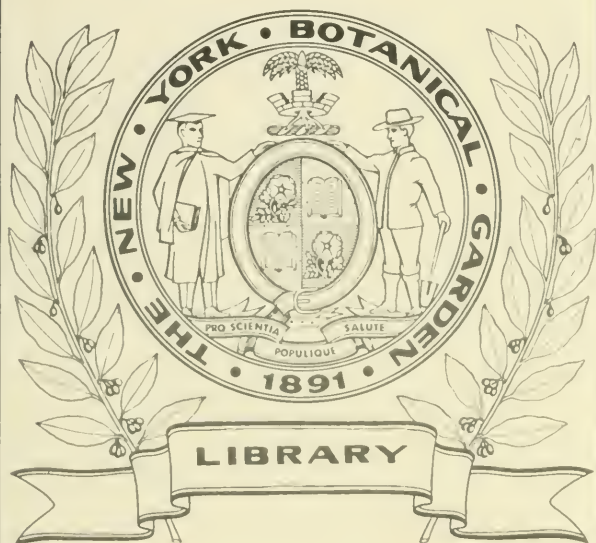


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E. S. Salmon.

Journal of Mycology Portraits with Facsimile Autographs.

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NORTH AMERICAN SPECIES OF *LEPIOTA*.

BY A. P. MORGAN.

(Concluded from page 203.)

VIII. *HIATULOIDES*. *Pileus submembranaceous, thin, soft and flexible, umbonate; the flesh well nigh obsolete except beneath the central disc; the dermis radiately fibrillose and plicate-sulcate often to the umbo; the cuticle separating into scales. Stipe slender and sometimes much elongated, fistulous and fragile, subglabrous; the annulus thin and membranaceous.*

A tribe of many species taking its name from *Lepiota hiatuloides* Speg. Like the genus *Hiatula* to which it is related, its members abound in tropical regions; in colder climates some of them appear in greenhouses, on hot beds and in similar situations.

a. *Pileus white with pallid or brownish scales.*

60. *LEPIOTA FARINOSA* PECK, 43 N. Y. REP. 1889.

Pileus submembranaceous, oblong-ovoid then campanulate and expanded, umbonate, the dermis white beneath the cuticle, flocculose-farinaceous, plicate-sulcate around the margin; the cuticle thin, whitish or pale alutaceous, at first continuous, very soon separating into small scales except upon the umbo, which at length are widely scattered and deciduous. Stipe tapering upward from a clavate base, more or less elongated and flexuous, hollow, white, subglabrous; the annulus a thin membrane, subpersistent. Lamellae rather narrow, close, free, white; spores elliptic-ovoid, sometimes oblique, 8-10 x 5-7 mic. uniguttulate.

Caespitose; growing on old manure heaps, in the rich soil of gardens, etc. Boston, Mass., *Forster*; Preston, O. Common

and abundant. Pileus 5-8 cm. in diameter; the stipe 6-10 cm. in height, 3-5 mm. thick at the apex and 7-12 mm. thick below. Probably confused generally with *Lepiota cretacea* from which it seems to differ chiefly in the pale color of the cuticle.

61. *LEPIOTA MASTOIDEA*. *AGARICUS MASTOIDEUS* FRIES, SYST. MYC. I. 1821, BASED ON A FIGURE AND DESCRIPTION OF BATTARRA, FUNGI ARIM. 1755; A. (*LEPIOTA*) *SUBREMOTUS* B. & C., ANN. AND MAG. N. H. 1859.

Pileus submembranaceous, at first elliptic-ovoid then campanulate and explanate, abruptly umbonate; the dermis radiately fibrillose, plicate-sulcate around the margin, beneath the cuticle snow-white; the cuticle whitish or drab, gradually separating into minute scales and warts, except upon the umbo. Stipe tapering upward from a bulbous base, slender, fistulous, whitish, subglabrous, the annulus thin, membranaceous. Lamellae rather narrow, close, white, free and remote from the stipe; spores elliptic-ovoid, 7-9 x 5-6 mic., uniguttulate.

Subcaespitose; growing in rich soil about old stumps in woods. New England, *Sprague*; Miami Valley, O., *Lea*, *Morgan*. Pileus 6-8 cm. in diameter; the stipe 7-10 cm. in length, 3-4 mm. thick at the apex and 5-8 mm. thick at the base. Mr. Lea's specimens were found at Waynesville; my figures were made in Dayton (1878); I have specimens collected about Preston; so the plant is an undoubted native to this region. A. (*Amanita*) *umbonatus* Schumacher, En. Pl. Saellandiae, the pileus furnished with brownish scales, is described by Berkeley and figured by Cooke under the name *Agaricus mastoideus*. *Lepiota subremota* "entirely yellow or white," Bull. Cornell University, Vol. III. No. 1, should have had another name and been described.

62. *LEPIOTA RUGULOSA* PECK, BULL. TORR. CLUB, 1900.

Pileus submembranaceous, broadly convex or nearly plane, umbonate; the dermis radiately fibrillose, plicate-rugulose, all white, the cuticle at length breaking up into minute fibrous scales. Stipe slender, nearly equal, fistulous, rufescent beneath the white silky-fibrillose cuticle; the annulus membranaceous, subpersistent, white. Lamellae narrow, close, free, white; spores elliptic-oblong, 6-8 x 4-5 mic.

Growing on the ground in woods. Washington, D. C., *Mrs. Williams*; Preston, O. Pileus 1-2 cm. in diameter, the stipe 2-3 cm. long and 2-3 mm. thick. I find this among undetermined specimens of 1896; it makes beautiful specimens; my notes do not add much to Prof. Peck's description.

63. *LEPIOTA CRETACEA*, *AGARICUS CRETACEUS* BULLIARD, HERB. FR. PL. 374, 1787, *AGARICUS CEPARESTIPES* (IN PART) SOWERBY, ENG. FUNGI, 1797; COOKE, ILLUSTR. PL. 942; PECK, N. Y. REP. 1882 AND 1904; *LEPIOTA MAMMAEFORMIS* UNDERWOOD, BULL. TORR. CLUB, 1897.

Pileus submembranaceous, at first subovoid with an obtuse apex, then campanulate and expanded, umbonate; the dermis white beneath the cuticle, densely flocculose-scaly and farinaeous, plicate-sulcate around the margin; the cuticle thin, brownish, darker on the umbo, very soon separating into minute scales which are more or less deciduous. Stipe arising from a more or less elongated and thickened base, tapering upward, flexuous, hollow, white, subglabrous; the annulus thin, membranaceous, subpersistent. Lamellae rather narrow, close, free, white; spores elliptic-ovoid, 8-10 x 5-7 mic.

Caespitose; growing in the rich soil of gardens, hot beds, etc. Probably common in such situations throughout the country. Pileus 5-10 cm. in diameter; the stipe 8-16 cm. in height, 4-6 mm. thick at the apex and 1-2 cm. thick at the base.

64. *LEPIOTA NICTOPHILA* ELLIS, BULL. TORR. CLUB, 1874; SYLLOGE V. 50.

Pileus fleshy, cylindraceous-hemispheric then convex or concave, broadly umbonate; the margin sulcate-striate, the striae at length reaching nearly to the center; the cuticle at first continuous, black, soon breaking up into small scales which are scattered over the surface. Stipe slender, fistulous, fibrous-stuffed, farinaeous-scaly, ornamented above the middle with an annular band, marked around the base by a black line. Lamellae rather close, whitish, rounded behind and free; spores oblong, about 5 mic. in length.

Subcaespitose and furnished with an abundant white mycelium. Newfield, N. J., *Ellis*. Pileus 2-3 cm. in diameter, the stipe 2-3 cm. in height.

65. *LEPIOTA LONGISTRIATA* PECK, BULL. TORR. CLUB, 1898.

Pileus submembranaceous, convex or nearly plane, umbonate; the dermis radiately fibrillose, striate nearly or quite to the umbo; the cuticle grayish or brownish, broken up into small fibrous scales. Stipe tapering upward from a thickened base, slender, fistulous; the annulus delicate, evanescent. Lamellae narrow, close, free, whitish or yellowish; spores elliptic, 6-8 x 4-5 mic.

Growing in rich soil in gardens. Alabama, *Earle*. Pileus 3-5 cm. in diameter, the stipe 5-8 cm. long and 2-6 mm. thick.

66. LEPIOTA EARLEI PECK, BULL. TORR. CLUB, 1898.

Pileus submembranaceous, broadly convex or nearly plane, umbonate; the dermis radiately fibrillose, white beneath the cuticle, the margin striate and somewhat lacerate; the cuticle at first brown and continuous, at length separating into minute scales except upon the umbo. Stipe tapering upward from a thickened base, slender, hollow, fibrillose, reddening where bruised. Lamellae close subventricose, free, white; spores elliptic, 10-12 x 6-8 mic.

Caespitose; growing in newly cleared land. Alabama, Earle. Pileus 5-7 cm. in diameter, the stipe 5-7 cm. long and 4-6 mm. thick. "A very pretty and delicate species." It is smaller than *Lepiota Americana* and has larger spores; the change in color is limited to wounded places.

b. Pileus white with yellow or all yellow.

67. LEPIOTA LUTEA, AGARICUS LUTEUS BOLTON, HIST. FUNG. 1788; WITHERING, BRIT. PL. IV, 233; COOKE, ILLUSTR. PL. 5.

Pileus submembranaceous, at first subovoid then campanulate and explanate, subumbonate; the dermis radiately fibrillose, plicate-sulcate around the margin, yellow, the cuticle separating into small scales scattered upon the surface. Stipe elongated, slender above the more or less elongated and inflated base, fistulous, yellow, subglabrous; the annulus thin membranaceous. Lamellae rather broad, subdistant, yellow, free; spores elliptic, 7-8 x 4-5 mic.

Growing in green houses, Columbus, O., Kellerman. Pileus 3-6 cm. in diameter; the stipe 6-10 cm. in length, 3-5 mm. thick at the apex and 6-10 mm. thick at the base. The specimens I have seen are pure yellow throughout; it is probably not uncommon in green houses everywhere.

68. LEPIOTA SPECTABILIS CLEMENT, BOT. NEB. III, 1894.

Pileus submembranaceous, convex and explanate with a smooth depressed disc, the dermis radiately fibrillose, pale sulphur-colored, the surface pulverulent, striate or sulcate around the margin. Stipe tapering upward from a strongly thickened base, minutely scaly above the annulus, below it glabrous, colored as the pileus; the annulus straw-colored persistent. Lamellae narrow, close, yellowish, remote from the stipe; spores ovoid, 5-6 mic. in diameter, uniguttulate.

Growing in a green house, Lincoln, Neb., Clements. Pileus 2-2.5 cm. in diameter; the stipe 3-4 cm. long, 3 mm. thick above and 7-8 mm. below.

69. *LEPIOTA FRAGILISSIMA*, *HIATULA FRAGILISSIMA* RAVENEL, IN BERKLEY'S CENTURIES OF N. A. FUNGI, ANN. & MAG. N. H. 1853.

Pileus membranaceous, very thin and fragile, ovoid then campanulate and explanate, subumbonate; the dermis radiately fibrillose, white beneath a yellow pulverulence, plicate-sulcate and rimulose. Stipe arising from a somewhat bulbous base, slender, elongated, fistulous, fibrous-stuffed, very fragile, yellow, with a white mycelium at the base; the annulus movable. Lamellae white, thin and membranaceous, rather distant, obtuse behind and remote from the stipe; spores obliquely elliptic, rather large.

Solitary or gregarious; growing on earth and decayed vegetables on the margin of swamps. S. Carolina, *Ravenel*. Pileus 5-8 cm. in diameter, the stipe 10-15 cm. in height.

70. *LEPIOTA SULPHURINA*, *MASTOCEPHALUS SULPHURINUS* CLEMENTS, BOT. NEB. IV, 1896.

Pileus submembranaceous, campanulate then convex, umbonate; the dermis radiately fibrillose, sulphur-yellow, torn into crowded, oblong or elongate scales, plicate-sulcate around the margin; the umbo glabrous, incarnate-brick-colored. Stipe arising from a bulbous base, tapering upward, fistulous, pruinose, at the base yellow-floccose, isabelline above; the annulus membranaceous, sulphur-yellow, lacerate. Lamellae linear, crowded, adnexed, white or pale straw-colored; spores elliptic-ovoid, 7-9 x 4-5 mic. uniguttulate.

Growing on the ground. Nebraska, *Clements*. Pileus 1.5-3 cm. in diameter; the stipe 4 cm. long, 3-4 mm. thick above, 6-7 mm. below.

71. *LEPIOTA FLAVESCENS* MORGAN SP. NOV.

Pileus submembranaceous, ovoid then campanulate and explanate, subumbonate; the dermis radiately fibrillose, becoming scaly, sulcate nearly to the center; pale yellow, fulvescent on the umbo. Stipe tapering upward, slender, fistulous, rufescent beneath the white-fibrillose cuticle; the annulus thin, membranaceous, yellowish, persistent. Lamellae narrow, subdistant, free, white or yellowish; spores elliptic-oblong, obliquely apiculate 5-6 x 3-4 mic. uniguttulate.

Growing on the ground under Robinia and Gleditsia trees. Preston, O. Pileus 2-4 cm. in diameter, the stipe 3-5 cm. long and 2-4 mm. thick. Apparently related to such species as *Lepiota sulphurella* K. & C. and *L. citrinella* Speng.

72. LEPIOTA RHODOPEPLA MORGAN SP. NOV.

Pileus submembranaceous, ovoid then campanulate and ex-
planate, subumbonate; the dermis radiately fibrillose, rimulose-
sulcate nearly to the center, beneath the cuticle whitish chang-
ing to rose-color; cuticle very thin, pale-yellow, soon separating
into furfuraceous scales. Stipe tapering upward, fistulous, rose-
colored beneath the white-fibrillose cuticle; the annulus thin,
membranaceous, pale yellow. Lamellae rather broad, subdistant,
whitish changing to pinkish, spores elliptic-oblong, 6.8×4.5 mic.

Growing on the ground among weeds in cultivated fields.
Preston, O. Pileus 1-2 cm. in diameter, the stipe 2-3 cm. long
and 1-2 mm. thick.

IX. PROCERAE. *Pileus thick and fleshy, usually um-
bonate; the dermis floccose or fibrillose beneath the cuticle; the
cuticle at first smooth and continuous, at length commonly sep-
arating into large irregular scales which are more or less de-
ciduous. Stipe tapering upward from a thickened or bulbous
base; the annulus often thick subcoriaceous, and truly movable.*

Lepiotae of the largest size, comprising numerous species;
in many of these is to be found the typical "annulus mobilis."

a. *Lepiotae of the largest size; the annulus thick and easily
movable.*

73. LEPIOTA PORRIGENS, AGARICUS PORRIGENS VIVI-
ANI, FUNG. IT. 1834; AGARICUS PROMINENS FRIES, HYM. EUR.
1874.

Pileus fleshy, ovoid then campanulate and expanded, um-
bonate; the flesh thick, soft, white, deeply impressed around the
apex of the stipe; the dermis white-fibrillose beneath the cuticle;
the cuticle thin, drab or pale alutaceous, at length breaking up
into irregular scales (except upon the umbo) which are more
or less deciduous. Stipe very tall, tapering upward from a
bulbous base, fistulous, fibrous-stuffed, minutely scaly or nearly
glabrous, whitish or pale drab; the annulus mobile, raised to
the summit of the stipe. Lamellae broad, close, white becoming
pinkish, tapering inward, remote from the apex of the stipe;
spores elliptic-oblong, obliquely apiculate, $12-16 \times 9-10$ mic.

Solitary; growing in rich soil along the borders of wood-
lands. Vermont, *Morgan*; New York, *Peck*; Wisconsin, *Brown*;
Preston, O. Pileus 10-18 cm. in diameter; the stipe 20-30 cm.
in height, the bulbous base 3-4 cm. thick, narrowing upward
from about 2 cm. below to 9-12 mm. at the apex. The snow-
white fully expanded pileus of this plant is strikingly different
in appearance from that of the common *Lepiota procera*.

74. *LEPIOTA PROCERA*, *AGARICUS PROCERUS* SCOPOLI, *FLORA CARN.* 1772; *AMANITA PETIOLO PROCERO, ANNULATO*, IN *ACETABULUM PILEI IMMISSO, ETC.*, HALLER, *HIST. STIRP. HELVETIAE*, 1768.

