fr. Hym. Eur.*, 150, *Icon t.* 84, *f.* 2
Pileus very thin, conical, somewhat umbonate, sulcate, plicate and toothed, white then yellowish; stem thread-like, smooth viscid, pale reddish; gills ascending, attenuated, adnate with a decurrent tooth, distant, white.—*B. & Br. Ann. N. H., No.* 1748.
Amongst heath. Coed Coch.

Agaricus (Mycena) clavicularis. *Fr. Sys. Myc.*, 1, 158.

Pileus membranaceous, convex, then expanded, striate, dry, without cuticle, disc at length depressed; stem tough, smooth, viscid, whitish, fibrillose at the base; gills adnate, white.—*B. & Br. Ann. N. H., No.* 1749.

In woody places. Glamis N.B.

Agaricus (Omphalia) umbelliferus. *L. var.* **viridis** *Fl. Dan. t.* 1672, *f.* 1.

On the ground. Kings Lynn.

Agaricus (Omphalia) retostus. *Fr. Icon. t.* 76, *f.* 2.

Umber. Pileus rather fleshy, plane, then depressed, even when moist, polished when dry, smooth, growing pale, margin involute, entire; stem fistulose, tough, smooth; gills slightly decurrent, broad, distant, paler.—*B. & Br. Ann. N. H., No.* 1750.

On lawns. Coed Coch.

Agaricus (Omphalia) abhorrens. *B. & Br.*

Tawny brown, very fetid, cæspitose; pileus umbilicate, even; stem slender, base white tomentose; gills distant, thick, decurrent, with the interstices even.—*B. & Br. Ann. N. H., No.* 1751.

On the lawn. Coed. Coch.

"Closely allied to *A. retostus*, but clearly distinct, apart from its disgusting smell; stem sometimes pruinose when young."

Agaricus (Omphalia) pseudo-androsaceus. *Bull. t.* 276.

Whitish or grey. Pileus between fleshy and membranaceous, convex, deeply umbilicate, at length infundibuliform, smooth; striate plicate, margin crenulate; stem stuffed, slender; gills deeply decurrent, segment-like, distant, distinct.—*B. & Br. Ann. N. H., No.* 1752.

On the lawn. Coed Coch.

Agaricus (Omphalia) bullula. *Brig. t.* xvi., *f.* 1.

Scattered, small, wholly white; pileus membranaceous, hemispherical, diaphanous; gills arched, decurrent, stem very thin, filiform.—*B. & Br. Ann. N. H., No.* 1753.

On dead sticks. Coed Coch.

Agaricus (Pleurotus) Ruthæ. *B. & Br.*

Pileus flabelliform, upper stratum gelatinose, rather hispid, whitish; margin very thin, striate; stem short, lateral, hispid; gills white, rather broad, acute and anastomosing behind, reddish as well as the stem, interstices veined.—*B. & Br. Ann. N. H., No.* 1754.

On Sawdust. Coed Coch.

Pileus 1½in. across, colour dirty white, with a hyaline aspect, mycelium fibrous.

Agaricus (Pleurotus) reniformis. *Fr. Hym. Eur.*, 177, *Icon., t.* 89, *f.* 3.

Pileus rather fleshy, horizontal, reniform, plane, cinereous, emarginate behind, with a very short rudimentary villous stem; gills excurrent and diverging from a stem-like tubercle, thin, linear, grey.—*B. & Br. Ann. N. H., No.* 1755.

On sticks. Glamis, N.B.

Agaricus (Pleurotus) flexilis. *Fr. Hym. Eur.*, 180.

Sessile Pileus rather fleshy, reniform, gelatinous and viscid above, somewhat umber; gills linear, diverging from a lateral point, distant, whitish, few, entire —*B. & Br. Ann. N. H.*, *No.* 1756.

On trunks amongst moss. Glamis, N.B.

Agaricus (Volvaria) temperatus. *B. & Br.*

Pileus convex, umbonate, pulverulent, striate; stem slender, pellucid; volva broad.—*B. & Br. Ann. N. H.*, *No.* 1757.

On soil in a greenhouse. Sibbertoft.

Pileus $\frac{1}{4}$in. across; stem 1in., not 1 line thick.

Agaricus (Clitopilus) stilbocephalus. *B. & Br.*

Pileus campanulate, obtuse, sometimes umbonate, hygrophanous, when dry white and rather silky; margin straight; stem hollow, nearly equal, silky-fibrous; gills broad, adnate, sometimes emarginate behind, veined.—*B. & Br. Ann. N. H.*, *No.* 1758.

Ascot.

Pileus sparkling.

Agaricus (Leptonia) nefrens. *Fr. S. M.*, *i.*, 209.

Pileus membranaceous, convex, then plane, at first umbilicate, without striæ, squamulose, sooty-brown, hygrophanous; stem stuffed, rather firm, even, punctate with black above, mealy; gills adnate, plane, segmentoid, rather distant, grey.—*B & Br. Ann. N. H.*, *No.* 1759.

In grassy places. Ascot.

"Odour not farinaceous. Exactly *A. nefrens*, with the exception of the dark margin of the gills."

Agaricus (Nolanea) infula. *Fr. Hym. Eur.*, 210. *Icon.*, *t.* 100, *f.* 1.

Very tough. Pileus membranaceous, conical, then expanded, papillate, shining, rather even, hygrophanous; stem somewhat hollow, rigid, smooth, naked, tawny; gills thin, narrow, very crowded, white, then rosy.—*B. & Br. Ann. N. H.*, *No.* 1760.

On the lawn. Coed Coch.

Agaricus (Inocybe) phæocephalus. *Bull*, *t.* 155, *f.* 1.—*B & Br Ann. N. H*, *No.* 1760 *

"Perfect specimens of this interesting and little known species were received from Rev. J. Stevenson, confirming the opinion that it is a true *Inocybe*."

Agaricus (Inocybe) Rennyi. *B. & Br.*

Small. Pileus hemispherical, fawn-color, centre brown; stem attenuated downwards, fibrillose; spores kidney-shaped, nucleate. *B. & Br. Ann. N. H.*, *No.* 1761.

On the ground. Hereford.

Spores ·0005-·0007 inch.

Agaricus (Hebeloma) lugens. *Fr. Hym. Eur.*, 241.

Pileus fleshy, convex, then plane, smooth, rather viscid; stem solid, shining, fibrillose, striate, somewhat bulbous, at the top sprinkled with white meal; gills nearly free, fragile, crowded,

pallid, then ferruginous, edge crenulate, darker.—*B. & Br. Ann. N. H., No.* 1762.

Under beeches. Lyndhurst.

Odour pungent.

Agaricus (Hebeloma) capniocephalus. *Bull t.* 574, *f.* 2.

Pileus fleshy, convex, then plane, obtuse, even, smooth, margin at length blackish; stem stuffed, attenuated downwards, striate with rufescent fibrils, becoming pallid; gills emarginate, broad, scarcely crowded, ferruginous.—*B. & Br. Ann. N. H., No.* 1763.

On the ground. Coed Coch.

Agaricus (Naucoria) badipes. *Fr. Hym. Eur., p.* 259.

Pileus somewhat membranaceous, campanulate, then convex, rather umbonate, smooth, pellucidly striate to the umbo when moist; stem stuffed, equal, rigid, ferruginous, squamulose to the middle, variegated with white fibrils; gills adnate, ventricose, rather distant, ferruginous grey.—*B. & Br. Ann. N. H., No.* 1764.

Abundant under larch. Coed Coch.

Agaricus (Crepidotus) calolepis. *Fr. Hym. Eur.*, 276.

Pileus rather fleshy, dimidiate, seated on a villous nodule, marginate behind, variegated with minute crowded rufescent scales; gills concurrent at the base, at length ferruginous-brown.—*B. & Br. Ann. Nat. Hist., No.* 1765.