Pileus fleshy, ovoid then campanulate and expanded, umbonate; the flesh thick, soft, white, deeply impressed around the apex of the stipe; the dermis beneath the cuticle radiately fibrillose and rufescent; the cuticle thick, at first smooth and continuous, rufous to umber in color, at length torn asunder, except upon the umbo, into large irregular scales which become scattered and gradually fall away. Stipe tall, tapering upward from a bulbous base, fistulous, fibrous-stuffed; the cuticle thin, flocculose, rufous or brownish, at length drawn apart into minute scales; the annulus thick, soft, subcoriaceous, mobile, raised high upon the stipe. Lamellae broad, close, white or pinkish, tapering slightly inward, free and remote from the apex of the stipe; spores elliptic or obovoid, apiculate, 14-18 x 9-11 mic. with one or more oily guttulae.

Solitary or gregarious, growing in meadows, pastures and open woods. Recorded from all parts of N. America. Pileus 8-16 cm. in diameter; the stipe 15-25 cm. in height, the bulbous base 2-3 cm. in thickness, tapering upward from 12-16 mm. below to 8-12 mm. at the apex. A splendid Agaric, known from the earliest times and found in all the countries of the earth.

75. *LEPIOTA RHACODIOIDES* P. HENNINGS, IN *ENGL. BOT. JAHRE.* 1901; *SYLLOGE* XVII, 3.

Pileus fleshy, campanulate-explanate, obtusely umbonate, covered as far as the middle with scattered, broad, brown, membranaceous scales, around the margin even, glabrous, whitish. Stipe very tall arising from a bulbous base, cylindric, even, glabrous, whitish or brownish; the annulus thick, mobile. Lamellae free, close, lanceolate, whitish; spores elliptic, 12-17 x 8-10 mic. uniguttulate.

Growing among old leaves. Pileus 15-20 cm. in diameter; the stipe 20-30 cm. in height, the bulbous base 3-4 cm. in thickness, tapering upward to 2-3 cm. The pileus lacks the umbo of *L. procera* and appears to be covered all over with the brown shaggy scales, which at length are deciduous around the margin and quite to the middle. This or a similar plant is reported from western New York by Prof. Peck in the 48 N. Y. Report; it is probably to be met with elsewhere. It differs from *Lepiota rhacodes* in having the spores of *L. procera*.

76. *LEPIOTA RHACODES* VITTADINI, FUNG. MANG. 1835; STEVENSON, BRIT. FUNGI; COOKE, ILLUSTR. PL. 22.

Pileus fleshy, at first globose then convex and explanate or slightly depressed; the flesh very thick, soft, white changing immediately to saffron-red when cut or broken; the dermis fibrillose-tomentose beneath the cuticle; cuticle thick, smooth, bay-brown, at first continuous, soon cracking and becoming reticulate, then separating into large irregular scales, which are drawn apart and persist upon the surface. Stipe tapering upward from a bulbous base, thick, stout, fistulous, fibrous-stuffed, smooth and glabrous, whitish; the annulus thick, mobile, fibrous-lacerate. Lamellae broad, close, whitish or pinkish, tapering inward and remote from the apex of the stipe; spores elliptic-ovoid, 10-12 x 6-8 mic.

Solitary or subcaespitose; growing in rich soil in fields and woods. Reported from various parts of the country from New England to the Pacific coast; but it is certainly rare. Pileus 10-15 cm. in diameter; the stipe 12-20 cm. long and 1-2 cm. thick above the very thick bulbous base.

77. *LEPIOTA MORGANI*, *AGARICUS MORGANI* PECK, BOTANICAL GAZETTE, 1879.

Pileus fleshy, at first globose then convex and expanded; the flesh thick, firm, white, deeply impressed around the apex of the stipe; the dermis white beneath the cuticle, radiately fibrillose; the cuticle at first continuous, buff to pale amber, soon broken up, except in the center, into irregular scales and patches, which are gradually drawn apart and at length are more or less deciduous. Stipe hard and firm, tapering upward from a thickened base, with a narrow tubule, fibrous-stuffed, the surface glabrous, buff to pale amber; annulus thick, soft, subcoriaceous, mobile, raised high upon the stipe. Lamellae rather broad, ventricose, close, remote from the stipe, at first white then changing to a greenish hue, at length dull green; spores in mass at first bright green, fading to dull green; with age becoming sordid, subelliptic, obliquely apiculate, 9-11 x 6-8 mic., with a large guttule.

Gregarious; growing in meadows, pastures and open woods; sometimes seen grouped in large rings. Met with throughout the Mississippi Valley from Michigan to the Gulf States and from Pennsylvania westward to Kansas and Nebraska. Pileus 10-20 cm. in diameter, the stipe 15-20 cm. in height, 1-2 cm. thick at the apex and 2-4 cm. thick at the base.

b. Lepiotae of small size; the annulus thin membranaceous, and not easily movable.

78. *LEPIOTA AMERICANA* PECK, 49 N. Y. REP. 1895; *AGARICUS AMERICANUS* PECK, 23 N. Y. REP. 1870.

Pileus fleshy, ovoid then campanulate and expanded, umbonate; the flesh thin, white, reddening when cut or broken; the dermis radiately fibrillose beneath the cuticle and at first white; the cuticle brick-color or bay-brown, at first continuous, soon breaking up except upon the umbo into small scales, which are gradually drawn apart and scattered over the surface. Stipe tapering upward from a base more or less thickened and elongated, fistulous, smooth and glabrous, white, reddening when handled; the annulus thin, membranaceous. Lamellae rather narrow, close, free, white; the spores subelliptic, 8-10 x 5-7 mic. uniguttulate.

Solitary or subcaespitose; growing in rich soil in grassy grounds or around old stumps, Eastern U. S. west to Michigan and Ohio, south to Alabama. Pileus 5-10 cm. in diameter; the stipe 8-12 cm. in length, 4-6 mm. thick at the apex, 8-12 mm. thick at the swollen base. When young and growing the whole plant except the epidermis of the pileus is white, but when handled or in drying it assumes a dull reddish or smoky-red color. It is quite probable that *Agaricus Badhami* B. & Br. catalogued by Sprague, Proc. Soc. N. H., Boston, 1859, was based upon specimens of this plant.

79. *LEPIOTA CALOCEPS* ATKINSON, JOURNAL MYCOLOGY, 1902.

Pileus fleshy, ovoid then convex and expanded; the flesh thick, firm, white; the dermis with a brownish or tawny-olivaceous cuticle, at first continuous, at length cracking and separating into rectangular or nearly square areas. Stipe arising from a bulbous base, fistulous, white above, dull flesh-color below, covered up to the annulus by angular patches of the dermis similar to those on the pileus. Lamellae rather narrow, close, free, dingy white; spores elliptic-oblong, obliquely apiculate, 6-8 x 2.5-3.0 mic.

Gregarious; growing on the ground in woods. New York, *Atkinson*. Pileus 4-8 cm. in diameter, the stipe 6-10 cm. in height and 6-10 mm. thick. It is possible this species belongs more properly in the *Clypeolariae*.

80. *LEPIOTA EXCORIATA*, *AGARICUS EXCORIATUS* SCHAEFFER, INDEX, 1774; ICONES TAB. 18 ET 19; COOKE, ILLUSTR. PL. 23; BRESADOLA, FUNG. MANG. TAV. 14.

Pileus fleshy, ovoid then convex and expanded, subumbonate; the flesh thick, soft, white, impressd around the apex of the stipe; the dermis white-fibrillose beneath the cuticle; the cuticle thin, firm, whitish or sometimes dusky in the center, splitting

and peeling up around the margin or breaking away in scales, sometimes altogether persistent. Stipe arising from a slightly thickened or bulbous base, fistulous, fibrous-stuffed, white, smooth and glabrous; the annulus firm, membranaceous. Lamellae broad, close, white, tapering inward and remote from the stipe; spores elliptic-oblong, 14-16 x 9-11 mic.

Growing in pastures and fields. New England, *Frost*; N. Carolina, *Curtis*; Alabama, *Atkinson*; Pacific Coast Cat. Pileus 5-7 cm. in diameter, the stipe 6-8 cm. long and 6-10 mm. thick. Withering and Persoon considered this species to be a small form of *Lepiota procera*; the size of the spores lends countenance to this opinion.

81. *LEPIOTA NAUCINOIDES*, *AGARICUS NAUCINOIDES* PECK, 29 N. Y. REP. 1876; *AGARICUS NAUCINUS* PECK, 23 N. Y. REF. 1870; MORGAN, MYC. FLORA M. V.

Pileus fleshy, subvoid and obtuse, then convex, expanded and explanate, subumbonate; the flesh thick, white; the dermis a thin membrane, white or smoky white, its surface commonly smooth and glabrous, but sometimes the cuticle breaks up into very minute fibrillose scales. Stipe tapering upward from a clavate base, fistulous, fibrous-stuffed, white, smooth and glabrous or becoming slightly fibrillose toward the base; the annulus thin, membranaceous, white, persistent. Lamellae broad, close, free, white, after maturity slowly changing in color to a dull livid; spores elliptic-ovoid, 8-9 x 5-6 mic. uniguttulate.

Gregarious; growing in grassy grounds, pastures, roadsides, etc. Eastern U. S. westward to Kansas. Pileus 4-8 cm. in diameter; the stipe 8-12 cm. in height, 6-12 mm. thick at the apex, 1-2 cm. thick at the base. European writers evidently confuse two species. *Agaricus naucinus* of Fries, and Berkeley, is *A. sphaerosporus* Krombliz. *Lepiota naucina* Bresadola, Fung. Mang. is *A. naucinoides* Peck. *Agaricus naucinus* with spherical spores occurs also in Australia; See Cooke's Handbook of Australian Fungi.

82. *LEPIOTA SOLIDIPES* PECK, 52 N. Y. REP. 1898.

Pileus fleshy, subhemispheric then convex and nearly plane; the flesh thick white; the dermis a continuous membrane, the surface smooth and glabrous, white sometimes with a slight pinkish tint. Stipe nearly equal or somewhat bulbous, solid, whitish, silky-fibrillose; the annulus thin, subevanescent. Lamellae close, free, white; spores subglobose, 4-5 mic. in diameter.

Growing in damp or swampy ground. New York, *Peck*. Pileus 5-10 cm. in diameter, the stipe 5-10 cm. long and 8-12 mm. thick. This species is distinguished from *Lepiota naucina* by its solid stipe and perhaps also by its smaller spores.

83. *LEPIOTA AVELLANEA* CLEMENTS, BOT. NEB. II, 1893.

Pileus fleshy, dry, explanate; the cuticle brown, at length lacerate toward the margin into appressed scales. Stipe arising from a bulbous base, fistulous, brown-fibrillose; the annulus thin, brownish, persistent. Lamellae cream-color, reddening with age, remote from the stipe; spores irregularly ovoid, acute at one apex, 8-10 x 5-6 mic.

Growing on the ground in a green house. Nebraska, *Clements*. Pileus 5 cm. in diameter, the stipe 4 cm. long and 8 mm. thick.

§ 3. *ANNULI SUPERI. THE VEIL IN THIS SECTION IS A PROLONGATION BEYOND THE APEX OF THE DERMIS OF THE STIPE; THIS IS REFLEXED OUTWARD AND DOWNWARD OVER THE LAMELLAE, THE LOWER SURFACE OF THE VEIL CORRESPONDING TO THE OUTER SURFACE OF THE STIPE. IT IS AT FIRST IN CONNECTION WITH THE EDGES OF THE LAMELLAE, FORMING A CONTINUOUS MEMBRANE OVER THE WHOLE HYMENIUM; AS THE PILEUS EXPANDS THIS CONNECTION IS DISSOLVED, BEGINNING WITH THE MARGIN OF THE PILEUS, UNTIL AT LENGTH THE ENTIRE MEMBRANE IS ATTACHED ONLY TO THE UPPER END OF THE STIPE, HANGING DOWN FROM IT AND FLARING OUTWARDS.*

X. *LYCOPERDINEAE. Pileus thick and fleshy; the dermis from the first composed of thick scales and pyramidal warts. Stipe thick, stout and usually solid, often prolonged downward and deeply rooting; the veil persistent entire or more or less torn and fragmentary.*

A tribe of several species named for *Lepiota lycoperdinae* Spegazzini, Fungi. Arg. The European representative is *Lepiota Vittadini* Moretti, Bot. Ital., "A large species, of a pure white; extremely beautiful" (Berkeley.)

84. *LEPIOTA POLYPYRAMIS*, A. (*AMANITA*) *POLYPYRAMIS* B. & C., ANN. & MAG. N. H. 1853.

Pileus fleshy, subglobose then convex and expanded; the flesh thick, soft, white; the dermis composed of thick pyramidal warts, which, by the growth of the pileus, are gradually separated, except in the center, drawn apart and to some extent deciduous. Stipe thick at the base and tapering downward into a very long-rooting portion, tapering slightly upward, solid, the surface white and somewhat scaly; the veil a large, thick, warted membrane,

torn in pieces by the expansion of the pileus and at length falling away. Lamellae close, white, tapering inward and reaching the stipe; spores elliptic, 8-10 x 6-8 mic.

Growing in rich soil among old leaves in woods. S. Carolina, *Curtis*; Preston, O. Pileus 10-15 cm. in diameter; the stipe 15-25 cm. in length including the root, 3-5 cm. thick at the base. This species is one of the forms of *Amanita solitaria*, so thoroughly discussed and so elegantly illustrated by Atkinson in "Mushrooms edible, poisonous, etc."

85. *LEPIOTA RADICATA*, *AMANITA RADICATA* PECK, BULL. TORR. CLUB, 1900.

Pileus fleshy, subglobose, convex then expanded; the flesh thin, white; the dermis composed of large thick persistent scales and warts, all white or becoming dusky; the veil lacerate, the fragments to some extent appendiculate, at length more or less deciduous. Stipe tapering upward from a thick base and downward into a long root, solid, white, fibrillose above, floccose-scaly below. Lamellae broad, close, white, adnexed; spores oblong, 9-11 x 5-6 mic.

Solitary; growing in grassy ground in thin woods. New Jersey, *Sterling*; Preston, O. Pileus 5-10 cm. in diameter; the stipe 6-8 cm. long above the rooting portion which is 4-6 cm. in the ground; the base of the stipe 12-20 mm. thick, the apex 6-8 mm. thick. This too is only another form of the *Amanita solitaria* of Atkinson's "Mushrooms."

86. *LEPIOTA DAUCIPES*, A. (*AMANITA*) *DAUCIPES* B. & M.; SYLL. CRYPT. 1856.

Pileus fleshy, globose then convex and expanded; the flesh thick, compact, white; the dermis composed of crowded, pyramidal warts, polygonal at the base and saffron-yellow at the apex; the veil fibrillose-floccose, yellowish, stretched between the margin of the pileus and the apex of the stipe, at length torn in pieces and disappearing. Stipe solid, with a thick base, narrowed upward to the apex and tapering downward into a long root, clothed below with broad, imbricate scales. Lamellae rather narrow, tapering to both ends, white, reaching the stipe; spores globose (?).

Growing in cultivated fields. Columbus, O., *Sullivan*. Pileus 6 cm. in diameter; the stipe 12-15 cm. long including the rooting portion, about 5 mm. thick at the narrow apex, but 3-4 cm. at the thickened base. The polygonal warts of the pileus are like those of *Lepiota Vittadini*, but are colored at the apex.

87. *LEPIOTA PELIDNA*, A. (*LEPIOTA*) *PELIDNUS* B. & M.: SYLL. CRYPT. 1856.

Pileus fleshy, ovoid then convex and expanded; the flesh thick, white, rufescent; the dermis thick, furfuraceous-rugose, greenish-livid in color; the veil continuous with the dermis and of similar substance, at maturity lacerate, the fragments dependent from the margin of the pileus. Stipe arising from a thick bulbous base, solid, elongated, furfuraceous-scaly and colored as the pileus. Lamellae narrow, white or pinkish, rufous when dried, remote from the dilated apex of the stipe and there attached by a very short tooth; spores globose and oblong, 10 mic. in length.

Growing on fallen trunks, Columbus, O., *Sullivant*. Pileus 7-9 cm. in diameter; the stipe 11-15 cm. long, in the middle 1.5-2 cm. thick, the bulbous base 3-4 cm. in diameter. The species is remarkably distinguished by the greenish-livid color of the pileus and stipe, the color of *Russula virescens*.

88. *LEPIOTA DRYMONIA* MORGAN SP. NOV. ILLUSTRATION IN HERBARIUM.