On sticks. Near Edinburgh.

Agaricus (Crepidotus) epibryus. *Fr. S. M.*, 275.

White. Pileus membranaceous, resupinate, sessile, adnate above, silky, becoming smooth; gills concurrent in the centre, thin, crowded, whitish, then greyish flesh colour.—*B. & Br. Ann. N. H., No.* 1766.

On moss, grass, holly leaves, &c. Coed Coch; Shrewsbury.

Agaricus (Stropharia) Percevali. *B. & Br.*

Pileus slightly viscid, fleshy, umbonate, then flattened, ochraceous here and there, chiefly about the margin, whitish floccose; flocci soon disappearing; stem transversely squamose, hollow above, pallid; ring narrow, more or less persistent; gills distant, affixed, broad, white, then somewhat cinereous; at length pallid, umber. *B. & Br. Ann. N.H. No.* 1767.

On sawdust. Wallington. On rotten wood. Highgate, 1864.

"Pileus 2in., stem 2-3in., attenuated upwards $\frac{1}{3}$-$\frac{1}{2}$in. at base, $\frac{1}{4}$in. above, gills $\frac{1}{2}$in. wide. Flesh of pileus at length dull umber; stem umber within, rooting. Allied to *A. squamosus*, but distinct."

Agaricus (Hypholoma) sublateritus var. **Schæfferi.** *Schæff., t.* 49, *f.* 4, 5.

Pileus conical, at length depressed, wrinkled; gills narrow, decurrent even in the youngest specimens. A remarkable variety. —*B & Br. Ann. N. H., No.* 1768.

On trunks. Coed Coch.

Agaricus (Psilocybe) scobicola. *B & Br.*

Pileus convex, umbilicate, white, smooth ; stem fibrillose, nearly equal, or dilated at the apex, fistulose ; gills broad, adnexed.—*B & Br. Ann. N. H., No.* 1769.

On sawdust. Glamis, N.B.

Agaricus (Psilocybe) atrorufus. *Schæff., t.* 234.

Pileus rather fleshy, hemispherical, convex, obtuse, smooth, slightly striate at the margin, discoloured when dry, even ; stem hollow, thin, equal, pallid bay; gills rather decurrent, broad, plane, umber. *B. & Br., Ann. N. H., No.* 1770.

On the ground in woods. Glamis, N.B.

Agaricus (Psilocybe) hygrophilus. *Fr. Hym. Eur.*, 302.

Pileus tawny, then clay colour ; stem 4-6 inches long, rather fusiform, rooting ; gills emarginate, with a deeply decurrent line ; at length umber-brown.—*B. & Br. Ann. N. H., No.* 1771.

At the roots of ash. Glamis, N.B.

Hiatula Wynniæ. *B. & Br.*

White. Pileus tender, striate, pulverulent, darker in the centre ; stem slender, striate; gills rather broad, rough. *B. & Br. Ann. N. H., No.* 1772.

In a stove at Kew.

" Pileus 1½in. across ; stem 1in. high, 1 line thick. One specimen became darker in drying, and had a longer and thicker stem."

Bolbitius rivulosus. *B. & Br.*

Pileus campanulate, clay coloured, rivulose ; stem attenuated upwards ; gills narrow, cinnamon.—*B. & Br. Ann. N. H., No.* 1773.

On earth in an orchard house. Chiswick.

" Pileus about 1½in. across. Very different from any other known species."

BRITISH SPECIES OF UROMYCES.

By M. C. Cooke.

It is now generally accepted that certain species of *Æcidium* are related to species of *Uromyces*, and are but conditions or stages of the same fungus. So many facts seem to indicate the soundness of this view that we are induced to rearrange the species of *Uromyces* found in Britain in accordance therewith. The only novelty to which we can establish any claim is the discovery, some years since, of the *Uromyces* on stems of the nettle to which *Æcidium Urticæ* is related. We have long delayed the publication in the hope of meeting with it again, since probably it has only been collected by ourselves and Dr. Capron, of Shere, but have not been successful. There is not, however, the slightest doubt of the accuracy or authenticity of the specimen from which the descrip-

tion has been drawn, and the fact is beyond dispute that an *Uromyces* is found, late in the year, after the *Æcidium* is gone, on the stems of the Nettle. We are not, however, prepared to accept the evidence as complete and satisfactory, for such species in which the *Æcidium* is said to be found on a foster plant of a different genus, and order, to that of the *Uromyces*.

In the following notes the continental method is adhered to of noting the three stages in the order of development, as—

I. Hymenium, or *Æcidium*.
II. Stylospores, or *Uredo*.
III. Teleutospores, or *Uromyces*.

Uromyces Ficariæ. *Lev.*

I. Hymenium. *Æcidium Ficariæ*, Pers. *Æ. ranunculacearum*, DC. in part.

II. Stylospores, unknown.

III. Telutospores oval or elliptical, brown, scarcely thickened above, ·03 × ·018 mm., on very short hyaline pedicels. *Uromyces Ficariæ*, Lev. Cke. "Hdbk," No. 1546.

On *Ranunculus ficaria*.

Uromyces Behenis. *Lev.*

I. Hymenium. *Æcidium Behenis*, DC. Cke. "Hdbk," No. 1,622.

II. Stylospores globose, brown, brown, rough.

III. Teleutospores ovate or pyriform, brown, darker and thickened above, ·025-·03 × ·018-02, mm.; pedicels hyaline, as long as the spores. *Uroymyces Behenis*, Lev. Cke. "Micr. Fungi." (4th Ed.), No. 213.

On *Silene inflata*.

Uromyces Geranii. *DC.*

I. Hymenium. *Æcidium Geranii*, DC. Cke. "Hdbk.," No. 1627.

II. Stylospores globose, smooth, ·025 mm. diam. *Trichobasis Geranii*, B. Cke. "Hdbk.," No. 1589.

III. Teleutospores elliptical, purple brown, even, with a hyaline apiculus, ·03 × ·015 mm., on very short evanescent pedicels. *Uromyces Geranii*, Cke. "Micr. Fungi." (4th), No. 213.

On leaves of *Geranium*.

Uromyces Parnassiæ. *Schrot.*

I. Hymenium. *Æcidiuni Parnassiæ*, Grev. Cke. "Micr. F." (4th ed.), No. 198.

II. Stylospores sphærical, rough, ·02-·025, mm. *Uredo Parnassiæ*, West.

III. Teleutospores ovoid, brown, even, ·025-·03 × ·02-·022 mm.; pedicels thin, hyaline. *Trichobasis Parnassiæ*, Cke. "Hdbk.," No. 1591.

On *Parnassia palustris*.

Uromyces Limonii. *Lev.*

I. Hymenium. *Æcidium Statices*, Desm., Cke. "Micr. Fun." (4th ed.), No. 197.

II. Stylospores subglobose, even, brown, .028 mm. diam. *Uredo Statices*, Desm., Cke. "Hdbk.," No. 1580.

III. Teleutospores ovate or pyriform, pale ochre, ·032-·04 × ·02-·025, mm.; apex much thickened; pedicels thick, hyaline, as long as the spore. *Uromyces Limonii*, Lev. Cke. "Hdbk.," No. 1545.

On *Statice limonum*.

Uromyces appendiculatus. *Lev.*

I. Hymenium. *Æcidium Ervi*, Wallr.

II. Stylospores globose, brown, rough.

III. Teleutospores, ovate or subpyriform, very much thickened above, brown, ·02-·022 × ·015 mm.; on long slender hyaline pedicels. *Uromyces appendiculata*, Cke. "Hdbk.," No. 1543.

On *Vicia sativa*, *Ervum hirsutum*, &c.

Uromyces phaseolorum. *De Bary.*

I. Hymenium. *Æcidium phaseolorum*, Wallr.

II. Stylospores subglobose, pale brown, rather rough, ·02-·025 mm. diam.

III. Teleutospores oval, apiculate, bright brown, ·03 × ·022 mm.; epispore thick, even, pedicels as long as the spores. *Uromyces appendiculata*, Cke. "Hdbk.," No. 1543, in part.

On leaves of *Phaseolus*.

Uromyces Orobi. *Fckl.*

I. Hymenium. *Æcidium Orobi*, DC. Cke. "Hdbk," No. 1623.

II. Stylospores subglobose, pale brown, ·022-·025 × ·02-·022 mm.; slightly rough.

III. Teleutospores ovate or pyriform, bright brown, flattened above, ·03 × ·02 mm.; epispore even, very much thickened above; pedicels as long as the spore, attenuated downwards. *Uromyces appendiculata*, Cke. "Hdbk.," No. 1543, in part.

On *Orobus tuberosus*.

Uromyces Fabæ. *Fckl.*

I. Hymenium. *Æcidium Viciæ*, Opiz (?)

II. Stylospores nearly spherical, tawny, ·022-·03 × ·02-·026 mm. *Trichobasis Fabæ*, Lev.

III. Teleutospores ovoid, even, epiculate, brown, ·03-·04 × ·02-·026 mm; epispore much thickened at the apex, pedicels hyaline, long. *Puccinia Fabæ*, Link. Cke. "Hdbk," No. 1512. *Uromyces Fabæ*, De Bary.

On *Faba vulgaris*.

Uromyces Pisi. *De Bary.*

I. Hymenium uncertain.

II. Stylospores sphæroid or ovoid, yellowish, ·02-·024 mm. *Uredo Pisi*, Strauss.

III. Teleutospores ovoid, brown, ·026-·03 × ·02-·022 mm.; epispore scarcely thickened above, everywhere minutely punctate; pedicels thin, hyaline, long. *Uromyces Pisi*, Fckl., S. M., 62. *Uromyces appendiculatus*, Cke "Hdbk.," No. 1543, partly.

On *Pisum sativum*.

Uromyces apiculatus. *Lev.*

I. Hymenium. *Æcidium Trifolii*, Cast.

II. Stylospores almost spherical, pale brown. *Uredo Leguminosarum*, Rabh.

III. Teleutospores elliptic, even, brown, soon deciduous, ·026-·03 × ·02-·023 mm.; pedicels short, hyaline. *Uromyces apiculosa*, Cke. "Hdbk.," No. 1544 in part. *Uromyces Trifolii*, Fckl. "Sym. Myc.," p. 64.

On Clover, *Lathyrus pratensis*, &c.

Uromyces Laburni, Fckl., is probably also British, but of this we have at present no definite evidence.

Uromyces Alchemillæ. *DC.*

I. Hymenium. Unknown.

II. Stylospores sphæroid, yellowish, ·02 mm. diam. *Uredo Alchemillæ*, Pers. *Uredo potentillarum*, DC. Cke. "Hdbk.," No. 1567.

III. Telutospores ellipsoid, rather angular, brown, ·032-·04 × ·33 mm.; pedicel thick, short. *Uromyces intrusa*, Lev. Cke. "Hdbk.," No. 1547. *Trachyspora Alchemillæ*, Fckl., S. M. 65.

On *Alchemilla*.

Uromyces scrophulariæ. *Lib.*

I. Hymenium *Æcidium Scrophulariæ*, DC. Cke. "Hdbk.," No. 1629.

II. Stylospores (uncertain). *Uredo scrophulariæ*, Lasch.

III. Teleutospores elliptical, brown, even, ·0022-·03 × ·012-·015 mm. on long, slender hyaline pedicels. *Puccinia scrophulariæ*, Lib., Cke. "Hdbk," No. 1476. *Uromyces scrophulariæ*, Cke. "Micr. Fung." (4th ed.), 213. *Uromyces concomitans*, B. & Br., Cke. "Micr. Fung." (4th ed.), 213.

On *Scrophulariæ*.

Uromyces rumicum. *Lev.*

I. Hymenium. *Æcidium rubellum*, Cke. "Hdbk.," No. 1632. Var. *β*.

II. Stylosphores sphæroid, rough, pale-brown, ·026-·028 × ·02-·026 mm. *Trichobasis rumicis*.

III. Teleutospores oval, warted above, brown, ·026-·03 × ·026-·028 mm.; very deciduous. *Uromyces rumicum*, Fckl. "S. M.," p. 64. *Uromyces apiculatus*, Cke. "Hdbk.," No. 1544, in part.

On species of *Rumex*.

Uromyces avicularіæ. *Schröt.*

I. Hymenium. *Æcidium avicularіæ*, Kze., Cke. "Micr. Fungi" (4th ed.), 199.

II. Stylospores nearly spherical, yellow-brown, ·02-·025 × ·02 mm. *Uredo Polygoni avicularіæ*, A. & S. "Consp.," 127.

III. Teleutospores ovoid, brown, even, ·025-·026 × ·022 mm.; pedicels hyaline, longer than the spore. *Uromyces polygoni*, Fckl. "S. M.," 64. *Capitularia polygoni*, Rabh. "Bot. Zeit.," 1851. *Puccinia vaginalium*, Cke. "Hdbk.," No. 1469.

On *Polygonum aviculare*.

Uromyces betæ. *Kuhn.*

I. Hymenium. *Æcidium betæ*, Kuhn.

II. Stylospores subglobose, brown, smooth, ·02-·022 mm. *Uredo betæ*, Pers. *Trichobasis betæ*, Cke. "Hdbk.," No. 1587.

III. Teleutospores ovate or pyriform, pale-brown, with a slight apiculus, ·025-·03 × ·02-·025 mm.; on slender pedicels. *Uromyces betæ*, in Fckl. "S. M.," p. 64.

On leaves of beet.

Uromyces salicorniæ. *Lev.*

I. Hymenium. *Æcidium salicorniæ*, DC.

II. Stylospores oval, or nearly globose, very pale, ·02-·022 × ·018-·02 mm.; epispore thin.

III. Teleutospores oval, pale-brown, ·03-·022 mm.; epispore even, thickened at the apex, pedicels scarcely as long as the spore, thick, hyaline. *Uromyces salicorniæ*, Lev.

On *Salicornia*.

Uromyces sparsa. *Lev.*

I. Hymenium uncertain.

II. Stylospores oval, pale, smooth, ·025 × ·02 mm.

III. Teleutospores oval, pale-brown, ·032-·035 × ·022-·025 mm.; epispore smooth, much thickened above; pedicels as long as the spores, thick, hyaline. *Uromyces sparsa*, Lev. Cke. "Hdbk.," No. 1550.

On *Spergularia rubra*.

Uromyces valerianæ. *Fckl.*

I. Hymenium. *Æcidium valerianacearum*, Duby. Cke. "Hdbk.," No. 1618.

II. Stylospores subglobose, pale-brown, smooth, ·015-·02 mm., or slightly longer. *Uredo valerianæ*, DC.

III. Teleutospores elliptical, pale-brown, even, ·022-·03 × ·012-·015 mm.; on short evanescent pedicels. *Uromyces valerianæ*, Fckl. "Sym. Myc.," 63. *Lecythea valerianæ*, B. Cke. "Hdbk.," No. 4595.

On valerian.

Uromyces urticæ. *Cke.*

I. Hymenium. *Æcidium urticæ*, DC. Cke. "Hdbk.," No. 1621.

II. Stylospores. Not seen.

III. Teleutospores subpyriform, apiculate, pale, ·03 × ·018 mm. On persistent hyaline pedicels; epispore thickened at the apex. (Shere, Surrey.)