Pileus fleshy, subglobose then convex and expanded; the flesh thick, white; the dermis thick, drab to pale umber, soon breaking up into reflexed, squarrose scales, which are gradually drawn apart and scattered over the white surface. Stipe stout, solid, tapering upward from a thick base, squarrose with reflexed scales, colored as on the pileus; the veil thin, white membranaceous, lacerate, the outer fragments appendiculate. Lamellae broad, close, white, free; spores —.

Growing on the ground among old leaves in woods. Pomfret, Vt., *Morgan*. Pileus 8-10 cm. in diameter; the stipe 10-14 cm. long, 12-16 mm. thick at the apex, 3-4 cm. thick at the base. This is certainly an elegant species of the type of *Lepiota Vittadini*, but unfortunately I failed to bring away my specimens and get the spore measurements.

XI. *LENTICULARES*. *Dermis of the pileus growing uniformly with the expansion of the latter and maintaining a smooth, unbroken surface, but coated with a thin, viscid epidermal layer. Stipe solid or stuffed; the veil large membranaceous.*

A tribe consisting of a few species of large Agarics, most of them formerly referred to *Amanita*. Karsten and Gillet transfer the species of Frie's fourth tribe to *Lepiota*. Costantin and Dufour describe *Lepiota Persoonii* Fr., *L. lenticularis* Lasch and *L. arida* Fr. all with "chapeau visqueux."

89. *LEPIOTA GUTTATA*, *AGARICUS GUTTATUS* PERSOON, SYNOPSIS, 1801; *AGARICUS LENTICULARIS* LASCH IN LINNAEA, 1828.

Pileus fleshy, at first globose then convex and expanded; the flesh thick, soft, white; the dermis a thin, firm, smooth membrane, pale alutaceous to pinkish, with a viscid cuticle. Stipe elongated, at the base slightly bulbous, or wholly equal, spongy-stuffed, minutely scaly or subglabrous, white; annulus a large smooth membrane, rather distant from the pileus. Lamellae rather narrow, crowded, whitish, tapering inward but free; spores —.

Growing in humid places in woods. N. Carolina, *Curtis*. Pileus 7-10 cm. in diameter, the stipe 10-15 cm. long and about 2 cm. thick.

90. *LEPIOTA BENTISTA* MORGAN SP. NOV.

Pileus fleshy, globose then convex and explanate; the flesh thin, white; the dermis a thin, smooth membrane whitish or pale alutaceous; with a viscid cuticle. Stipe arising from a slightly bulbous base, subequal, stuffed, white, smooth but viscid; the annulus thin, white, membranaceous. Lamellae narrow, close, white, free; spores elliptic-ovoid, 9-11 x 5-6 mic.

Growing on the ground. Blue Mounds, Wis., *Denniston*. Pileus 5-8 cm. in diameter, the stipe 6-8 cm. long and 8-12 mm. thick.

THE DESCRIPTIVE SYNOPSSES.

LEPIOTA Persoon, Synopsis 1801; Fries, Syst. Myc. 1821. Hym. Eur. 1874; Saccardo, Sylloge Fungorum, V, IX, XI, XIV, XVI, XVII.

Pileus soft fleshy, rather dry; veil marginal. Stipe hollow or fibrous-stuffed, rarely solid, commonly tapering upward from a thickened base; volva none. Lamellae free, approximate or remote, rarely reaching the stipe; spores white, sometimes with a tinge of pink or yellow, in one species bright green.

§ 1. *ANNULI INFERI. THE VEIL IN THIS SECTION HAS A TWO-FOLD ORIGIN; IT IS A CONTINUATION OF THE OUTERMOST ROW OF CELLS OF THE STIPE WHICH HAS GROWN FOR SOME TIME WITH THE STIPE BY INTERCALARY GROWTH AND PASSES INTO THE MARGIN OF THE PILEUS; AND CONVERSELY IT IS A CONTINUATION OF THE OUTERMOST HYPHAE OF THE PILEUS PASSING INTO THE SURFACE OF THE STIPE. THE SEPARATION TAKES PLACE AT THE MARGIN OF THE PILEUS, THE VEIL*

REMAINS ATTACHED TO THE STIPE AS A RING OR AS A SHEATH RUNNING DOWN ITS SURFACE OR SOMETIMES PORTIONS OF IT FORM A FRINGE OR APPENDAGE TO THE MARGIN OF THE PILEUS.

I. MESOMORPHAE. *Dermis of the pileus entire, the surface of both pileus and stipe smooth and glabrous; the veil annulate, often evanescent.* Species: 1-2

II. EUCONIATI. *Dermis of the pileus not lacerate, but the surface pruinose, finely pulverulent or minutely furfuraceous; the investment of the stipe usually similiar to that of the pileus; the veil often appendiculate.*

A. STIPE GLABROUS. Species: 3

B. STIPE PULVERULENT OR MINUTELY FURFURACEOUS. Species: 4-12

III. GRANULOSAE. *Dermis of the pileus or at least its outer layer composed of granules, minute warts or furfuraceous particles; the investment of the stipe similar to that of the pileus; the veil of like structure, lacerate and appendiculate.*

a. Lamellae adnate to the stipe. Species: 13-16

b. Lamellae free from the stipe or merely reaching it.
. Species: 17-20

IV. CLYPEOLARIAE. *Dermis of the pileus a thin membrane, radiately fibrillose, the cuticle at first continuous but sooner or later broken up and drawn apart by the growth of the pileus, this at length presenting a white-fibrillose surface sprinkled with colored scales; the veil lacerate, part of it appendiculate, continuous downward with the floccose-fibrillose investment of the stipe.* Species: 21-28

V. ASPERAE. *Dermis of the pileus or at least its superficial layer fibrillose-scaly from the first, the scales reflexed and squarrose or the fibres fasciculate and convergent into pointed warts; the veil and the cuticle of the stipe may be of similar texture or the stipe may be nearly glabrous.* Species: 29-35

VI. GLIODORMATAE. *Dermis of the pileus continuous, never separating into scales, but the surface invested by a more or less thickened layer of gluten, pellucid or colored. Stipe commonly dry and squamulose or subglabrous, in a few species with a viscid cuticle like the pileus.* Species: 36-41

§ 2. ANNULI MOBILES. THE VEIL IN THIS SECTION IS MARGINAL AND INFERIOR AS IN THE FIRST SECTION. BUT THE DERMIS OF THE PILEUS AND THAT OF THE STIPE ARE DISSIMILAR, THE COL-

ORED CUTICLE OF THE PILEUS NOT BEING CONTINUED DOWNWARD UPON THE STIPE, RARELY COLORING EVEN THE UPPER MARGIN OF THE VEIL. THE VEIL IS ANNULATE UPON THE STIPE AND IS COMMONLY A THIN MEMBRANACEOUS BAND, THOUGH SOMETIMES IT IS THICKENED AND SUBCORIACEOUS; IT IS CONTINUOUS DOWNWARD WITH THE DERMIS OF THE STIPE, AND BY ITS UPPER BORDER CONNECTS WITH THE DERMIS OF THE PILEUS. SOMETIMES THE VEIL IS FIRST TORN AWAY FROM THE STIPE AND DRAWN UPWARD TO SOME EXTENT UNTIL THE EXPANSION OF THE PILEUS BEGINS, THUS GIVING RISE TO THE TYPICAL "ANNULUS MOBILIS."

VII. SUBCLYPEOLARIAE. *Dermis of the pileus a thin membrane, radiately fibrillose; the cuticle at first continuous, at length separating into small or minute scales, which are drawn apart and scattered over the white fibrillose surface. The cuticle of the stipe commonly white, smooth and even or only appressedly fibrillose; the annulus thin and membranaceous, usually persistent.*

- a. Scales of the pileus white, cineleous, yellowish. . . . Species: 42-45
- b. Scales of the pileus red, rufous, fulvous. . . . Species: 46-52
- c. Scales of the pileus brown or blackish. . . . Species: 53-59

VIII. HIATULOIDES. *Pileus submembranaceous, thin, soft and flexible, umbonate; the flesh well nigh obsolete except beneath the central disc; the dermis radiately fibrillose and plicate-sulcate often to the umbo; the cuticle separating into scales. Stipe slender and sometimes much elongated, fistulous and fragile, subglabrous; the annulus thin and membranaceous.*

- a. Pileus white with pallid or brownish scales. . . . Species: 60-66
- b. Pileus white with yellow or all yellow. . . . Species 67-72

IX. PROCERAE. *Pileus thick and fleshy, usually umbonate; the dermis floccose or fibrillose beneath the cuticle; the cuticle at first smooth and continuous, at length commonly separating into large irregular scales which are more or less deciduous. Stipe tapering upward from a thickened or bulbous base; the annulus often thick subcoriaceous, and truly movable.*

- a. *Lepiotae* of the largest size: the annulus thick and easily movable. . . . Species: 73-77
- b. *Lepiotae* of small size; the annulus thin membranaceous, and not easily movable. . . . Species: 78-83

§ 3. *ANNULI SUPERI. THE VEIL IN THIS SECTION IS A PROLONGATION BEYOND THE APEX OF THE DERMIS OF THE STIPE; THIS IS REFLEXED OUTWARD AND DOWNWARD OVER THE LAMELLAE, THE LOWER SURFACE OF THE VEIL CORRESPONDING TO THE OUTER SURFACE OF THE STIPE. IT IS AT FIRST IN CONNECTION WITH THE EDGES OF THE LAMELLAE, FORMING A CONTINUOUS MEMBRANE OVER THE WHOLE HYMENIUM; AS THE PILEUS EXPANDS THIS CONNECTION IS DISSOLVED, BEGINNING WITH THE MARGIN OF THE PILEUS, UNTIL AT LENGTH THE ENTIRE MEMBRANE IS ATTACHED ONLY TO THE UPPER END OF THE STIPE, HANGING DOWN FROM IT AND FLARING OUTWARD.*

X. *LYCOPERDINEAE. Pileus thick and fleshy; the dermis from the first composed of thick scales and pyramidal warts. Stipe thick, stout and usually solid, often prolonged downward and deeply rooting; the veil persistent entire or more or less torn and fragmentary. Species: 84-88*

XI. *LENTICULARES. Dermis of the pileus growing uniformly with the expansion of the latter and maintaining a smooth, unbroken surface, but coated with a thin, viscid epidermal layer. Stipe solid or stuffed; the veil large membranaceous. Species: 89-90*

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THE RUSTS OF GUATEMALA.*

FRANK D. KERN.

Two botanical excursions have been made to Guatemala, Central America, by Professor W. A. Kellerman; one during the months of January, February and March, 1905, and another during the corresponding season of 1906. The principal object of the trips was to secure collections of parasitic fungi, but a large amount of material which will serve to illustrate the general botanical character of the country was brought back. The trips covered the territory from the Atlantic to the Pacific coast, special attention being given to collecting in the higher altitudes of the intervening mountainous and volcanic regions.

Professor Kellerman has very generously sent much of his material to a number of workers for identification and study, the collections of rusts with some notes having been placed in the hands of the writer. The present communication is a report of the studies upon the larger portion of the material. There still remain a number of specimens, some of which may be undescribed, but concerning which no definite conclusions have yet been reached. In all determinations and in the drawing up of descriptions of new species the writer has been aided by Prof. J. C. Arthur and enjoyed the privilege of access to his herbarium and library.

In many instances new hosts have been added and the geographical distribution has often been extended. It has been found necessary to describe several species as new. Perhaps the most notable single collection is the *Aecidium* on *Byrsonima crassifolia*. The species are distributed among all the larger groups of the Uredinales.

I. COLEOSPORIUM IPOMOEAE (Schw.) Burr. — On *Ipomoea macrocalyx* (Ruiz. & Pav.) Choisy (host no. 5187), Laguna, Depart. Amatitlan, alt. 1200 m., Jan 20, 1906, no. 5408

*Contributions to Guatemalan Mycology IV. (The three previous articles in this series were by W. A. Kellerman.)

(host no. 5191) Jan. 19, 1906, no 5450: *Ipomoea tyrianthina* Lindl. (host no. 5192), Moran, Depart. Amatitlin, alt. 1205 m., Jan 25, 1906, no. 5435; *Pharbitis hederacea* (L.) Roth (host nos. 5185, 5186), Laguna, Depart. Amatitlán, alt. 1200 m., Jan. 17, 1906, nos 5409, 5405.

All of the above hosts were determined by H. D. House.

2. COLEOSPORIUM VERBESINAE Diet. & Holw. — On *Verbesina turbacensis* H. B. K. (host 5190), Los Amates, Depart. Izabal, March 15, 1905, no. 5315; *Verbesina gigantea* Jacq. (host no. 5183), Patalúl, Depart. Sololá, Feb. 13, 1906,, no. 5385.

The hosts were examined by J. M. Greenman, who has attached the specific names with some doubt.

3. COLEOSPORIUM ELEPHANTOPODIS (Schw.) Thuem. — On *Elephantopus mollis* H. B. K., (det. by H. A. Gleason), Los Amates, Depart Izabal, alt. 90 m., Mar. 15, 1905, no. 5362.

4. COLEOSPORIUM EUPATORII Arth. — On *Eupatorium collinum* DC., (host no. 5181), Palmar, Depart. Quezaltenango, Feb. 11, 1906, no. 5458.

This host was determined by J. M. Greenman, and is a new one for the species which heretofore has been known only on *Eupatorium macrophyllum* L.

5. COLEOSPORIUM PLUMIERAE Pat. — On *Plumiera rubra* L., (host no. 5218), Palmar, Depart. Quezaltenango, Feb. 11, 1906, no. 5460.

This is the first time this species has been collected on the continent, the other collections coming from the West India Islands. The host has been identified by John Donnell Smith.

6. MELAMPSORA BIGELOWII Thuem. — On *Salix Humboldtiana* Wild. (host det. by R. F. Griggs), near Patalúl, Depart. Sololá, Feb. 16, 1906, no. 5473

7. UROPYXIS MIRABILISSIMA (Peck) Magn. — On *Odotemon* sp., Volcano Agua, Depart. Sacatepéquez, alt. 3000 m., Feb. 15, 1905, no. 4624.

8. RAVENELIA SPINULOSA Diet. & Holw. — On *Cassia biflora* L (host no. 5189), Gualan, Depart. Zacapa, alt. 122 m., Dec. 30, 1905, no. 5441.

This host has been identified by J. M. Greenman and is a new one for this species of rust. Sydow (Annal. Myc. 1:330, 1903) and Dietel (Bot. Centr. Beih. 20:394, 1906) have reported

another species of *Ravenelia*, *R. papillifera* Syd. on *Cassia biflora* from Bahama Islands, collected by J. J. and A. R. Northrop, but this material has since been examined by N. L. Britton, of the New York Botanical Garden, who reports that it is *Cassia angustisiliqua* Lam. and not *C. biflora* L.

9. RAVENELELIA HUMPHREYANA P. Henn. — On *Poinciana pulcherrima* L. (*Caesalpinia pulcherrima* Lév.), (host det. by R. F. Griggs), Gualan, Depart. Zacapa, alt. 122 m., Dec. 27, 1906, no. 5427.

A common species in the North American tropics wherever this host occurs. The type of *R. Humphreyana* was said to be on *Cassia* sp., but a careful examination shows that it is undoubtedly *Poinciana pulcherrima*. As pointed out by W. H. Long (Jour. Myc. 12:236 1906), *Ravenelia pulcherrima* Arth. is a synonym of *R. Humphreyana*.

10. KUEHNEOLA ALBIDA (Kuehn) Magn. — On *Rubus poliophyllus* Focke (host no. 4775), Antigua, Depart. Sacatepéquez, Feb. 18, 1905, no. 5363; *Rubus* sp., Guatemala, Depart. Guatemala, Feb. 12, 1905, no. 4625.

No. 5363 shows some variation in the surface of the urediniospores, the markings being much coarser than is typical. The host of this number was determined by John Donnell Smith.

11. PUCCINIOSIRA BRICKELLIAE Diet. & Holw. — On *Brickellia cavanillesii* Gray (host no. 5198), Volcano Cerro Quemado, Depart. Quezaltenango, Feb. 8, 1906, no. 5448.

This species has previously been known only from Mexico. J. M. Greenman, who examined the host, is somewhat doubtful about the specific determination.

12. PUCCINIOSIRA PALLIDULA (Speg.) Lagerh. — On *Triumfetta* sp. (host no. 4584). Guatemala, Depart. Guatemala, alt. 1465 m., Feb. 3, 1905, no. 4608.