On nettles. III. Very rare.

Uromyces scutellatus. *Lev.*

I. Hymenium. *Æcidium Euphorbia cyparissiæ*, DC.

II. Stylospores not determined.

III. Teleutospores subglobose or elliptical, pale-brown, ·022-·03 × ·016-·02 mm.; epispore thin, coarsely warted; pedicels short, hyaline, evanescent. *Uredo scutellata*, Pers. "Syn.," p. 220.

On wood spurge.

Uromyces excavatus. *DC.*

I. Hymenium. *Æcidium Euphorbiæ*, Pers. Cke. "Hdbk.," No. 1610, in part.

II. Stylospores subglobose, pale-brown, ·018-·02 mm.; epispore granulated.

III. Teleutospores oval, bright-brown, ·028-·03 × ·018-·02; epispore smooth or faintly striate, scarcely thickened above; on short evanescent pedicels. *Uromyces excavata*, DC. Cke. "Micr. Fun." (4th ed.), 213.

On species of *Euphorbia*.

There is usually some confusion and uncertainty amongst authors concerning these two species of *Uromyces* on *Euphorbia*. Having original specimens in our Herbarium from Persoon and DeCandolle, we are enabled to determine for certainty the species which each of these authors had in view. Persoon's species (*U. scutellata*), has pale teleutospores, which are very coarsely warted, whilst in DeCandolle's species (*U. excavata*), the teleutospores are dark-coloured, with a smooth epispore, or with scarcely distinguishable striæ. On the small *Euphobia exigua*, if we mistake not, an *Uromyces* occurs which cannot be referred to either of these species, and which is perhaps the *U. tuberculatus* of Fuckel.

Uromyces alliorum. *DC.*

I. Hymenium uncertain.

II. Stylospores subglobose, pale, ·022 × ·025 mm.; epispore thin. *Uredo alliorum*, DC. Cke. "Hdbk.," No. 1579.

III. Teleutospores elliptical, brown, ·03-·035 × ·015-·018 mm.; pedicels very evanescent. *Uromyces alliorum*, Cke. "Hdbk.," No. 1542.

On species of *Allium*.

Uromyces ornithogali. *Lev.*

I. Hymenium. *Æcidium ornithogali*, Kze.

II. Stylospores, at present unknown.

III. Teleutospores, ovate, fuliginous, brown, with a small hyaline apiculus, ·03 × ·02; on short hyaline pedicels. *Uredo ornithogali*, Kze. & Schm.

On *Gagea lutea*. (Yorkshire).

Uromyces concentricus. *Lev.*

I. Hymenium. *Æcidium scillæ*, Fckl.

II. Stylospores globose, reddish-brown, mixed with the teleutospores.

III. Teleutospores ovate, dull-brown, ·02-·025 × ·02 mm.; epispore smooth, thickened a little above; pedicels longer than the spore, slender, hyaline. *Uromyces concentricus*, Lev. Cke. "Hdbk.," No. 1548. Fckl. "Sym. Myc.," p. 65.

On wild hyacinth.

Uromyces graminum. *Cke.*

I. Hymenium unknown.

II. Stylospores globose, pale, scarcely colcured, rough, ·02-·022 mm.

III. Teleutospores ovate, bright-brown, quite smooth, ·015-·02 × ·012 mm. ; epispore thickened and darker above ; pedicels short, slender, hyaline. *Uromyces graminum*, Cke. "Hdbk.," No. 1551.
On *Dactylis glomerata*.

Uromyces junci. *Tul.*

I. Hymenium. *Æcidium* unknown.
II. Stylospores globose or oval, brown, rough, ·018-·02 × ·016-·018 mm. *Uredo junci*, Strauss.
III. Teleutospores pyriform, clavate, compressed laterally and irregular, bright-brown, ·03-·035 × ·015-·02 mm. ; epispore smooth, very much thickened and darker above ; pedicels thick, continuous, persistent. *Uromyces junci*, Tul. Cke. "Micro. Fun." (4th ed.), 213. *Puccinella junci*, Fckl.
On rushes.

Besides the foregoing, there are other species of *Uromyces* found in Europe, some of which will probably be met with in Britain. Whether all of these are good and distinct species, we are not prepared to affirm, but some of them undoubtedly are. Amongst those to be sought after are *U. calystegiæ*, DeBary ; *U. laburni*, DC. ; *U. muscari*, DC. ; *U. liliacearum*. Kze., and the forms on *Lathyrus*, *Medicago*, *Onobrychis*, *Hedysarum*, and other *Leguminosæ*.

ALGÆ EXSICCATÆ AMERICÆ BOREALIS.

Curantibus—W. G. Farlow, C. L. Anderson, D. C. Eaton.

Fasc. III.

Here follows a list of the species included in the last fasciculus :—

101. Sargassum vulgare, Ag.
102. Sargassum piluliferum, Ag.
103. Sargassum Agardhianum, Farlow.
104. Sargassum pteropleuron, Grunow.
105. Sargassum bacciferum, Ag.
106. Halidrys osmundacea, Harv.
107. Fucus evanescens, Ag.
108. Fucus furcatus, Ag.
109. Fucus vesiculosus, Linn.
109bis. Fucus vesiculosus, L., var spiralis, Lyngb.
110. Fucus (Pelvetia) fastigiatus, Ag.
111. Egregia Menziesii (Turn.), Aresch.
112. Agarum Turneri, Post. & Rupr.
113. Postelsia palmæformis, Rupr.

114. Pterygophora Californica, Rupr.
115. Dictyoneuron Californicum, Rupr.
116. Nereocystis Lütkeana, Post. & Rupr.
117. Laminaria longicrucis, De la Pyl.
118. Laminaria Sinclairi (Harv.).
119. Laminaria flexicaulis, Le Joh.
120. Saccorhiza dermatodea (De la Pyl.), Ag.
121. Desmarestia latifrons, Kütz.
122. Gigartina Radula, Ag.
123. Gigartina microphylla, Harv.
124. Gigartina spinosa (Kütz), Harv.
125. Iridæa laminarioides. Bory.
126. Callophyllis variegata (Bory), Kütz.
127. Callophyllis furcata, Farlow.
128. Callophyllis laciniata, Kütz.
129. Callophyllis gracilarioides, Farlow.
130. Grateloupia Cutleriæ, Kütz.

A NEW BRITISH PEZIZA.

By W. Phillips, F.L.S.

To British Botanists every addition to the Flora of this country has a great interest, which to some extent arises from the surprise at finding that anything has been overlooked within an area so limited in which so many sharp eyes are at work, but perhaps more to the pleasure we feel in having so rich a Flora in our own native land. The minute species which I have the pleasure of describing does not appear, as far as I have been able to learn, to have been previously noticed, though, probably, not uncommon. It may be distinguished thus:—

Peziza asterostoma, n. s.—Minute, scattered, sessile, globose, white, mouth constricted, and surrounded by long, radiating, deflexed, simple hairs; exterior glabrous, very rarely with a few scattered hairs; asci clavato-cylindrical; sporidia 8, oblong or fusiform (·007 × ·0015 mm.); paraphyses filiform.

On dead herbaceous stems, *Alliaria officinalis*, &c. April, 1879. Broome, Shropshire.

The cups are not more than ·2 mm. in diameter, and occurred in company with *Peziza sulphurea*, Pers. The hairs, which consist of a single cell, are about ·07 mm. long, and are confined chiefly to the margin, forming a horizontal fringe, but occasionally a few are distributed over the exterior of the cup.

This species will stand in the section *Dasyscyphæ*, in the sessile group. Specimens will be published in my next fasciculus of *Elvellacei Britannici*.

ADDITIONS TO THE BRITISH *RAMALINEI*.