13. CRONARTIUM QUERCUM Miy. — On *Quercus tomentosa* Willd. (host no. 5234), Guatemala, Depart. Guatemala, alt. 1465 m., Feb. 2, 1905, no. 5304.

This host was submitted to John Donnell Smith, who applied the above specific name with an indication that it is not a typical specimen.

14. UROMYCES CELOSIAE Diet. & Holw. — On *Iresine canescens* H. B. K., Guatemala, Depart. Guatemala, alt. 1465 m., Feb. 2, 1905, no. 4344; Laguna, Depart. Amatitlán, alt. 1200 m., Jan. 20, 1906, no. 5395.

Although all previous collections of this species have been on *Celosia*, these specimens on *Iresine* agree so well with the type specimen, and the similarity between the hosts is so great, that they are placed here without hesitation. The hosts have been determined by J. N. Rose and W. A. Kellerman.

15. UROMYCES HELLERIANA Arth. — On *Cayaponia racemosa scaberrima* Cogn. (host no. 5207, det. by John Donnell Smith), Moran, Depart. Amatitlán, alt. 1205 m., Feb. 1906, no. 5436.

16. UROMYCES INDIGOFERAE Diet. & Holw. — On *Indigofera mucronata* Spreng. (host no. 5228, det. by J. M. Greenman), Gualan, Depart. Zacapa, Dec. 28, 1905, no. 5444.

17. PUCCINIA CYNANCHI Lagerh. — On *Philibertella crassifolia* Hemsl. (host no. 4359, det. by John Donnell Smith), Laguna, Depart. Amatitlán, alt. 1200 m., Feb. 11, 1905, no. 4348, Jan. 20, 1906, no. 5437.

This species is morphologically very similar to *Puccinia Gonolobi* Rav., but differs in its habits of growth, spreading evenly over the surface, extending to the young shoots and sometimes forming witches' brooms, while in *P. Gonolobi* the sori are in small groups.

18. PUCCINIA TITHONIAE Diet. & Holw. — On *Tithonia tubaeformis* Cass. (host no. 4374, det. by John Donnell Smith), Guatemala, Depart. Guatemala, alt. 1465 m., Feb. 3, 1905, no. 4328; Laguna, Depart. Amatitlán, alt. 1200 m., Jan 30, 1906, no. 5425.

19. PUCCINIA SENECTIONICOLA Arth. — On *Senecio petasioides* Greenm. (host no. 5200), Volcano Atitlán, Depart. Sololá, Feb. 16, 1906, no. 5442, (host no. 5201), Volcano Cerro Quemado, Depart. Quezaltenango, Feb. 8, 1906, no. 5418, *Senecio Warszewiczii* A.Br. & Bouche (host no. 5206). Volcano Cerro Quemado, Depart. Quezaltenango, Feb. 8, 1906, no. 5445.

The hosts were determined by J. M. Greenman.

20. PUCCINIA ROSEA (Diet. & Holw.) Arth. — On *Ageratum conyzoides* L., (host no. 4386), Mazatenango, Depart. Suchitepéquez, alt. 330 m., Feb. 28, 1905, No. 4346, (without host no.) no. 5373; San Filipe, alt. 615 m., Depart. Retalhuleu, Feb. 4, 1906, no. 5446.

This species is very similar in the uredinial and telial stages to *Puccinia conoclinii* Seym. and has about the same host distribution. It may be distinguished by its larger spores, the thicker walls and more pronounced umbo of the teliospores.

21. PUCCINIA CONOCLINII Seymour. — On *Eupatorium pycnocephalum* Less. (on host no. 4369), det. by B. L. Robinson), Guatemala, Depart. Guatemala, alt. 1465 m., Feb. 1, 1905, no. 5312; *Eupatorium Rafaelense* Coulter (host no. 5197, det. by J. M. Greenman), Volcano Cerro Quemado, Depart. Quezaltenango, Feb. 8, 1906, no. 5449.

22. PUCCINIA SORGHII Schw. — On *Zea Mays* L., Guatemala, Depart. Guatemala, alt. 1465 m., Feb. 3, 1905, no. 5474.

23. PUCCINIA HETEROSPORA B. & C. — On *Sida cordifolia* L., (host det. by John Donnell Smith), Gualán, Depart. Zacapa, alt. 122 m., Jan. 23 and March 12, 1905, no. 4323.

24. PUCCINIA COGNITA Syd. — On *Verbesina fraseri* Hemsl. (host det. by B. L. Robinson), Guatemala, Depart. Guatemala, alt. 1465 m., Feb. 1, 1905, no. 4324; Laguna, Depart. Amatitlán, alt. 1200 m., Jan. 1906, no. 5412.

25. PUCCINIA ESLAVENSIS Diet. & Holw. — On *Panicum leucophaeum* H. B. K., Laguna, Depart. Amatitlán, alt. 1200 m., Jan. 31, 1906, no. 5469.

26. PUCCINIA TETRAMERII Seymour. — On *Blechnum Brownei* Juss. (host no. 5214, det. by John Donnell Smith), Laguna, Depart. Amatitlán, Jan. 17, 1906, no. 5400.

27. PUCCINIA PRUNI-SPINOSAE Pers. — On *Amygdalus persica* L., Antigua, Depart. Sacatepéquez, Feb. 15, 1905, no. 5358.

28. PUCCINIA ARECHAVALETAE Speg. — On *Cardiospermum grandifolium* Sw. (host no. 5211, det. by John Donnell Smith), El Rancho, Depart. Jalapa, Jan. 6, 1906, no. 5461.

29. PUCCINIA INFREQUENS Holw. — On *Salvia cinabarina* Mart. & Gal. (host no. 5229, det. by J. M. Greenman), Volcano Atitlán, Depart. Sololá, Feb. 15, 1906, No. 5438.

30. PUCCINIA XIMENESIAE Long. — On *Verbesina* sp. (host no. 5196, det. by J. M. Greenman), Laguna, Depart. Amatitlán, alt. 1200 m., Jan. 20, 1906, no. 5455.

31. PUCCINIA HYPTIDIS (Curt.) Tr. & Earle. — On *Hyptis spicata* Poit., Morán, Depart. Amatitlán, alt. 1205 m., no. 4327, (host no. 5236), no. 5310, (host no. 5235), no. 5311; (host no. 5227). Fiscal, Depart. Guatemala, Jan. 11, 1906, no. 5443.

The hosts of the first three collections were determined by John Donnell Smith, that of the last collection by J. M. Greenman. Only urediniospores could be found on any of the collections of *Hyptis*. Two collections, one on *Hyptis urticoides*, and one on *H. lilacina*, are not included here, as they differ in having urediniospores with more dense and finer markings and several scattered pores. These have not been assigned to any species.

32. **PUCCINIA HELIOTROPII** Kern & Kellerm. sp. nov.

III. Telia hypophyllous, gregarious, densely crowded in orbicular groups, 1.5-4 mm. across, often confluent, round, small, 0.1-0.2 mm. across, early naked, pulverulent, chestnut-brown, becoming cinereous by germination, ruptured epidermis inconspicuous; teliospores oblong, rounded or obtuse above, usually narrowed below, $14-10 \times 30-40 \mu$, somewhat constricted at septum, wall pale cinnamon-brown, thin, about 1μ , thicker at apex ($2-4 \mu$), smooth; pedicel colorless, about half length of spore.

On *Heliotropium indicum* L. (host no. 4372), Gualán, Depart. Zacapa, alt. 122 m., Mar. 12, 1905, no. 4326 (type) and Dec. 30, 1905, no. 5422.

Host no. 4372 was determined by John Donnell Smith and the same collection also bears aecia which without doubt belong to an entirely distinct species of rust. This species is of the ordinary leptopuccinia type. It differs from *Puccinia heliotropicola* Speg. by the longer and more oblong spores with a thickened apex.

33. **PERIDERMIMUM GRACILE** Arth. & Kern.—On *Pinus filifolia* Lindl., Antigua, Depart. Sacatepéquez, Feb. 13, 1905, nos. 4626, 5355, 5324.

One of the above collections (host) was submitted to C. S. Sargent for identification, the others have been determined by comparison. The type of the species was on the same host from Oaxaca, Mexico.

34. **AECIDIUM CISSI** Wint.—On *Cissus sicyoides* L. (host no. 5223, det. by J. M. Greenman), Gualán, Depart. Zacapa. Dec. 28, 1905, no. 5440; Los Andes, Depart. Izabal, Jan. 17, 1905, no. 5335.

35. **AECIDIUM GUATEMALENSIS** Kern & Kellerm.
sp. nov.

O. Pycnia epiphyllous, gregarious, abundant on discolored spots opposite the aecia, inconspicuous, punctiform, subepidermal, becoming dark brown, globoid, $100-115 \mu$ wide, $80-105 \mu$ high; ostiolar filaments up to 65μ long.

I. *Aecia* hypophyllous, gregarious, numerous on indefinite discolored spots, 0.5-1.5 cm. across, especially extending along the veins, short, 0.2-0.3 mm. in diameter; peridium white, margin erect, slightly erose, peridial cells rhomboidal, 15-25 μ long, somewhat overlapping, walls of equal thickness 2-4 μ , inner moderately verrucose, outer smooth, transversely striate; aeciospores globoid. 16-18 x 18-23 μ , wall colorless, thin, about 1 μ , finely and inconspicuously verrucose.

On *Heliotropium indicum* L (host no. 4372), Gualán, Depart. Zacapa, alt. 122 m., Mar. 12, 1905, no. 4326.

The specimens from which this species is described are a part of the same collection from which *Puccinia Heliotropii* sp. nov. is described in this paper. In gross appearance and habit of growth this species differs from *Aecidium Heliotropii* Tr. & Gal. and *Aecidium biforme* Peck. It may possibly be identical with *Aecidium heliotropidatum* Schw. of which no specimens have been examined. The description, however, indicates a distinct difference in the distribution on the leaf surface and in the manner of development in the groups.

36. *AECIDIUM BYRSONIMAE* Kern & Kellerm. sp. nov.

O. Pycnia amphigenous and caulicolous, preceding or among the aecia, numerous, evenly scattered over the hypertrophied leaves and branches, conspicuous, subcuticular, becoming chestnut-brown, conical, large, 150-200 μ broad, by 75-85 μ high; ostiolar filaments wanting.

I. *Aecia* amphigenous and caulicolous, from an unlimited mycelium causing extensive hypertrophy, numerous, scattered often crowded, cylindrical, long, deep-seated, 0.5-0.7 mm. in diam by 1-1.5 mm. high; peridium white, margin erose, somewhat recurved, often deeply torn, peridial cells rhomboidal, overlapping 35-50 μ long, outer wall 3-4 μ thick, smooth, inner wall 5-7 μ thick, coarsely verrucose, transversely striate; aeciospores angularly oval or oblong, often truncate at base, and narrowed above, 26-35 x 39-57 μ , wall pale yellow, coarsely verrucose, thick (3-5 μ), much thicker above (5-15 μ).

On *Byrsonima crassifolia* (L.) H. B. K. (host no. 4368), Sierra de las Minas, Depart. Baja Verapaz, alt. 615 m., Mar 10, 1905, no. 4325.

An interesting species because of the hypertrophy it produces. the prominent subcuticular pycnia, and the long and numerous aecia, but especially on account of the very odd spores, which are

exceedingly large, with coarsely marked thick walls, much thickened above. The characters of the pycnia and eacia are so unlike those of autoecious species on *Malpighiaceae* that it is assumed to be heteroecious. The fact that the pycnia are sugcuticular indicates that it does not belong to the *Uromyces-Puccinia* group but to some genus of the *Raveneliatae* or *Uropyxidatae*. Both host and fungus of a specimen in the New York Botanical Garden, collected at Rancho Guerro, Jalisco, Mexico, June 15 1892, by M. E. Jones, said to be on an *Ericaceous* host, agree perfectly with this Guatemalan specimen. Because of the long bladderly peridia there is a resemblance to *Peridermium*, and the Mexican specimen has been so labelled, but there can now be no doubt that it belongs here.

37. UREDO BIOCELLATA Arth.—On *Pluchea odorata* Cass. (host no. 5202, det. by J. M. Greenman), Amatitlán, Depart. Amatitlán, Jan. 25, 1906, no. 5388.

The sides of the spores in this species are inflated in a very conspicuous manner making them unusually odd. It has been known before only from the type locality, Florida Keys, on *Pluchea purpurascens*.

38. UREDO FICINA Juel.—On *Ficus aurea* Nutt; Guatlán, Depart. Zacapa, Jan 1, 1906, no. 5456.

This species differs from the common *Ficus* rust, *Uredo Fici* Cast., in its larger spores and especially in the paraphyses, which are curved, strong and thick-walled as compared with the more erect, slender, thin-walled ones of *U. Fici*. The host of the Guatemalan specimen agrees so well with a specimen from Florida known to be *Ficus aurea*, that it has been called by that name. The fungus on the Florida specimen is also *U. ficina*. The species is chiefly known from South America, where the type was collected.

39. UREDO CABRERIANA Kern & Kellerm. sp. nov.

II. Uredinia chiefly hypophyllous, gregarious in orbicular groups 2-4 mm. across, or scattered singly, roundish, 0.5-1 mm. across, subepidermal, soon naked, chestnut-brown, pulverulent, ruptured epidermis conspicuous; paraphyses intermixed with the spores, spatulate or sometimes capitate, often irregular, 10-23 x 40-80 μ , heads solid, stipes hollow; urediniospores broadly obovate-ellipsoid, 17-27 x 27-34 μ , wall dark chestnut-brown, thick (3-4 μ), thicker above (5-7 μ) coarsely echinulate with blunt conical tubercles 3-4 μ apart, pores 3, rarely 4, equatorial.

On *Buettneria lateralis* Presl. (?) (host no. 5219), Livingston, Depart. Izabal, Jan. 18, 1905, no. 5465.

This host was determined from fragments by John Donnell Smith, who expresses some doubt as to the correctness of the specific name. With the exception of two species of *Accidium* from South America, described by P. Hennings, this is the only rust reported on a host belonging to this family, *Sterculiaceae*, or any closely related family. No other spore structures being present the species is described as *Uredo*. The thickened apex of the spores, the intermixed paraphyses, and the gross appearance of the sori indicate that its relationship is with the *Raveneliatae*.

The name is to honor Sn. Manuel Estrada Cabrera, President of Guatemala, patron of education and applied science.

40. **UREDIO TRIXITIS** Kern & Kellerm. sp. nov.

II. Uredinia hypophyllous, scattered, small, round, 0.3-0.5 mm. across, soon naked, becoming somewhat pulverulent, dark chestnut brown, ruptured epidermis conspicuous; without peridium or paraphyses; urediniospores broadly ellipsoid, sometimes somewhat narrowed below, $19-24 \times 25-30 \mu$, wall light chestnut-brown, medium thick ($2-3 \mu$), sparsely and rather inconspicuously echinulate, pores distinct, 2, opposite.

On *Trixis frutescens* P. Br. (host no. 5204), San Lucas, Depart. Sololá, Feb. 15, 1906, no. 5432.

This host was determined by J. M. Greenman and belongs to a section of the *Carduaceae* which does not include any other genera known to bear rusts.

THE LEPIOTAS OF SWEDEN.

II. C. BEARDSLEE.

The following notes on the species of *Lepiota* collected in Sweden by Mr. C. G. Lloyd and the writer during the summer of '05 may be of interest in connection with the papers upon this genus which are appearing in the JOURNAL.

The number of species collected was not large, probably partly at least because work was necessarily stopped the first week of September. Doubtless other species might have been found in the same collecting grounds if work had continued a few weeks longer. The species detected were six in number. *L. procera*, *naucina*, *rhacodes*, *cristata*, *metulaespora*, and *amiantina*. Of *Lepiota procera* little need be said. It was found in the same surroundings in which it would have appeared in the United States and agreed with our plant in every detail. There is, however, food for reflection in the fact that this fine species which lends itself so well to description and illustration that it is easily recognized, even by the amateur, has been reported from so many stations and is known to have so wide a distribution.

Is it not at least possible that some of its relatives are also widely distributed, but owing to the greater difficulty of their recognition, are not so widely recognized? It is hard for one whose views on "new species" are perhaps a little "cranky" to account otherwise for the facts, for instance, in regard to *L. seminuda*. This pretty species is abundant at Asheville, perhaps the most abundant species of *Lepiota*. Specimens and photographs have been seen by Bresadola who has verified the determination, and pronounced it correct in every detail. Still this species so far as I know is reported by only one collector, Prof. Morgan finding it at Preston. I greatly suspect that several of our new species will be found on further investigation to be referable to this abundant and variable species.

Lepiota rhacodes is a beautiful and striking species. As we found it it is large and robust, with a rounded almost hemispherical pileus, whose flesh is remarkably thick and firm, and which is covered with large strongly revolute scales, which render it very striking. It is at once recognized by the student of the group at first sight. The flesh and gills redden when bruised as in *L. Americana*, but the red color is not as bright and the change is slower. This species is doubtless rare in the United States. I have never seen anything even approaching it, though it has been found in New England. Cooke's figure is not good, but it will easily be recognized when found from the description.

Lepiota naucina was found only once, but then in some abundance in the parks at Stockholm. It is of course in outward appearance like our own *L. naucinoides*. The main point of interest was the form of the spores, as Fries stated that the spores of his species were round, which has led to the separation of our species in which the spores are elliptical and apiculate. Upon examination the spores were found to be identical with those of the American plant, and there can be no question that *L. naucina* as it is at present known to European mycologists is identical with *L. naucinoides*. It seems hardly probable that the traditional plant has been incorrectly determined. It is much easier to believe that the form of the spores was originally given incorrectly. The species is plentiful in Sweden and is, so far as I could learn, universally recognized as Fries' species.

L. cristata and *L. amianthina* need no comment. They were in agreement with the plants known by the same names with us.

The last species to appear at Drottningholm was an old friend, which is abundant at Asheville, and quite generally distributed in the U. S. It belongs to a group whose status is at present unsatisfactory, the *Clypeolariae*. Our species need further examination and comparison with well authenticated specimens of the European species before we shall be certain of their identity. The species found is known in Europe as *L. metulae-spora*. Fries considered it the same as Bulliard's species, *L. cly-*

peolaria, and so published it. Bulliard's plant is, however, different. It occurs in Sweden but is not as common and in spite of careful search I failed to find it. It is said to have a darker umbo and shorter spores than the true *L. metulaespora*. The plants we found were well marked by their soft appressed tomentose pileus, flocculose veil, and long spores. These were 15-20 x 5-6 mic., and were spindle shaped. The Asheville specimens have slightly shorter spores but agree in all other details with the Swedish plants. At Asheville there are three species of *Lepiota* belonging to this group, *L. metulaespora*, *floralis* and a third species upon which I am unwilling at present to express an opinion. Possibly it may prove to be the true *L. clypeolaria*, though it seems at present doubtful. *Lepiota floralis* occurs rarely in open sandy ground and seems to correspond well with Ravenel's plant, which was found in his garden from which he distributed at least three other new species, *L. oligosarcus*, *fulvaster*, and *psilopus*. These are all small species and from the specimens examined can not be well understood. I have examined two of Ravenel's specimens of *L. floralis*, one in very good preservation at Washington, the other in the herbarium at Biltmore. The spores in the latter were examined and were rather larger than the measurements given by Morgan, being 11-13 x 4-5 mic. and spindle shaped. It is worth suggesting that this species needs further investigation before its status can be considered satisfactory. The conditions under which it is found suggest very strongly that it is only a depauperate form of *L. metulaespora*. An almost unbroken series of forms can be found in this region connecting the two species, and the points of difference are such as may well be explained by the fact that one form is found in sheltered places in woods and the other in sterile sandy soil in open places.

NEW GENERA OF UREDINALES.

BY J. C. ARTHUR.

As the rusts are more carefully studied, and increased attention is given to the minute details of their structure, it becomes possible to find characters which enable one to group the species under genera that show relationship better than by the earlier method of using some obvious character to place many diverse forms under a few genera. The rusts are minute plants, and the diagnostic characters must be sought for with a corresponding minutia. In addition to the strictly morphological characters, the recognition of the invariable relation of the pycnia to the other spore-forms, by which it is possible to judge with much certainty of the nature of the life-cycle, has made it feasible to draw from

the whole set of spore-forms in assembling the characters held in common. In addition to these two sources of information regarding relationship sufficient knowledge of the whole body of *Uredinales* is now available so that some importance must be attached to the *pari passu* relationship of the host on which the fungus occurs.

In establishing the following genera these three points of view for determining relationship have been taken into account, *vis.*, morphological characters, life-cycle, and family of the host.

POLIOMA Arthur gen. nov.

Cycle of development includes pycnia and telia, both sub-epidermal.

Pycnia flask-shaped or globoid, central cavity usually large; ostiolar filaments apparently wanting.

Telia erumpent, somewhat indefinite, without peridium or paraphyses; teliospores pedicelled, two-celled, wall very pale or colorless, homogeneous, smooth, one pore in each cell and apical. Spores usually germinate upon maturity.

Type species: *Puccinia nivea* Holw., on *Salvia purpurea* Cav. Genus related to *Eriosporangium*, but without as many spore-forms. The generic name is taken from the Greek for grayness, in allusion to the usual appearance of the telial sori.

Polioma nivea (Holw.) Arthur nom. nov.

Puccinia nivea Holway, Jour. Mycol. 11:158, 1905. On *Salvia purpurea* Cav., Oaxaca, Mex., Oct. 21, 1899, 3696, and Nov. 11, 1893, 5378, *E. W. D. Holway*

Polioma griseola (Lagerh.) Arthur nom. nov.

Puccinia griseola Lagerh., in Sydow, Monog. Ured. 1:296, 1902. On *Salvia* sp., Ecuador.

Polioma delicatula Arthur sp. nov.

O. Pycnia unknown.

III. Telia hypophyllous, scattered or somewhat confluent in compact groups, round, 0.3-0.4 mm. across, soon naked, pulverinate, dirty white, becoming cinereous by germination, ruptured epidermis not noticeable; teliospores oblong or lanceolate-oblong, rounded or obtuse at apex, 12-15 x 40-48 μ , slightly or not constricted at septum, wall colorless, medium thin, 1-2 μ , not thickened above, smooth; pedicel hyaline, short.

On *Salvia elegans* Vahl., Sacred Mt., Amecameca, Mex., Oct. 20, 1903, *E. W. D. Holway*, 5200. Differs from *P. griseola* in the smaller spores without apical thickening.

SPIRECHINA Arthur sp. nov.

Cycle of development imperfectly known; only uredinia and telia recognized, both subepidermal, but judging from analogy also possessing subcuticular pycnia.

Uredinia erumpent, definite, without peridium or paraphyses; urediniospores borne singly on pedicels, ellipsoid, wall nearly colorless, echinulate-verrucose, pores obscure; contents colored.

Telia erumpent, definite, without peridium or paraphyses; teliospores borne singly on pedicels, obovate, one-celled, wall nearly or quite colorless, smooth, pore apical.

Spirechina Loeseneriana (P. Henn.) Arthur nom. nov.

Uredo Loeseneriana P. Henn. Hedwigia 37:273, 1898.

O. Pycnia unknown.

II. Uredinia amphigenous, often forming firm, more or less globular excrescences 3-20 mm. across, pulvinate, soon naked, pulverulent, bright orange-yellow fading to pale yellow, sometimes confluent, ruptured epidermis noticeable; urediniospores ellipsoid or obovate-oblong, $16-26 \times 19-40\mu$; wall pale yellow, $1.5-2.5\mu$ thick, thicker above, $3-5\mu$, echinulate-verrucose with rather fine tubercles closely set in spiral rows $2-3\mu$ apart, pores obscure.

III. Telia chiefly hypophyllous, scattered, small, 0.1-0.2 mm. across, soon naked, pulverulent, becoming pale yellow or whitish, ruptured epidermis not noticeable; teliospores narrowly obovate or oblong, $16-19 \times 42-48\mu$, usually germinating upon maturity; wall nearly or quite colorless, $1-1.5\mu$ thick, thicker above, $3-5\mu$, smooth; pedicel colorless, short.

On *Rubus Bogotensis* H. B. K. Yungas, Bolivia, 1890, *A. Miquel Bang 684* (type).; *Rubus* sp., St. Catharine, Serra Geral, Brazil, January, 1891, *E. Ule 1656*; Jalambohoch, Dept. of Huehuetenango, Guatemala, August 22, 1896, *C. & E. Seler, 2687* (type of *Uredo Loeseneriana*). The type specimen from South America was detected by the writer in the phanerogamic collection of the Field Museum in Chicago, upon sheet no. 77528. The spiral markings of the urediniospores naturally suggest the similar markings on the urediniospores of *Pileolaria*. The teliospores are in both cases one-celled. Yet these resemblances are doubtless superficial, and while they would consign both genera to the genus *Uromyces*, under the old system of single characters, the genus *Pileolaria* clearly shows affinities in the direction of *Ravenelia*, while *Spirechina* is closely related to *Kuehneola*, its chief difference being the one-celled teliospores. The generic name is taken from the Greek for *spiral* and *prickly husk*.

PROSPODIUM Arthur gen. nov.

Cycle of development includes pycnia, uredinia and telia, all subcuticular.

Pycnia hemispherical, hymenium flat, without ostiolar filaments.

Uredinia early naked, encircled by paraphyses; urediniospores borne singly on pedicels, wall colored, echinulate, often with a hygroscopic layer.

Telia erumpent, surrounded more or less by paraphyses; teliospores two-celled by transverse septum, wall colored, with a thin, hygroscopic, hyaline layer, sparsely papillose, pores one in each cell, apical in upper cell, near the pedicel in lower cell; pedicel refractive, usually appendaged.

Type species: *Puccinia appendiculata* Wint., on *Bignoniaceae*. This genus is related to *Uropyxis* by its subcuticular pycnia, encircling paraphyses in the uredinia, and hygroscopic layer of the teliospores, but differs in having only one pore in each cell of the teliospores.

Prosopodium appendiculatum (Wint.) Arthur nom. nov.

Puccinia appendiculata Wint. Flora 1884:262; *Puccinia ornata* Harkn. Proc. Calif. Acad. II, 2:231, 1889; *Puccinia medusaeoides* Arth., Bot. Gaz. 16:226, 1891; *Dicaeoma Stantis* Kuntze, Rev. Gen. Pl. 3:467, 1898; *Dicaeoma appendiculata* Kuntze, Rev. Gen. Pl. 3:467, 1898; *Puccinia Tecomae* Sacc. & Syd., Syll. Fung. 14:358, 1899. On *Stenolobium Stans* (L.) Don. (*Tecoma Stans* Juss., *T. sambucifolia* H. B. K.), Cuba, Mexico, South America.

Prosopodium Amphilophii (D. & H.) Arthur nom. nov.

Puccinia Amphilophii Diet. & Holw., Bot. Gaz. 24:30, 1897; *Puccinia phlyctopus* Syd., Monog. Ured. 1:242, 1902. On *Pithecoctenium hexagonum* DC. (not *Amphilophium*, as originally published), Mexico.

NEPHLYCTIS Arthur gen. nov.

Cycle of development includes pycnia and telia, both subcuticular.

Pycnia hemispherical, hymenium flat, without ostiolar filaments.

Telia erumpent, without peridium or paraphyses; teliospores two-celled by transverse septum, colored, with a usually obscure hygroscopic layer, sparsely papillose, pores one in each cell, apical in upper cell, near the pedicel in lower cell; pedicels without appendages.

Type species: *Puccinia elegans* Schroet., on *Tecoma Stans* Juss. Closely related to *Prosopodium*, but with fewer spore-forms, and short, unappendaged pedicels to the teliospores.

Nephlyctis elegans (Schroet.) Arthur nom. nov.

Puccinia elegans Schroet., Hennings in Hedw. 35:238, 1896. On *Stenolobium Stans* (L.) Don (*Tecoma Stans* Juss.), Argentine, Brazil.

Nephlyctis transformans (E. & E.) Arthur nom. nov.

Puccinia transformans E. & E., Erythea 5:6, 1897; *Puccinia exilis* Syd. & Holw., Sydow Monog. Ured. 1:245, 1902. On *Stenolobium Stans* (L.) Don, Lower California, Mex., Cuba, Bahama Islands. On *Stenolobium molle* (H. B. K.) Seem. (*Tecoma mollis* H. B. K.) Mexico.

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THE GENUS *CORTINARIUS* WITH KEY TO THE SPECIES.

BY C. H. KAUFFMAN.

The editor of the JOURNAL has asked me to furnish an account of the genus *Cortinarius* with Key to the species. What follows is given in response to this invitation. I desire to call attention to what was published in the *Bulletin of the Torrey Botanical Club*, based mainly on my study of the species found at Ithaca, N. Y. The cuts prepared for the illustration there have been kindly loaned for use here.

I quote from the same article the following:

"It is absolutely useless to pick up an old, dried specimen of *Cortinarius*, and ask any one to recognize it. Once in a while some easily known plant may be recognized in that way, but in the majority of cases old plants of different species look so much alike that it is mere guessing to say anything about them. The first thing to remember is that young, unexpanded plants must be examined as well as mature ones. Next a careful description must be made, *with special reference to the difference in the color of the gills in the young and old plants*. Then a similar comparison of the color of pileus and stem; and then a search for an annulus or universal veil, and its character. Finally, a careful test of the pileus and stem for gluten or viscosity. (One must remember that old, dry plants may lose this character.) These points are absolutely essential. In addition to the above, the following characters are often useful: the shape of the pileus; the size of the parts; the smoothness of the surface of pileus and stem; the character of the edge of the gills; the nature of the bulbous base of the stem; the appearance of the flesh. In fact, the notes can-

not be too full, *provided they contain the essential facts mentioned first.*" (*Bulletin of the Torrey Botanical Club.*)

THE KEY.

The key which is here presented is a revision, with many additions, of the key printed in the Bulletin of the Torrey Botanical Club, June, 1905. It is based on the study of fresh plants; but there have been added a few which the writer has not seen, but which have characters so easily recognized, and so different from others, that they were thought worthy of inclusion. This key, like its predecessor, necessarily has many shortcomings. As long as we are not sure what American plants are really identical with European ones, and so long as good figures or photographs of the species described for North America, are lacking, we are easily able to mistake the meanings of the descriptions, which are often of the very briefest. Hence this list is merely offered as a slight forward step towards opening up for amateurs the study of this interesting genus.

Six species, which the writer believes to be undescribed, have been included, although their descriptions have not yet been published. All of them have been collected or been received from various places more than once, and by inserting them in the key, we may be able to help those who continue to come across them. It is hoped soon to publish descriptions of them elsewhere.

It is to be noted that the key has been built largely on the size of the spores. This will necessitate, it is hoped, the study of the plant under the microscope, and so initiate the beginner at once into the proper study of these fungi. We know that two different species of mushrooms have again and again been placed under one name because of similar external appearances, when an examination of the spores would have shown a difference of as much as 8 microns in some cases. In deciding on the size of spores, the measurement of mature spores only should be taken, which may be recognized by the dark wall or the roughness of the exospore; even in plants with yellowish spores a difference between young and mature spores can be made out.

KEY TO THE COMMON SPECIES OF CORTINARIUS OF EASTERN NORTH AMERICA.

- A. Pileus with a gelatinous cuticle, more or less viscid or glutinous when moist, as is also the stem in some species. [Myxacium and Phlegmacium.]
 - a. Pileus coarsely corrugate.....*C. corrugatus* Pk.