By the Rev. J. M. Crombie, F.L.S.

Since my "Notes on the British *Ramalinei* in Herb. Brit. Mus., in "Journ. Bot.," 1872, pp. 70-5, several interesting species and varieties have been detected in different parts of the country, which I here enumerate. At the same time one or two corrections require to be made on those there recorded, and subsequently described in Leighton's "Lich. Fl. Suppl.," pp. 470-7.

1. **R. farinacea** f. **phalerata.** *Ach.*

Probably not unfrequent in S. England, though we have seen it only from Stowe Park, Buckingham. Sterile.

2. **R. fraxinea** var. **ampliata** f. **monophylla.** *Cromb.*

Thallus simple, very broad, oblongo-rotundate, subreticulately costato-rugose.

On old trunks. New Forest. Fertile.

Analagous to f. *monophylla*, Cromb., of *R. evernioides*.

3. **R. fastigiata** f. **minutula.** (*Ach.*)

On old fir pales. Sterile. Probably not rare, as in the New Forest and various parts of Scotland.

This was referred by Acharius to *R. farinacea*, but more correctly by Fries fil., in "Lich. Scand.," I., p. 37, to *R. fastigiata*. It is mentioned in my "Not. Brit. Ram.," p. 7, as a cæspitose condition of *R. calicaris*.

4. ***R. capitata.** *Ach., Nyl.*

On mountain rocks. Very rare. Teesdale, Durham; Bennahoord, Braemar.

I may here mention that true *R. polymorpha* is an extremely rare British plant, as also its var. *emplecta*, Ach.

5. **R. scopulorum** f. **incrassata.** *Nyl.*

On maritime rocks. Jersey and Cornwall. Probably frequent on the rocky coasts of Britain.

6. **R. cuspidata** f. **crassa.** (*Del.*)

On maritime rocks. Jersey, Cornwall, and Portlethen, Kincardineshire.

F. **minor,** *Nyl.*, North Wales and Coast of Kincardineshire. Probably common.

7. ***R. breviuscula.** *Nyl.*

On maritime and mountain rocks. S. and W. England, N.E. Scotland.

This is *R. polymorpha*, "Mudd. Man.," p. 74, "Cromb. Enum.," p. 25, pro p., Leight. "Lich. Fl.," p. 92. It is also *R. polymorpha* f. *depressa*, Cromb., in "Journ. Bot.," 1872, p. 72.

F. **gracilescens.** *Cromb.*

Thallus very small, pulvinato-congested, laciniæ slender, the apices incurved or revolute.

On maritime boulders. Apparently very rare in S. England.

8. **R. Curnowii.** *Cromb.*

On maritime rocks. S.W. England.

As observed by Nylander, in "Flora," 1877, p. 562, this descends from *R. cuspidata.*

9. **R. geniculata.** *Tayl.*

On thorns. Killery Bay, Connemara.

This is a very interesting discovery by Mr. Larbalestier of a plant formerly known to occur only in exotic regions.

10. **R. minuscula.** *Nyl.*

On the branches of stunted larches. Craig Cluny, Braemar, and probably also elsewhere in that district.

11. **R. intermedia.** *(Del.)*

On stems of heath and shrubs. Scilly Islands and Galway, &c. Sparingly fertile.

Note on **Lecidea farinaria.** *Borr.*

In "Sm. E. B." Suppl. II., t. 2, 727, Mr. Borrer described a plant under the above name, which has hitherto not been identified by any subsequent lichenist. Schærer, in his "Enum.," p. 138, doubtfully refers it to *Lecidea granulosa* var. *aporetica*, Ach. Of this latter there is no specimen amongst the Lichens sent by Acharius to the Linnean Society, nor *fide* Fries fil. (Lich. "Scand.," p. 443) are there any in his own Herb. now in the University of Helsingfors. I believe, however, that it is merely a corticole and lignicole state of *Lecidea decolorans*, such as I have gathered on Craig Calliach, &c. (not var. *aporetica*, Cromb., Exs. n. 81, which is *Lecidea viridescens*, Schrad.). Unfortunately, also, there is no *named* specimen of *Lecidea farinaria* in Hb. Sowerby. A specimen, however, from Borrer himself occurs in Hb. Salwey, which in appearance exactly corresponds with the figure and description in E. B. S., and with an unnamed specimen in Hb. Sowerby. There can thus be no doubt as to the identity of this previously most uncertain species. It is also the plant named by Nylander *Lecanora homopis*, Nyl. = Cromb. Exs. n. 163, which is, therefore, with strict propriety to be called *Lecanora farinaria* (Borr.). It is very common on old pales in the north of Middlesex and south of Hertfordshire, though often sterile.

J. M. C.

Note on **Bacidia Arnoldiana.** *Körb.*

In Köerber "Par. Lich." II. (1860), p. 134, a well-marked species of *Lecidea* is described under the above name, in compliment to the distinguished Lichenist, Dr. Arnold. Previously to this however, Krempelhuber, in "Flora," 1855, p. 72, had described another species, s.n. *Biatorina Arnoldi*, Kphb. As in the Nylan-

derian arrangement, the two genera of the Sporologists, *Bacidia* and *Biatorina*, rightly constitute merely sections of the genus *Lecidea*, and as the two specific names *Arnoldiana* and *Arnoldi* are in reality homonymous, it becomes necessary to re-name the former of these species. I therefore propose to call it LECIDEA LARBALESTIERI, Cromb., in compliment to Mr. Larbalestier, who by his extensive researches has added so many interesting species to the genus *Lecidea*. I may also observe that though *Lecidea Larbalestieri* has not yet been recorded as detected in this country, there is every reason to believe that it will yet be found; and, indeed, some of our specimens of *Lecidea inundata* (Fr.), with which it is apt to be confounded, may, on re-examination, be seen to be referable to this species.

J. M. C.

OBSERVATIONS ON *MICROGONIDIA*.

By the REV. J. M. CROMBIE, F.L.S.

At one time even Schwendener himself discovered and taught that the gonidia of Lichens had their origin in the hyphæ, though afterwards, no doubt, on finding out his fancied error, he surrendered this opinion, and inculcated the now notorious Schwendenerian hypothesis.

At a later date, Fries fil. accepted the said discovery and promulgated it very truthfully in "Lich. Scand.," p. 7, where he writes as follows:—"Depending on my own observations, I embrace and defend this opinion"—viz., that the gonidia have their origin from the hyphæ. "For the hyphæ are not only elongated into filaments, but also send out short ramules. The terminal cell of the ramule is gradually dilated; it becomes subglobose and at length is filled with chlorophyll (or a sub-similar substance); in a few that cell is changed into a gonidium, which finally is divided in various ways, and gives origin to other gonidia." These observations of the distinguished author are thus affirmed to be in accordance with nature, and teach that the gonidia have their origin in the simple, globulose terminal dilatation of the ramules of the hyphæ. This dilated portion is filled with green matter, and eventually is separated from the filament, and so becomes a free gonidium. Such is the extremely simple history of the origin of gonidia in Lichens according to Fries fil.

It would now, however, appear that these observations have not been correctly made. For Dr. Minks has recently come forward with other and new observations concerning the origin of the gonidia in the hyphæ, which are entirely different to those recorded by Schwendener and Fries fil. In a paper in the "Flora," 1878, Nos. 15-18, entitled "Das Microgonidium," he states that he has

perceived (and in this he is corroborated by Dr. Müller, of Geneva, in "Archives des Sciences Physiques et Naturelles," 1879, No. 1),* that the commencement of the gonidia takes place in the hyphæ and in various other anatomical hyphoid elements. Nay, he has even seen, according to his own account, initial gonidia, called by him "Microgonidia" in the rhizinæ, in the cortical cells, in the medullary filaments, in the young thecæ, in the spores, &c., so that they are common both to the vegetative and the reproductive organs of Lichens. In all of these, as well as in the hyphæ, they appear, according to Dr. Minks, in the form of very minute corpuscles, which in the hyphæ become free through the dissolution† of these, and there, as elsewhere, gradually become larger, and at length assume the definite form of gonidia. Such expressed, in a very few words, is the history of Dr. Minks' "Microgonidia," or the minute corpuscules which, according to him and Dr. Müller, are in their evolution changed into gonidia, and constitute the initial state of gonidia.