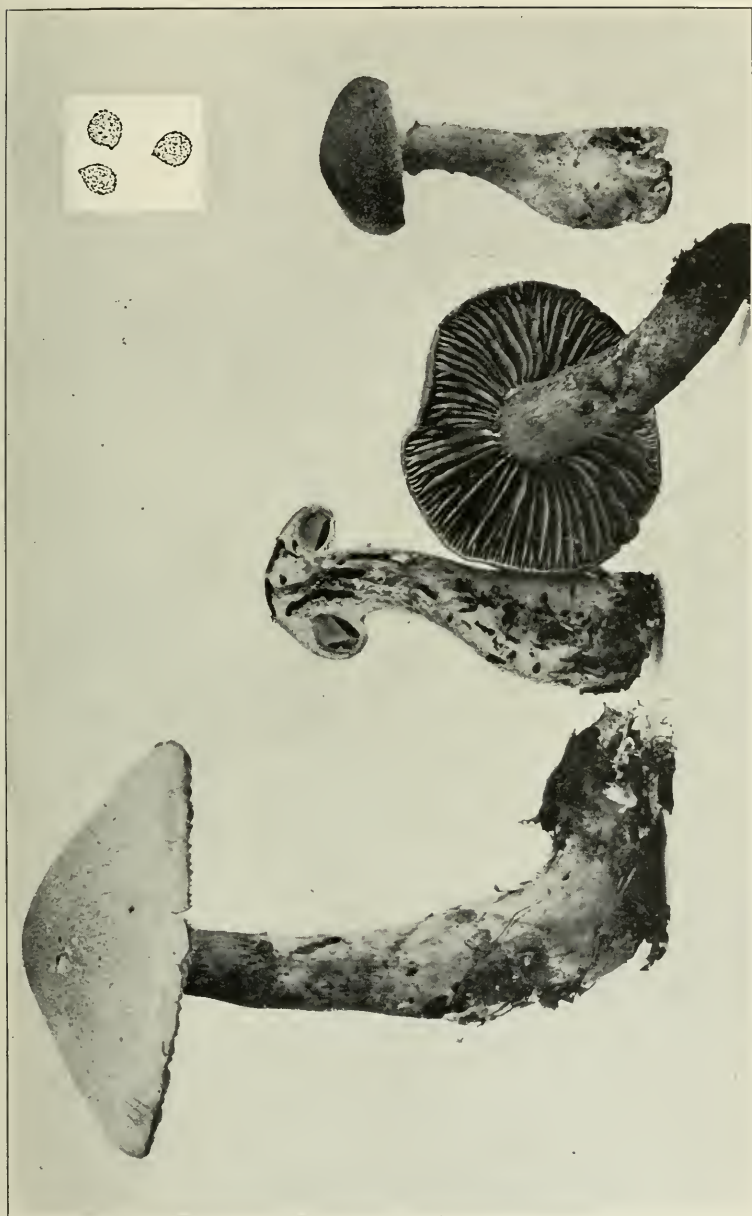
- aa. Pileus not coarsely corrugate
 - b. Surface of pileus or flesh distinctly bitter
 - c. Pileus yellow
 - d. Glutinous when young, very bitter; stem white.
C. amarus Pk.
C. vibratilis Fr.
 - dd. Not glutinous; stem and gills citron yellow;
flesh rather bitter; spores $14-17 \times 7-9\mu$
C. turbinoides sp. nov.
 - cc. Pileus dark olivaceous to fuliginous, surface bitter*C. infractus* Fr.
 - bb. Taste not distinctly bitter
 - c. Spores large, $9-16\mu$ long
 - d. Stem short, subequal or marginate-bulbous; spores $9-12\mu$ long.
 - e. Pileus heliotrope-purple; gills close, narrow and concolor; plant medium size...*C. heliotropicus* Pk.
 - ee. Pileus some shade of yellow or greenish
 - f. Gills whitish at first; pileus tinged greenish; stem not bulbous*C. olivaceo-stramineus* Kauff.
 - ff. Gills yellow to yellowish at first; stem marginate-bulbous
 - g. Bulb top-shaped; gills entire; flesh white...*C. turbinatus* Fr.
 - gg. Bulb truncate below; gills eroded, flesh yellow; whole plant citron-yellow*C. sulfurinus* Quel.
 - eee. Pileus whitish, no greenish tinge
 - f. Stem marginate-bulbous; plant whitish throughout
C. albidus Pk.
 - ff. Stem equal or subequal; pileus whitish or tinged red,
C. communis Pk.
 - dd. Stem long and bulbous; gills and stem violaceous at first
 - e. Spores $10-12.5\mu$ long; pileus pale brown; on sphagnum*C. sphagnophilus* Pk.
 - ee. Spores $13-16\mu$ long; pileus yellow; in woods....
C. Atkinsonianus Kauff.
 - ddd. Stem not bulbous, long and cylindrical, plant more or less glutinous
 - e. Stem with evanescent, patch-like scales
 - f. Gills pallid at first.....*C. elatior pallidifolius* Pk.
 - ff. Gills violaceous at first.....*C. cylindripes* Kauff.
 - ee. Stem with broken, concentric rings of floccose scales, usually somewhat narrowed at base.....*C. collinitus*. Fr.
 - cc. Spores smaller, $6-9\mu$ long
 - d. Pileus olivaceous; stem bulbous

- e. Universal veil present; spores $8-9\mu$ long.....
C. olivaceodes sp. nov.
- ee. No remains of a universal veil; spores $6-7\mu$ long....
C. olivaceus Pk.
- dd. *Pileus violaceous or purple, or at least tinged violaceous*
- e. Pileus glutinous when young and moist
 - f. Stem marginate-bulbous; gills very narrow and crowded; whole plant violaceous, large
C. Michiganensis sp. nov.
 - ff. Stem subequal or clavate; gills subdistant, adnate; whole plant violaceous-purple, medium size.....
C. iodes B. & C.
- ee. Pileus not glutinous
 - f. Flesh and gills turning purple when bruised.....
C. purpurascens Fr.
 - ff. Flesh not turning purple
 - g. Stem marginate-bulbous; pileus yellowish or brownish, tinged violaceous; medium size.....
C. coerulescens Fr.
 - gg. Stem not marginate-bulbous
 - h. Pileus yellow; gills violaceous to cinnamon; stem white with violaceous apex.....
C. Berlesianus Sacc. & Cub.
(Syn. = *C. tricolor* Pk.)
 - hh. Pileus and gills lilac; plant small.....
C. croceo-coerulius (Pers.) Fr.
 - ddd. *Pileus with neither olivaceous nor violaceous tints (except the first)*
- e. Pileus glutinous
 - f. Gills olivaceous; pileus brownish-ochraceous.....
C. glutinosus Pk.
 - ff. Gills whitish at first
 - g. Pileus bay-red.....*C. maculipes* Pk.
 - gg. Pileus pale ochraceous, spores globose
C. sphoerosporus Pk.
 - fff. Gills violaceous at first, spores as in preceding
C. delibutus Fr.
- ee. Pileus not glutinous
 - f. Stem marginate-bulbous
 - g. Gills at first whitish.....*C. multiformis* Fr.
 - gg. Gills at first blue.....*C. glaucopus* Fr.
 - ggg. Gills at first yellow...*C. fulgens* (Alb. & Schw.)
 - ff. Stem not marginate-bulbous, clavate to subequal
 - g. Gills and stem pallid at first, soon tinged brown
 - h. Pileus watery-cinnamon to brick-red on disk; in woods*C. glabrellus* sp. nov.

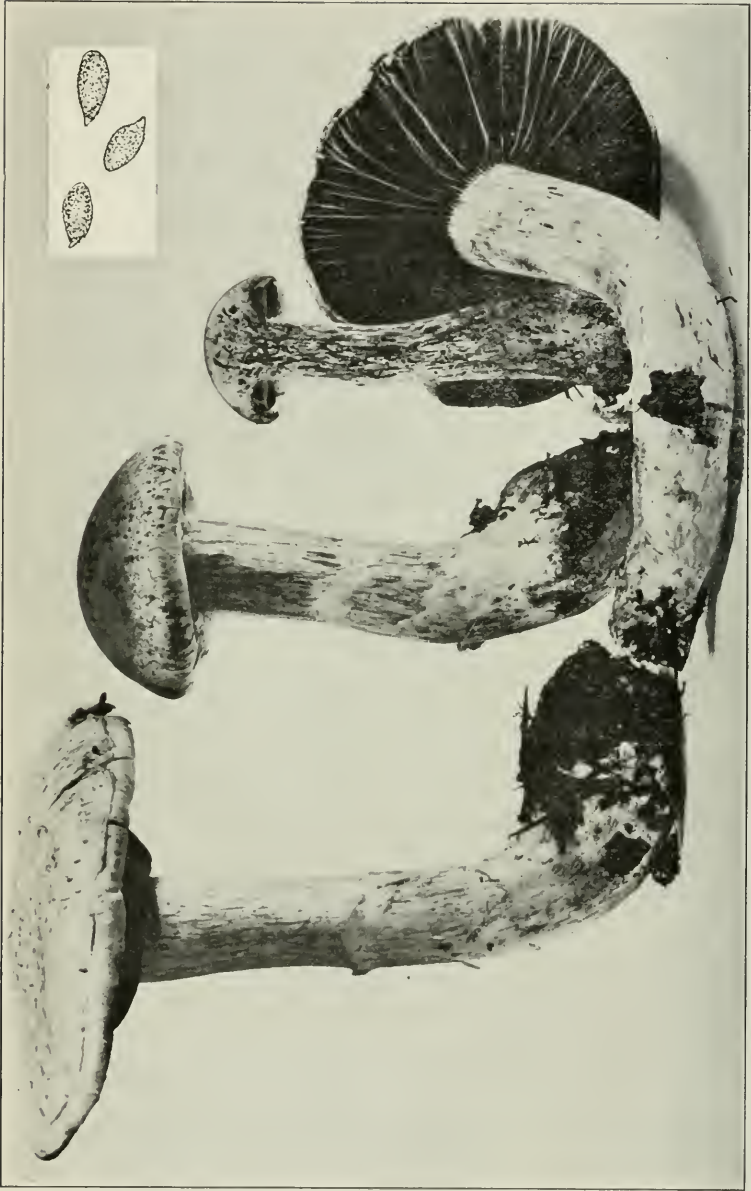
- hh. Pileus whitish to pale clay-color; in mushroom and flower-beds.....*C. intrusus* Pk.
- gg. Gills and apex of stem violaceous at first, soon brownish*C. lanatipes* Pk.
- ggg. Gills and pileus drab-gray; viscid universal veil present*C. sterilis* Kauff.

B. Cuticle of pileus not composed of gelatinous cells, hence never viscid nor gelatinous. [Inoloma, Talamonia, Dermocybe, and Hydrocybe.]

- a. Spores 12-16 μ long
 - b. Pileus rather large, squamulose; whole plant dark violaceous*C. violaceus* Fr.
 - bb. Pileus small, chestnut color; stem white; spores 16 x 11 μ *C. sericipes* Pk.
- aa. Spores 10-12 μ long
 - b. Plants small, 2-4 cm. tall
 - c. Pileus hygrophanous, glabrous, bay-red (moist); gills subochraceous*C. badius* Pk.
 - cc. Pileus not hygrophanous, densely fibrillose; gills yellow.....*C. auricfolius* Pk.
 - bb. Plants larger
 - c. Stem distinctly sheathed or ringed by the universal veil
 - d. Pileus tawny; stem with cinnabar-colored, persistent, concentric rings.....
C. armillatus (Alb. & Schw.)
 - dd. Pileus purplish-brown, copper-brown, etc., to drab; stem peronate, i. e., sheathed with a universal veil.....*C. torvus* Fr.
C. torvus nobilis Pk.
 - ddd. Pileus tinged yellow or rufous; stem peronate and annulate by a white universal veil...
C. canescens Pk.
 - cc. Stem not sheathed or ringed; the universal veil evanescent or absent
 - d. Pileus hygrophanous, fibrillose-squamulose (like *C. palcaceus*)
 - e. Pileus dingy chestnut (moist); stem long and slender...
C. gracilis Pk.
 - ee. Pileus grayish; stem stout and short, bulbous.....
C. griseus Pk.
 - dd. Pileus not hygrophanous, merely silky or innately fibrillose
 - e. Pileus reddish-gray, tinged purplish; gills purple or violaceous; spores 10-12 μ long....*C. pulchrifolius* Pk.
C. rubrocinerus Pk.



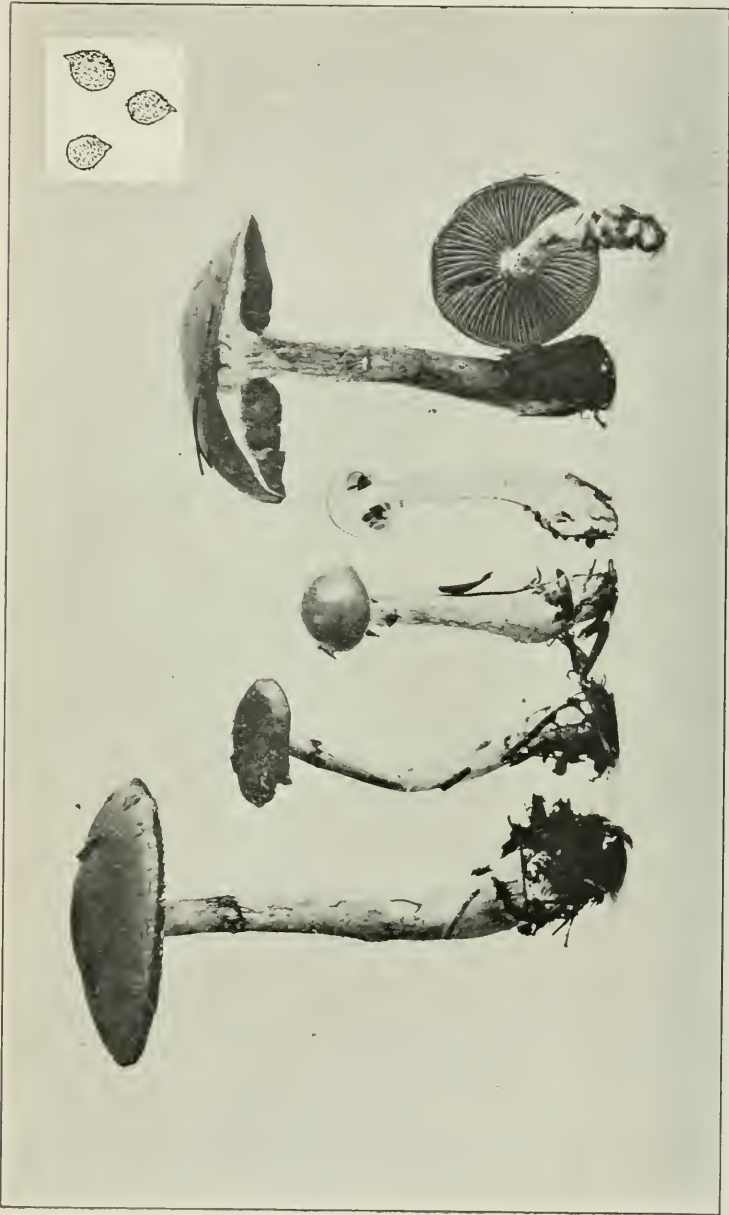
CORTINARIUS CROCEOCOLOR KAUFF. (From Bull. Torr. Bot. Club.)



CORTINARIUS UMIDICOLA KAUFF. (From Bull. Torr. Bot. Club.)



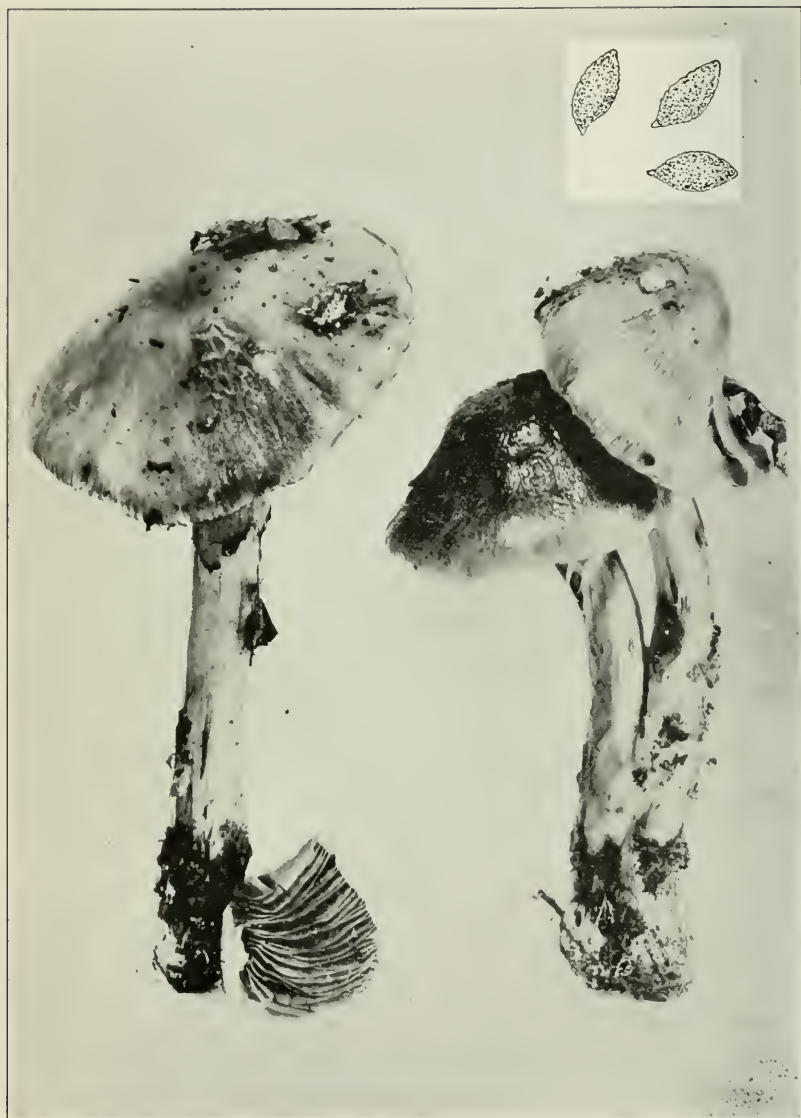
CORTINARIUS OLIVACEO-STRAMINEUS KAUFF. (From Bull. Torr. Bot. Club.)