With reference to these so-called "Microgonidia," Dr. Nylander (who in his numerous writings has done more than any other Botanist to prove how untenable is the Schwendenerian doctrine in all its phases) has just declared in the "Flora" (*Addend.* xxxi) that they are no new discovery whatever, and have nothing at all in common with gonidia. In fact, they are simply what is called in Vegetable Anatomy "molecular granulations," which never, if present in the cellules, go forth from them, and never present any cellulose metamorphosis. So far from being any novelty, their existence has been well known to every microscopic observer; and vainly in these granulations shall we seek for anything having any special relation to gonidia or their origin.

In this view I do not hesitate to affirm that every competent observer entirely coincides. Consequently "the labours of Dr. Minks" cannot in any way, in so far, at least, as his discovery of "*Microgonidia*" in concerned, be regarded as "profoundly modifying the anatomical notions which were entertained concerning the thallus of Lichens." Rather is it to be regretted in the interest of true science and for the final suppression of Schwendenerian opinions that these labours, valuable in some respects as they may be, should have resulted in the promulgation of another theory as untenable as that which Dr. Minks set himself to destroy.

I may here also briefly take notice of the "zoospores or zoosporoid corpuscles," which Dr. Müller (l.c.) mentions as having been observed by him in certain gonidia "contento contracto,"

* See also the translation of M. Roumeguere's paper in last No. of "Grevillea," pp. 89-92.

† This liberation of the corpuscles and dissolution of the hyphæ they certainly have not seen, though they are certain that the matter is thus effected. It exists, therefore, merely in their own fancy, and imagination has no place whatever in true science.

gyrosely agitated (and also in the spores of *Agaricus rimosus*). This is a discovery exactly of the same nature as that of *Microgonidia;* and they are in reality nothing more than the same "molecular granulations." The motion which he saw is evidently merely the well-known *Brownian movement**—an ordinary property of molecular granulations to agitate themselves where sufficient space is allowed them. This is an elementary and well-known matter.

PREPARATIONS OF LICHENS FOR THE MICROSCOPE.

Mr. W. Joshua, of Cirencester, has prepared a series of 48 slides, illustrating the genera and species of British Lichens. These are but the first issue of what is intended to be a complete collection, as far as possible, of typical forms. The price of the set is three pounds, which contains the following species :—

No.	Tribe.	Fasciculus 1.
1	Lichenei.	Gonionema velutinum.—*Nyl.*
2	,,	Ephebe pubescens.—*Fr.*
3	,,	Lichina pygmæa.—*Ag.*
*4	Collemei.	Pyrenopsis granatina.—*Smft.*
*5	,,	Collemopsis Arnoldiana.—*Nyl.*
6	,,	Synalissa symphorea.—*D.C.*
*7	,,	Collema myriococcum.—*Nyl.*
8	,,	,, pulposum.—*Bernh.*
9	,,	,, multipartitum.—*Sm.*
10	,,	,, nigrescens.—*Huds.*
*11	,,	,, aggregatum.—*Ach.*
12	,,	,, biatorinum.—*Nyl.*
13	,,	Leptogium plicatile.—*Ach.*
14	,,	,, Burgessii.—*Lghft.*
15	,,	,, muscicolum.—*Sw.*
16	,,	,, Schraderi.—*Bernh.*
17	Myriangiei.	Myriangium Duriæi.—*Mnt. & B.*
*18	Caliciei.	Calicium septatum.—*Leight.*
*19	,,	Trachylia tigillaris.—*Fr.*
20	Stictei.	Ricasolia glomulifera.—*Lightft.*
21	Peltigerei.	Peltigera venosa.—*L.*
22	,,	,, horizontalis.—*L.*
*23	,,	Solorina bispora.—*Smft.*
24	,,	,, crocea.—*L.*
25	Physciei.	Physcia pusilla.—*Arn.*
26	,,	,, ciliaris.—*L.*
27	Pertusariei.	Pertusaria globulifera.—*Turn.*

* *Vid.* "Lindsay Popular History of British Lichens," pp. 71, 292, and Nyl. in "Flora," *l. c.*

No.	Tribe.	Fasciculus.
28	Lecanorei.	Lecanora Bischoffii.—*Hepp.*
29	„	Phlyctis argena.—*Ach.*
30	Thelotremei.	Thelotrema lepadinum.—*Ach.*
31	Lecidinei.	Lecidea alocizoides.—*Leight.*
*32	„	„ urceolata.—*Crom.*
*33	„	„ leiotea.—*Nyl.*
*34	„	„ Næglii.—*Nyl.*
35	„	„ sanguinaria.—*L.*
36	„	„ Zwackhii.—*Mass.*
37	„	„ pachycarpa.—*Duf.*
*38	„	Odontotrema longius.—*Nyl.*
39	Graphidei.	Graphis Ruiziana.—*Fu.*
*40	„	Arthonia proximella.—*Leight.*
41	„	„ ilicina.—*Nyl.*
*42	Pyrenocarpei.	Verrucaria fusco-argillacea.—*Anzi.*
43	„	„ nitida.—*Weig.*
44	„	„ olivacea.—*Bow.*
45	„	„ cinerea.—*Pers.*
46	„	Verrucarina sparsula.—*Nyl.*
*47	Peridiei.	Endococcus complanata.—*Nyl.*
*48	„	Mycoporum ptæleodes.—*Nyl.*

To Museums or Private Collectors, these specimens will prove invaluable as an easy means of reference and comparison. To the Science Student they offer the advantage of a quick and easy method of familiarizing the eye with the appearance of the structure of thallus and apothecia, and of the different groups of Lichens, gonidia, paraphyses, asci, spores, epithecium, hypothecium, and thalamium being all represented.

To the Amateur and those just beginning the study, the examination of these specimens will give a better idea of the various terms used in describing the shape and size of spores than is possible by any written explanation; at a glance, the meaning of such terms as large, small, moderate, or minute spores, and ovoid, oblong, fusiform, cylindrical, ellipsoid, polari-bilocular, septate, muriform, etc., may be perceived.

The species marked with an asterisk are either very rare or only recently discovered in Britain.

LICHENS OF IRELAND.

Mr. C. Larbalestier, B.A., proposes to issue, during the present year, Fasciculi of the Lichens of Ireland, England, and the Channel Islands, under the title of "Larbalestier's Lichen Herbarium." The series will include a large number of plants which are altogether new to Science, or little known to the majority of British Lichenists. All communications to be addressed to the author, Roche Vue, St. Aubin's, Jersey.

THE UROMYCES OF EUPHORBIA.

By P. Magnus.*

Professor Körnicke, in No. 3 of "Hedwigia" for 1877, refers the Uromyces growing on *Euphorbia Gerardiana* and *Euphorbia verrucosa*—and, according to him, also on *Euph. Cyparissias*—to a new species (*Uromyces lævis*, Körn.), which he distinguishes from *Uromyces scutellatus*, Lév., by the smooth membrane of the Teleutospores. At the meeting of the Association of Naturalists on the 20th March, 1877, I endeavoured to prove that this Uromyces corresponds with the old *Uredo excavata*, DC., and it seems advisable to me to give here my arguments for the benefit of the readers of "Hedwigia."