CORTINARIUS STERILIS KAUFF. (From Bull. Torr. Bot. Club.)



CORTINARIUS CINNAMOMEUS (L.) FR (From Bull. Torr. Bot. Club.)



CORTINARIUS CYLINDRIPES KAUFF. (From Bull. Torr. Bot. Club.)



CORTINARIUS ATKINSONIANUS KAUFF. (From Bull. Torr. Bot. Club.)



CORTINARIUS DECEPTIVUS KAUFF. (From Bull. Torr. Bot. Club.)



CORTINARIUS RUBRIPES KAUFF. Reduced. (From Bull. Torr. Bot. Club.)

- ee. Pileus, stem and gills lilac; spores $9-10\mu$
C. lilacinus Pk.
- eee. Pileus, stem and gills violaceous at first; spores $10-12\mu$ long.....*C. rimosus* Pk.
- aaa. Spores $4-9\mu$ long; if longer, plants are whitish or violaceous
 - b. Stem and pileus scaly or shreddy
 - c. Scales red (scarlet to vermillion)....*C. bolaris* Fr.
 - cc. Scales brown to blackish
 - d. Plant large, watery-spongy, soon dark chocolate colored*C. squammulosus* Pk.
 - dd. Plants of medium size, wood-brown.....
C. pholideus Fr.
 - bb. Stem not scaly.
 - c. Stem with more or less persistent annular rings, or peronate
 - d. Plants large, 2-8 cm. or more tall; pileus in proportion
- e. Pileus watery-cinnamon (moist); gills very distant.....
C. distans Pk.
- ee. Pileus buff, ochraceous, clay-colored or tawny
 - f. Gills at first yellow or yellowish
 - g. Pileus at first buff; stem peronate by the thin universal veil.....*C. flavifolius* Pk.
 - gg. Pileus ochraceous to ferruginous; subannulate..
C. Morrisii Pk.
 - ggg. Pileus at first tawny-yellow, with pointed squamules on disk; peronate by tawny-yellow universal veil*C. annulatus* Pk.
 - ff. Gills at first brownish or ochraceous; pileus rufous-ochraceous
 - g. Spores elliptical.....*C. bivelus* Fr.
 - gg. Spores spherical, minute, $4-5\mu$ diameter.....
C. subbivelus sp. nov.
- eee. Entire plant saffron-yellow.....*C. croceocolor* Kauff.
- eeee. Pileus some shade of blue or purple when young, buff to tan when old
 - f. Plants stout, umber-purple to buff; pileus punctuate in or near swamps, in large troops....*C. umidicola* Kauff.
 - ff. Mature plants rather slender; pileus fawn-colored, tinged lavender when young, not punctate; common in hemlock woods.....*C. deceptivus* Kauff.
 - dd. Plants small, subannulate; pileus less than 3-4 cm broad
- e. Pileus fuscous, covered with white villose fibrils.....
C. paleaceus (Weinm.) Fr.

- ee. Pileus not villose-squamulose, cinnamon to chestnut color
 - f. Gills and stem violaceous at first. . . . *C. subflexipes* Pk.
 - ff. Gills and stem pallid to brownish
 - g. On rotten wood; pileus watery cinnamon. . . . *C. ligniarius* Pk.
 - gg. On ground or moss; pileus bay to chestnut brown; annulus often distinct. *C. castaneoides* Pk.
 - cc. Stem with no annulus, or annulus evanescent
 - d. Stem bulbous or clavate
- e. Bulb depressed-marginate; gills heliotrope purple when young. *C. obliquus* Pk.
- ee. Bulb clavate to subclavate
 - f. Color of plant lilac to violaceous-white
 - g. Plants of medium size, violet tinge evanescent, never yellowish *C. alboviolaceus* (Pers.) Fr.
 - gg. Plants medium to large, lilac tinge persistent. . . . *C. lilacinus* Pk.
 - ggg. Plants medium to small, violaceous to cinereous, tinged yellow or brown. *C. simulans* Pk.
 - ff. Color of plant deep chrome, unchanging. *C. callisteus* Fr.
 - fff. Color of plant watery-cinnamon or rufous-cinnamon (moist)
 - g. Stem whitish, pileus rufous-cinnamon to tan; not hygrophanous. *C. subsalmonens* sp. nov.
 - gg. Stem red; pileus hygrophanous, pinkish-ochraceous (dry) *C. rubripes* Kauff.
 - dd. Stem subequal or tapering downward
- e. Pileus distinctly hygrophanous
 - f. Plant small; pileus 2 cm. broad or less
 - g. Gills and stem violaceous when young
 - h. Stem stout, smooth; spores 7-9 μ long. *C. castaneus* (Bull.) Fr.
 - hh. Stem slender; spores 6-7 μ long
 - i. Gills and stem pale reddish violaceous at first; pileus blackish-brown; in woods. . . . *C. subflexipes* Pk.
 - ii. Gills dark-violaceous at first; pileus fuscous, tinged violaceous; on sphagnum. . . . *C. fuscoviolaceus* Pk.
 - gg. Gills ochraceous, pale; stem whitish, not slender. . . *C. pulcher* Pk.
 - ff. Pileus broader than 2 cm.
 - g. Pileus tawny orange to cinnamon; stem pale. *C. armeniacus* (Schaeff.) Fr.
 - gg. Pileus watery-cinnamon; gills very distant. *C. distans* Pk.

- ggg. Pileus and stem pale lavender; stem long and attenuated *C. everneus* Fr.
- ee. Pileus not hygrophanous
- f. Pileus chestnut or cinnamon color
- g. Stem whitish, soon dingy to brownish.....
C. castanellus Pk.
- gg. Stem yellow, no olivaceous tinge
- h. Gills at first yellow.. *C. cinnamomeus* (L.) Fr.
- hh. Gills at first flame scarlet.....
C. semisanguineus flamineus Kauff.
- hhh. Gills at first dark blood-red.....
C. semisanguineus Fr.
- ff. Pileus tawny-olive; stem yellow, tinged olivaceous....
C. croceus Fr.
- fff. Pileus and stem scarlet or blood red
- g. Pileus broad as compared with the rather short stem; spores $8 \times 5\mu$ *C. cinnabarinus* Fr.
- gg. Pileus narrow; stem longer; spores $6 \times 4\mu$
C. sanguineus (Wulf) Fr.

Univ of Michigan.

JOURNAL OF MYCOLOGY

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EDITOR'S NOTES.

This No. of the Journal is issued somewhat earlier and the size is less than usual, on account of the editor's contemplated trip to Guatemala. The next No. may be correspondingly delayed by his prolonged absence. We regret also that no account can at present be given of the mycological papers presented at the New York Meeting of the A. A. A. S. and affiliated societies.

In this No. we are concluding the installments of Professor Morgan's monograph of the North American species of *Lepiota*. The parts will be reprinted as a single pamphlet. This then, as well as the North American species of *Marasmius*, by the same author, will we are sure be welcomed by very many botanists. Those interesting special groups can now be observed and studied systematically and advantageously — scarcely the case when the literature pertaining to many of the species remained practically inaccessible except perhaps to the specialist himself.

As serving a similar purpose and likewise of special advantage to the student of mycology — therefore it can be placed in the same category, namely, the article we are giving this month by Mr. Kauffman of the University of Michigan. His excellent work on the species of *Cortinarius*, to which difficult and important group he is still devoting himself, will be keenly appreciated by those interested in the *Agarics*. To the numerous other contributors in the past we are equally grateful for important articles — all of which in fact can justly be claimed as creditable to American mycology.

The Journal has set for itself the aim to index and in a measure to represent the work of our mycologists — and incidentally to give by brief notes some idea of the work in the entire mycological world. In our scope we include monographic articles of lesser or greater extent — and we expect to present from time to time much work of the latter character.



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McALPINE'S STUDIES OF AUSTRALIAN RUSTS.

BY J. C. ARTHUR.

Among the notable recent contributions to uredinology the volume on "The Rusts of Australia, their structure, nature and classification," by D. McAlpine, is worthy of special attention. It was prepared under the auspices of the Department of Agriculture of Victoria, and is an octavo volume of 349 pages of text and 55 full-page plates, partly colored, and the others half-tones from excellent photographs and photomicrographs. The press work and binding are well done, and the volume as a whole is a good piece of book-making.

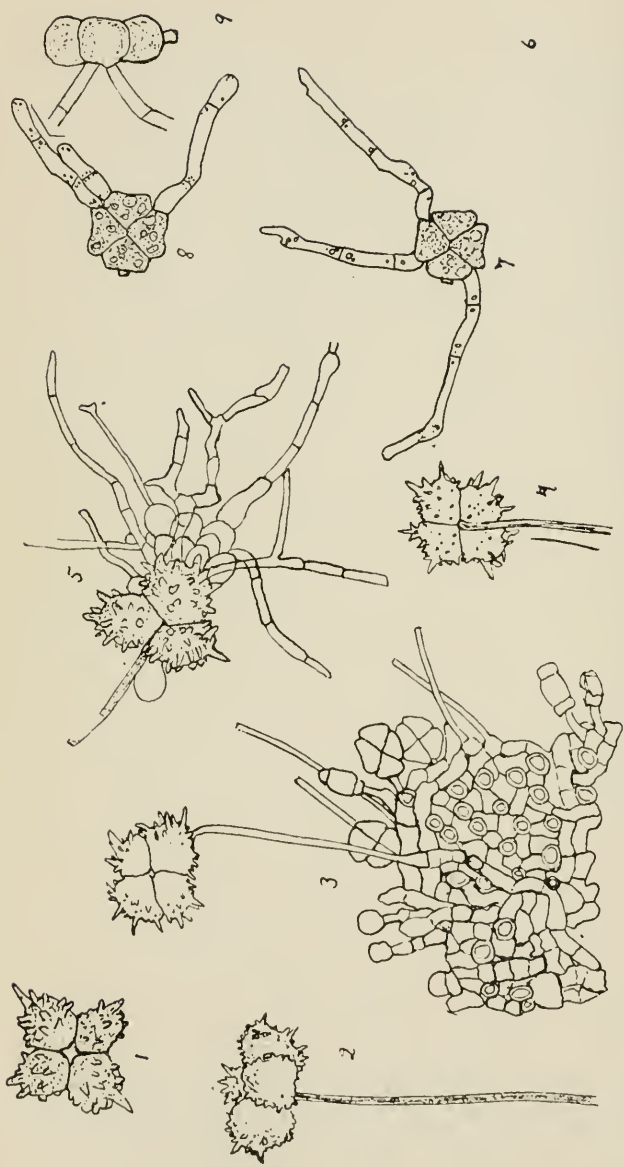
The body of the work is occupied by a systematic account of 161 species of rusts, all so far known to occur in Australia, distributed under 9 genera. The descriptions of the species are admirably drawn with uniform diagnostic characters for each of the spore-forms. The care exercised to study fully each kind of spore, and especially to search out and describe the spermogonia, is worthy of highest commendation. All collections are reported by place, date and name of collector. Much care has also been taken in citing bibliography and synonymy for each species, and many notes and observations are appended. Prac-

tically every species is illustrated in a most satisfactory manner, to show not only the spore-forms, but in many instances the gross appearance of the fungus and the distortions it produces as well.

Preceding the systematic part twenty chapters are devoted to a discussion of the general subject of rusts in its various aspects, and from the most modern points of view. It is by much the best account now available in the English language.

Following the systematic account is a glossary, bibliography, and three ample indexes. Nothing has been forgotten that might make the work serviceable and complete.

The thoroughness with which the author has accomplished his task, the culmination of many years of observation and study, has insured a valuable work of reference for both local and other botanists. But even more than this, the broad spirit in which the work has been conceived, and the ability shown to discover and interpret the less obvious morphological structures, give added value to the record of facts. The author states that there was "a special object in view in thus recording and describing the rust-fungi of Australia, for this can afterwards be used as a basis in working out the life-history of those particular forms which attack our cultivated and economic plants," which is clearly a sensible method of procedure in attacking the difficult problem of the harmful rusts. It was the author, who a short time ago established the interesting genus *Uromycladium* with its half dozen or more species, founded upon heretofore unrecognized fruiting structures, and his perspicacity brought to light the fascicled arrangement of teliospores in the plum and peach rust, which has put a new interpretation upon the affinities of this and similar rusts. It is this clear insight, and the accuracy and fullness of details, that commend the work to all students of the rusts in every part of the world.



SPORE FORMS OF SPEGAZZINIA ORNATA SACC.

SPORE FORMS OF SPEGAZZINIA ORNATA SACC.¹

ERNST A. BESSEY.

The group, *Tubercularieae Dematieae*, to which genus *Spegazzinia* belongs is a rather artificial one containing some fungi of undoubted close relationship but others whose affinities are certainly with other groups. The genus *Spegazzinia* seems to stand rather apart from any other genera in this group on account of the peculiar structure of the spores. The genus was first described by Saccardo² from specimens collected in Italy, with the single species *S. ornata*. Some six or more species have since been described so that representatives of this genus are known to occur also in South America, Mexico and United States, and doubtless many other parts of the world. The species are mostly saprophytic,³ attacking different leaves, herbaceous stems and wood, and in one instance observed by the writer, the dead skin of a pomelo (*Citrus decumana*). They are most commonly found on dead parts of grasses. The specimens examined by the writer were collected by him in Florida on dead grasses, pineapple leaves and pomelo skin, in addition to specimens collected by Langlois in Louisiana (under the name of *S. tessarthra*) and a specimen on unknown host from Texas. Through the kindness of Professor Saccardo who sent the writer, on request, an authentic specimen of *S. ornata* collected by him in Treviso in 1877, it was possible to identify all the above-mentioned specimens as belonging to this species. The differences between the specimens on different hosts in different localities were not greater than the difference between spores in the same lot of material.

The mycelium within the substratum is colorless. On the surface are produced here and there larger or smaller masses of closely woven, thick-celled, dark-colored septate threads. In some cases these bodies may attain a diameter of 5 mm. and be from 50-100 μ thick, forming a definite sporodochium, but often there are not more than one or two layers of threads. In such a case it is difficult to see why the fungus is put in with the *Tubercularieae*. Arising from these dark-colored threads are conidiophores which bear two kinds of conidia (Fig. 3), long-stalked, spiny conidia and short-stalked, smooth conidia; the latter are borne on stalks 5-8 μ long, occasionally longer, arising directly from the hyphae of the sporodochium. These conidia are cruciately four-celled and flattened in the plane in which the stalk lies (Figs. 6,

¹ Read before Section G., A. A. A. S., December, 1906.

² Saccardo, P. A. *Spegazzinia*, novum *Hyphomycetum* genus. Padova. 1879.

³ *Spegazzinia trichophila* Atkinson, a form lacking sporodochia, as well as *S. meliicola* Henn. and *S. meliolae* Zimm. are found accompanying and perhaps parasitic upon species of *Meliola*.