On our ordinary *Euphorbiaceæ*, *Tithymalus Cyparissias* and *Tithymalus Esula* grow a *Uromyces* and a *Æcidium*, both of which originate the same degeneration of the vegetative powers attacked by them, and both grow on them in the same characteristic manner; while their Mycelium pervades the whole of the attacked vegetative system, and their Spermogonia and Teleutospore stroma, or Æcidium cups, are spread over the whole expanse of all the leaves of the attacked vegetation, or of the affected part. All fungologists (myself included) had hitherto assumed—principally from analogy—that both these fungi, the Uromyces and the Æcidium, in the circle of evolution belonging to one Fungus, were different fructifications of one and the same fungus. So surprising were the observations of Chief Staff Surgeon Dr. Schroeter that the spores of *Æcidium Euphorbiæ* when sown on the leaves of our Pea, *Pisum sativum*, L., sprouted there as Stylospore pustules of *Uromyces Pisi*, Strauss. ("Hedwigia" xiv., part 1875, p. 98). It is correct that an Æcidium never grows on *Pisum sativum*, L. But, nevertheless, I had hitherto imagined that *Uromyces Pisi* belonged to an Uromyces which was only unable to attain to the formination of the Æcidium fructification on the special foster plant, *Pisum sativum*, L.; while it grows in all its forms of fructification on the nearly allied tares, *Vicia angustifolia*, Rth., *Lathyrus montanus*, Bernh., &c. On these grow a very closely allied and long-stalked Uromyces, which Schroeter denotes *Uromyces Viciæ Fabæ* (Pers.), and distinguishes from that which grows on the *Pisum* by the great thickening of the apex of the Teleutospores. That a parasitical fungus does not develop all its fructifications on certain allied plants, is frequently the case. Thus, the *Puccinia Compositarum*, Schl., produces on the *Taraxacum officinale* all its forms of fructification, but it never produces Æcidium on *Hieracium Pilosella;* and thus, in an analogous manner, *Cystopus candidus*, Pers., grows on very many *Cruciferæ*, but forms Oogoniæ on very few species. Therefore, the above-mentioned observations of Dr. Schroeter surprise me in many respects.

* Translated from "Hedwigia" for May, 1877.

I read with very great interest Prof. W. Voss's communications in the "Austrian Botanical Journal" for 1876, No. 9, p. 299, that he, in the Laibach State Forest, found *Euphorbia verrucosa* largely covered with Æcidium, and that between the Æcidium cups at the end of May the stroma of Teleutospores of *U. scutellatus* (Pers.), Lév., appeared. Professor W. Voss, at my request, most kindly sent me the specimens which were laid before the Society of Naturalists at their March meeting this year.

In the examples sent, the Æcidium cups and Uromyces grow in closely the same characteristic manner as on *Euphorbia Cyparissias*, so that one is very much inclined to consider both to be the same species. On the stalk which bears both forms of fructification, the Uromyces stroma grows between the Æcidium cups; on the other stalk there are exclusively Uromyces. This common successive growing of the Æcidium cups and Uromyces stroma on one stem, as observed by Voss, makes it very probable that both these forms of fructification belong to one circle of evolution. While, therefore, the Æcidium cups and Uromyces stroma treated of above on *Euphorbia verrucosa* accord closely in their appearance with those on *Euph. Cyparissias*, yet the Teleutospore itself shows a difference, so that on that account we may consider the Uromyces on *Euph. verrucosa* as specifically different from *Urom. scutellatus*, Lév., on *Euph. Cyparissias*. That is to say, the Teleutospores of the latter have strong projecting, short fillet-formed, irregularly placed thickenings on the epispore, while the Teleutospores on *Euph. verrucosa* are quite smooth. Herein they agree with the Uromyces which grows on *Euphorbia Gerardiana*, which also attacks its closely allied plants in the same way as *Uromyces scutellatus*, Lév. I had not, in truth, hitherto been able to observe with certainty an Æcidium on *Euph. Gerardiana;* yet certainly, Fuckel, in "Symbolæ Mycologicæ," p. 64, gives the appearance of an Æcidium on *Euph. Gerardiana*, and Dr. Schroeter communicates to me by letter that he has observed an Æcidium on *Euph. Gerardiana* at Rheinufer, and this, also, Körnicke reports in the above-mentioned communication, and Oudemans even shows in "Aanwinsten voor de Flora Mycologica van Nederland" (3e Bijlage tot de 30e Jaarvergadering der Nederl. Bot. Veræniging), p. 8, that *Uromyces scutellatus*, Lév., *Fungus hymeniiferus* and *teleutosporiferus* grow near Amtem on *Euphorbia Gerardiana*.

One asks oneself now how the Uromyces, with smooth-membraned teleutospores, which grow on *Euphorbia verrucosa* and *E. Gerardiana*, is to be characterised. In Duby "Botanicon gallicum," p. 11., fig. 896, there are three distinct species of *Uredo* on different Euphorbiaceæ. The one is the *Uromyces proeminens*, Pass., on *Euphorbia Chamæsycæ*, which Saccordo recently in "Hedwigia," 1875, p. 192, has unnecessarily newly advanced and described as *Uromyces Chamæsycis*, Sacc. In addition there are described *Uredo scutellatus*, Pers., "*In Euphorbiis variis præsertim in E. Cyparissia, cujus folia inde deformantur*," and *Uredo excavata*, DC., "*ad Euphorbias varias præsertim in provinciis australibus.*"

As the latter species I long ago claimed *Uromyces tuberculatus*, Fckl., which Fuckel, in "Symbol. Mycol.," p. 64, had combined with *Uromyces scutellatus;* while this fungus is mentioned in "Grevillea," No. 23, May, 1874, p. 161, under the supplement to the English Fungoflora, as *Uromyces excavata* (DC.), on *Euphorbia exigua*. But after Dr. Schroeter had, at my request, most kindly forwarded this fungus to me, I was able easily to convince myself that its appearance on *Euph. exigua* is quite different to that described by Duby l.c. as *Uromyces excavatus* (DC.), for *Uromyces tuberculatus* grows only in a small and completely separate heap on the leaves and more abundantly on the stalk of *Euphorbia exigua*, so that the separate attacked leaves, as also the stalk, bear only a few scattered heaps, and the greater part of the attacked leaf, as also the whole of the attacked plant, is entirely free from fungus. On the contrary, Duby l.c., in his description of *Uromyces excavata*, DC., calls it "*hypophylla, acervulis fuscis parvulis, numerosis*," &c., and in conclusion it is remarked, "*Acervuli frequentes totam paginam occupant, sed non deformant.*" This cannot, therefore, be the *Uromyces tuberculatus*, Fckl., which grows in separate little heaps on the stalk and leaf of *Euphorbia exigua*. Whereas the description very well suits the Uromyces which grows on *Euph. Gerardiana* and *Euph. verrucosa*, in both of which species, indeed, the leaves attacked by the fungus do not present so very different an appearance from that of the normal leaves, as the leaves of *Euph. Cyparissias* do when attacked by the Uromyces. The Uromyces growing on *Euph. verrucosa* and *Euph. Gerardiana*, I, therefore, hold to be the old *Uredo excavata*, DC., and describe it as *Uromyces excavata* (DC) It is distinguished from *Uromyces scutellatus*, Lév. (with which, in its characteristic growth on Euphorbiaceæ, it fully agrees), by the smooth membrane of the Teleutospores, as also by its association with the Æcidium.

We have here consequently a most highly paradoxical circumstance of two very nearly allied species of Uromyces growing on the most nearly related Host plants. Both grow in nearly the same very characteristic manner on the Host plants, and are accompanied by the same undistinguishable Spermogonia. The same Spermogonia accompany the Æcidium belonging to one Uromyces. One similar Æcidium, accompanied by similar Spermogonia, grows on the Host plants of the other species in very nearly the same characteristic way; but this does not belong to the circle of evolution of the nearest allied Uromyces, but, in a highly remarkable manner, to the circle of evolution of quite a different species of Uromyces on another Host plant The two associated fruit-forms of a Fungus closely allied to a species of Uromyces, growing on the most nearly allied species of Host plants to this Uromyces, thus unexpectedly belong to two perfectly distinct fungi.

It deserves here to be mentioned that *Uromyces Pisi*, Str., is in no way nearly allied to *Uromyces excavatus* (DC.). Irrespectively

of the difference of the Teleutospores, it is very essentially distinguished by its whole biological condition and growth. While *Uromyces excavatus* (DC.) and also *Uromyces scutellatus*, Lév., bring forth only one generation of Teleutospores yearly, *Uromyces Pisi*, Str., forms several successive generations of Uredo stroma, which are finally followed by the Teleutospore pustules; further, the latter grows only in separate little heaps, and is never accompanied by Spermogonia These parallel species of Uromyces belong, therefore, to very different sections of the genus. On the contrary, *Uromyces Pisi*, Str., as already shown above, stands very near to a species on closely allied Host plants.

Note.—The reference in "Grevillea," of the Uromyces upon *E. exigua* to *U. excavata* has since been found to be an error. With the above observations on the two species of Uromyces we mainly concur.—Editor.

BERKELEY HERBARIUM.

The unique Herbarium of Fungi which the Rev. M. J. Berkeley has presented to the nation is in course of removal to Kew. As an evidence of the immense value of this collection, we may instance the Order *Agaricini*, which is represented by the following number of species:—

Agaricus	1,286	species.
Hiatula	10	,,
Montagnites	1	,,
Coprinus	49	,,
Bolbitius	8	,,
Cortinarius	90	,,
Gomphidius	4	,,
Paxillus	23	,,
Hygrophorus	85	,,
Lactarius	49	,,
Russula	34	,,
Cautharellus	35	,,
Nyctalis	3	,,
Heliomyces	6	,,
Marasmius	231	,,
Leutinus	110	,,
Panus	33	,,
Xerotus	15	,,
Trogia	4	,,
Schizophyllum	5	,,
Racophyllus	1	,,
Lenzites	35	,,
22 genera	2,087	species

NOTICE OF THE DISCOVERY OF *MONOCLEA FORSTERI*, Hook., IN NEW ZEALAND.

By T. Kirk, F.L.S.

In "Flora Novæ-Zelandiæ" and "The Handbook of the New Zealand Flora," a plant of general distribution in this country is doubtfully described, in the absence of fruit, as *Dumortiera hirsuta*, Nees, the specimens apparently differing from that plant only in their larger size. Fruiting specimens recently obtained near Wellington show that it is the long-lost *Monoclea forsteri*, Hook.* (*Anthoceros univalvis*, G.E. Forst., MS.), all our knowledge of which was obtained from Forster's original specimens, and we were even destitute of exact information as to the locality in which it was collected.

Monoclea is a monotypic genus, and with *Calobryum* forms a section of *Hepaticæ* characterised by the solitary unilocular sporangium destitute of a columella, and having the elaters carried away with the spores.

The thick, fleshy, irregularly-lobed and imbricated fronds of this common plant are so well known to every New Zealand botanist as to need no description. Fructification springing from cavities in the substance of the frond, tumid on the under surface, and opening by slits on the upper surface near the margin. Peduncles 1-3 in each cavity, 1-1½ inch long, succulent, white or yellowish, the base of each surrounded by a delicate, stipitate, tubular perianth ⅔-½ inch long, with a two-lobed mouth, the lobes jagged or rarely lacerate, not extending beyond the cavity. Peduncle consisting of two separate tubes closely fitting one within the other. Capsule oblong-cylindrical, coriaceous, faintly striated, sub-erect or inclined, dehiscing longitudinally, at length expanding into an oblong flattened valve, coarsely striated within. Columella 0. Elaters and spores forming a densely matted dark-brown mass; elaters vermiform, with intersecting spiral bands; spores globose, minutely punctate.

The capsule is at first erect, but becomes inclined or even horizontal in dehiscence.

Our plant is frequently found growing in situations where it must be submerged for the greater part of the year; in places of this kind its fronds are perfectly flat and less coriaceous than in the usual state.

The fruiting condition appears to be remarkably local; my specimens were obtained from the head of a gully running into the Kaiwarawara. Mr. Buchanan has collected fruiting specimens at Wainuiomata; these are the only instances of its being found in fruit, since its discovery, most probably in the South Island, by Forster more than a century ago. It appears to fruit only during the spring months, October and November.

* "Musci Exotici," ii., p. 174.

CRYPTOGAMIC LITERATURE.

Waldheim, A. F. de. Ueber die Ehrenberg, in Ægypten und Nubien gesammelten Brandpilze.

Karsten, P. A. Mycologia Fennica, Part iv. Hypodermii, &c.

Vize, J. E. Peronospora and its Allies.

Sadler, J. On Agaricus Sadleri, B., in "Trans. Bot. Soc., Edin."

Lindsay, W. L. Fossil Lichens, in "Trans. Bot. Soc., Edin."

Thumen, F. & Voss, W. Neue Beitrage zur Pilz-Flora Wiens.

Howse, T. Cryptogamic Flora of Kent, in "Journ. Bot.," Mar., Ap., 1879.

Thuemen, F. Mycotheca Universalis, Cent. xiii.

Berkeley, M. J. & Broome, C. E. Notices of British Fungi, in "Ann. Nat. Hist.," Mar., 1879.

Peck, C. H. New Species of Fungi, in "Botanical Gazette" (Madison, Indiana), Feb. & March, 1879.

Thuemen, F. Fungorum novorum exoticorum decas.

Peck, C. H. United States species of Lycoperdon.

Thuemen, F. On Melampsora salicina.

Thuemen, F. Diagnosen zu Mycotheca Universalis, in "Flora."

Farlow, Anderson & Eaton. Algæ exsiccatæ Americæ Borealis. Fasc. iii.

Thuemen, F. Hyphomycetes nonnulli Novi Americani.

Thuemen, F. Diagnosen zu Mycotheca universalis, x.-xii.

Allen, T. F. Characeæ Americanæ, part i. Recherches de M. le Dr. Muller, sur la Nature des Lichens, in "Revue Mycologique." No. 2.

Roumeguere, A. M. C. Les Champignons des Galeries souterraines des Thermes de Bagnères de Luchon, in "Revue Mycologique." No. 2.

Quelet, Dr. La tribu des nuclëes (Pyrenomycetes), in "Revue Mycologique." No. 2.

Gillot, X. Note sur l'Agaricus unicolor, Fr., in "Revue Mycologique." No. 2.

Roumeguere, C. De la culture des Champignons comestibles, in France, en Angleterre, en Belgique et en Italie. "Revue Mycologique." No. 2.

Wolle, F. Dubious forms of Fresh Water Algæ, in "Amer. Quart. Micro. Journ." No. 3.

Renault. Notice sur quelques mousses des Pyrénées, in "Revue Bryologique." No. 3, 1879.

Ravaud. Guide du Bryologue et du Lichenologue dans les environs de Grenoble, in "Revue Bryologique." No. 3, 1879.

Winter, Dr. G. Einige Mittheilungen über die Schnelligkeit der Keimung der Pilzsporen und des Wachsthums ihrer Keimschläuche, in "Hedwigia." No. 4, 1879.

Just, Dr. Botanischer Jahresbericht, part i. (for 1877). Vol. v.

Lanzi, M. Quelques mots en réponse à M. Petit, in "Brebissonia." No. 9, 1879.

INDEX.