7, 8), the latter being attached at the middle of one edge of one of the cells. The spores are 6-8 μ thick and 13-16 μ wide and high. Usually the conidiophore separates from the spore leaving a portion but one or two microns long, although occasionally the whole conidiophore may remain attached when the spore separates from the sporodochium. The spiny spores are long-stalked, the stalks being 30-120 (usually 50-70) μ long. These conidiophores are non-septate. The spores are like the preceding, four-celled, but the constrictions between the cells are deeper and the outer portions are spiny; the plane passing through the four cells is perpendicular to the conidiophore which is fastened at the point where the four cells meet (Figs. 1, 2 and 4). In the original description of the species, as well as that occurring in the *Sylloge Fungorum*,⁴ the fungus is described as consisting of superficial sporodochia with fasciculately-radiating, filiform, non-septate, fuscous hyphae, 99-100 $\times$ 2-3 μ , terminating in fuliginous, mostly four-celled, sporophores upon which are borne on subhyaline, acicular sterigmata, sarciniform-four-celled, fuliginous, smooth conidia, constricted at the septa, 16-20 μ in diameter. Essentially the same description is given in *Die natürlichen Pflanzenfamilien*.⁵ Examination of Fig. 3 (which was drawn with camera lucida) will convince one, however, that this description is erroneous, for it will be seen that the two forms of spores are borne independently of one another directly from the sporodochial hyphae, instead of the smooth spores being conidia borne upon a spiny, long-stalked sporophore. The writer made pure cultures of the fungus obtained on dead pineapple leaves and found that under certain conditions only smooth-celled conidia would be formed, while at other times, none but the long-stalked, spiny forms would appear; while still again both would be mixed on the same sporodochium. Hanging drop cultures were then made to observe the germination of the two types. The smaller smooth spores germinated quickly, usually within a day or two, mostly with one germ tube from each cell (Figs. 7, 8, and 9, Fig. 9 being an abnormally-shaped and unusually large spore). The germ tubes are stout with several granules near the partitions. The spiny spores germinated with difficulty after three days, or even longer, producing first many hyaline, bladder-like structures from

⁴ Vol. 4: p. 758, 1886. "Sporodochiis superficialibus. * * * * hyphis fasciculato-radiantibus, filiformibus, 90-100 $\times$ 2-3, cespitatis, fuscis in sporophora, saepius 4-cellularia, fuliginea desinentibus; conidiis e sporophoris per sterigmata acicularia subhyalina, 30-40 μ long. oriundis, sarciniformi-subquadriceellularibus, ad septa constrictis, 16-20 diam. fuligineis, levibus."

⁵ I Teil, 1, Abt.** p 515, 1900. "Conidienlager gewölbt, dicht schwarz. Hyphen dicht stehend, am Ende in einem mehrzelligen, *Sarcina*-artigen, sporentragenden Teil endigend. Conidien aus dem sporentragenden Teil mit einem Sterigma entspringend, *Sarcina*-artig gestaltet, häufig über Kreuz vierzellig, dunkel gefärbt."

which later mostly slender, branching germ tubes were produced. (Fig. 5, showing, for the sake of clearness, only part of the bladder-like structures and germ tubes).

In various culture media, the writer was unable to obtain any further forms of this fungus.

EXPLANATION OF PLATE IOI.

Fig. 1. Top view of spiny spore from pineapple leaf, x 750.

Fig. 2. Side view of spiny spore from *Cenchrus*, x 750.

Fig. 3. Portion of sporodochium on *Cenchrus*, showing two kinds of spores and scars where sporophores have fallen away, x 750.

Fig. 4. Underview of spiny spore on *Cenchrus*, showing mode of attachment of sporophore to spores, x 500.

Fig. 5. Germination of spiny spore from pineapple leaf (only a portion of the germ tubes being shown, for the sake of clearness), x 600.

Fig. 6. Smooth spore from *Cenchrus*, showing sporophore, x 600.

Figs. 7. and 8. Smooth spores from pineapple leaf, in germination, x 600.

Fig. 9. Abnormal smooth spore, from pineapple, in germination, x 700.

All drawings were made with the aid of the camera lucida.

Subtropical Laboratory, Miami, Florida.

NEW FUNGI FROM NEW YORK.

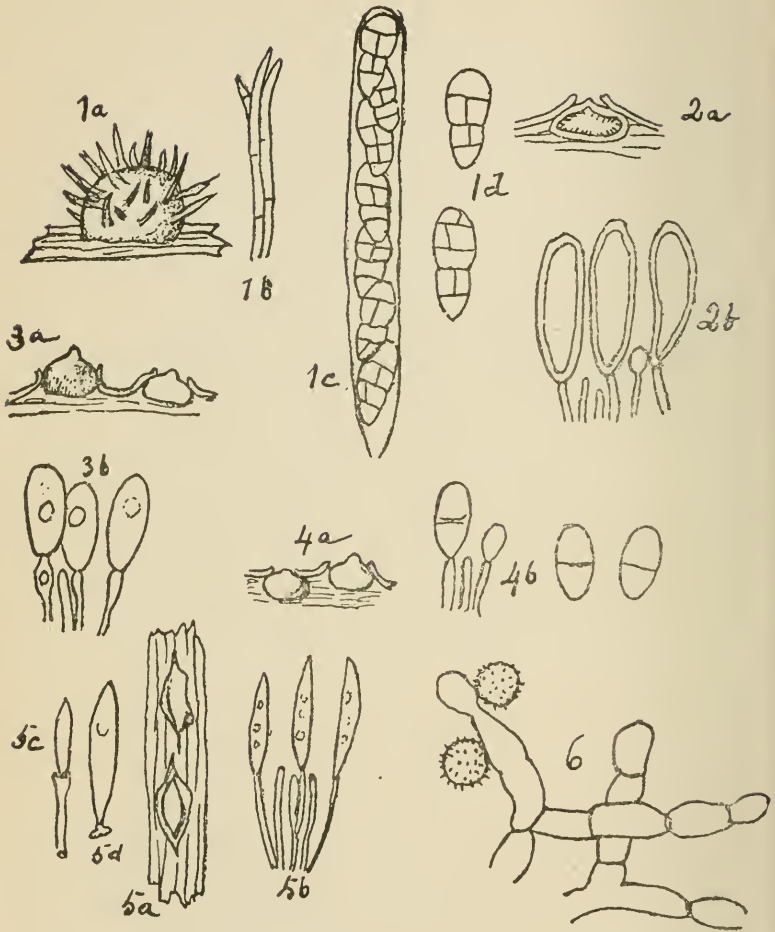
P. A. SACCARDO.

The following fungi were collected by Dr. C. E. Fairman, near Lyndonville, N. Y., and submitted to me for determination:

PLEOSPHERIA FAIRMANIANA Saccardo sp. nov.

Peritheciis laxae gregariis v. subsparsis, superficialibus, globosis, nigris, membranaceo-carbonaceis, 250-280 μ diam., vertice rotundatis, non papillatis, utique laxae setulosi; setulis fileformibus, obtusulis, indistincte septulatis, fuliginosis, 85-100 x 5-6 μ , in fasciculos rigidulos junctis; ascis cylindricis, octosporis, 100-120 x 12 μ , indistincte paraphysatis; sporidiis oblique monostichis, oblongo-ovoideis, sursum crassioribus, 3-septatis (rarius 4-septatis), medio constrictis, parceque muriformibus, 19-23 x 7.5-9 μ , olivaceo-fuscis.

Hab. in ligno carioso indurato Ulmi americanae. Lyndonville, N. Y., Maio 1906, Doct. C. E. Fairman, no. 55.



- | | |
|-----------------------------|----------------------------|
| 1. PLEOSPHERIA FAIRMANIANA. | 4. DIPLODIA HORTENSIS. |
| 2. SPHAEROPSIS AMERICANA. | 5. HYMENOPSIS HYDROPHYLLA. |
| 3. SPHAEROPSIS RUMICICOLA. | 6. ZYGODESMIS AVELLANEUS. |

Praecipue *Pleosphaeria quercinae* Pat. boreali-africanæ affinis, a qua differt ascis cylindraceis nec clavatis, setulis peritheciæ fasciculatis, etc.

PHOMA STROBILIGENA Desm. f. abietina; a typo generi satis aberrans et forte non diversa a *Ph. cornigena* Karst. Lyndonville, N. Y., Doct. C. E. Fairman, No. 45.

SPHAEROPSIS (Macropodia) AMERICANA Sacc. sp. nov.

Pycnidiis laxe gregariis, globoso-depressiusculis, peridermio pustulatim elevato tectis et denique ostiolo breviter papillato erumpentibus, 500-700 μ diam., excipulo crassiusculo, 90-100 μ cr., minute celluloso, atro-fuligineo, nucleo farcte subolivaceo; sporulis oblongo-ellipsoideis, $28-3 \times 9-11 \mu$, rectis v. leviter inaequilateris ex ochraceo olivaceo-fuligineis, initio granulosus, dein 2-nucleatis, demum farctis, tunica hyalina crassiuscula obductis; basidiis paliformibus, 10-15-4-5, hyalinis.

Hab. in ramis Tiliae americanae, Lyndonville, N. Y., Maio 1906. Doc. C. E. Fairman. No. 50.

SPHAEROPSIS RUMICICOLA Saccardo sp. nov.

Pycnidiis densiuscule gregariis, subcutaneo-erumpentibus et dein subsuperficialibus, globoso-conoideis, atris, membranaceis, 1-3 mm. diam., glabris; sporulis ellipsoideis v. ovato-ellipsoideis, utrinque rotundatis; $22-27 \times 11-14 \mu$, inaequaliter 2-3-guttulatis, fuligineis; basidiis paliformibus, v. sursum leviter inflatis, hyalinis.

Hab. in caulibus emortuis Rumicis sp., Lyndonville, N. Y., Apr. 1906. Dr. C. E. Fairman. No. 50.

Sporulis jugiter continuis, huic typica Sphaeropsidis species nec Diplodia.

DIPLODIA ROSARUM Fr.; basidia breviuscula, hyalina, $6 \times 2.5 \mu$. Lyndonville, N. Y. Dr. C. E. Fairman. No. 51.

DIPLODIA HORTENSIS Saccardo sp. nov.

Pycnidiis gregariis, subcutaneo-erumpentibus, globosis, breve papillatis, nigris, 300-400 μ diam.; sporulis ellipsoideis, utrinque rotundatis, medio septatis, non constrictis $19-20 \times 11 \mu$, fulgineis; basidiis fasciculatis, paliformibus, $8-10 \times 5$, hyalinis.

Hab. in caulibus Clematidis paniculatae cultae, Lyndonville, N. Y., Martio 1906. Dr. C. E. Fairman. no. 48.

Dipl. herbarum dignoscitur pycnidiis regularibus, papillatis, sporulis brevioribus, haud constrictis.

HYMENOPSIS HYDROPHILA Saccardo sp. nov.

Sporodochiis laxe gregariis, longitrorsum oblongis, 400-450 $\times$ 200 μ , opace nigris, glabris, compactiusculis, subexcavato-hysterioides, erumpenti-superficialis; conidiis fusiformibus, rectis v. leviter inaequilateris, $16 \times 4-4.2 \mu$, intense olivaceis, obsolete guttulatis, utrinque acutiusculis; basidiis dense fasciculatis, filiformibus, sursum incrassatulis, hyalino-viridulis, $20-20 \times 2 \mu$, apice truncatulis et subinde fimbriatulis.

Hab. in foliis emortuis Typhae latifoliae, Lyndonville, N. Y., Maio 1906. Dr. C. E. Fairman. no. 53.

Species peculiaris, ab *H. typhae* (Fuck.) Sacc. omnino diversa. Conidia mutica, sed a basidio liberate hinc v. utrinque maculam mucosam emittere videntur.

HELICOMYCES CINEREUS Peck. Lyndonville, N. Y., Dr. C. E. Fairman, no. 52.

ZYGODESMUS AVELLANEUS Saccardo sp. nov.

Effusus, velutinis, avellaneo-olivaceis; hyphis varie intricatis, ramosis, crassiusculis, dilute flavidis, septatis, 9-11 μ diam. articulis interdum gibbis v. inflatulis, rarius apice subrotundatis; conidiis acro-pleurogenis, globosis, minute asperulis, dilute mel-leis.

Hab. in cortice emortuo Pruni serotinae, Lyndonville, N. Y., Apr. 1906, Dr. C. E. Fairman, no. 46.

Affinis *Z. fulvo* var. olivascent. Sacc. differt praecipue hyphis etiam fertilibus multo crassioribus, nempe 9-11 μ , nec 5-7 μ et colore.

ASCOMYCETES AND LOWER FUNGI.

GUY WEST WILSON AND FRED. JAY SEAVER.

It is the intention of the writers to issue, as material accumulates, exsiccati of fungi under the above title, the scope of the work being limited to Ascomycetes, Deuteromycetes and Phycomycetes. This material will be issued in unbound fascicles of twenty-five numbers each. The following is an annotated list of the contents of the first fascicle:

1. CHLOROSPLENium CHLORA (Schw.) Massee.

Peziza chlora Schweinitz, Syn. Fung. Car. Sup., 96. 1822.

Chlorosplenium schweinitzii Fries, Summa Veg. Scand., 356. 1849.

Chlorosplenium chlora (Schw.) Massee, Jour. Linn. Soc., 35:116. 1901.

Plants externally bright yellow; hymenium dull becoming green. The genus *Chlorosplenium* was founded by Fries on *C. schweinitzii* which is synonymous with this species.

2. DERMATEA OLIVASCENS Rehm, Ascomycetes, 1686.

The material issued under this number is a part of the type collection. The species is close to *Dermatea crataegicola* Durand. On branches of *Crataegus* sp. apparently dead but still on the tree.

3. DIAPORTHE PARASITICA Murrill, *Torreya* 6:189. f. 2. 1906.

This is the only parasitic species of the genus. It is rapidly destroying the Chestnut trees, both old and young, in the infested region which is known to extend as far south as Virginia and probably farther.

4. FUMAGO VAGENS Pers. *Myc. Eur.* 1:9. 1822.
On leaves of *Quercus* sp.

5. GLONIOPSIS SMILACIS (Schw.) n. n.

Hysterium smilacis Schweinitz *Syn. Fung. Car.*
Sup., 23. 1822.

Hypoderma smilacis (Schw.) Sacc., *Syll. Fung.*
2:789. 1883.

Hysterographium smilacis (Schw.) Ellis & Everhart, *N. Am. Pyrenom.* 709. 1892.

Common on dead stems of *Smilax*.

6. GLONIUM STELLATUM Muhlenberg; Schw. *Syn. Fung. Car.* 24. 1822.

Specimens issued were abundant on old butternut wood.

7. GLOESPORIUM VENETUM Speg., *Michelia* 1:477. 1879.
Gloesporium necator Ellis & Everhart, *Jour. Myc.*
3:129. 1887.

The first report of this species in America was from Illinois. It has later been reported from almost the entire region in which the raspberry is cultivated. While usually not considered destructive, it is locally a serious pest.

8. HENDERSONIA STAPHYLEAE Ellis & Everhart, *Jour. Myc.*
1:151. 1885.

This species occurs on the young, dead twigs of *Staphylea trifoliata*. During the spring of 1907 it was found to be common.

9. HYPODERMA COMMUNE (Fries) Duby.

Hysterium commune Fries, *Syst. Myc.* 2:589. 1823.

Hypoderma commune Duby, *Mem. Soc. Phys. Hist.*
Geneva, 16:41. 1861.

The plants of this species form elongated smooth, shining patches on the stems of herbaceous plants. The lips usually remain tightly closed but often spread so as to show the lighter colored disc.

10. HYPOXYLON SASSAFRAS (Schw.) Berkeley.

Sphaeria sassafras Schweinitz, Syn. Fung. Car. Sup.
10. 1822.

Hypoxylon sassafras Berkeley, Grevillea, 4:52.
1875.

The perithecia are large and either single or confluent. On dead branches of *Sassafras*.

11. HYSTEROGRAPHIUM MORI (Schw.) Rehm.

Hysterium mori Schweinitz, Syn. Fung. Am. Bor.
244. 1832.

Hysterographium mori (Schw.) Rehm. Ascomy-
cetes 363. 1877.

This is a very common and variable species. The specimens issued here occur on decorticated wood of *Gleditschia*. The plants are often very thickly crowded and mostly parallel with the grain of the wood.

12. HYSTEROPATELLA PROSTII (Duby) Rehm.

Hysterium prostii Duby, Bot. Gall, 2:79. 1830.

Hysteropatella prostii (Duby) Rehm. Rabenh.,
Krypt-Flora, 1³:367. (Ed. 2.) 1896.

Plants usually scattered and with the lips widely gaping. The plants occur on either side of the young fallen bark of (elm?).

13. MELASMA GLEDITSCHIAE Ellis & Everhart, Jour. Myc., 4:45. 1888.

Leptrostroma hypophylla Berk. & Rav., Ravenel,
Fungi Carol. Exs. 3:45. 1855.

Melasmia hypophylla P. Sydow, in Sacc. Syll. Fung.
10:419. 1892.

On leaves of *Gleditschia triacanthos*.

14. MICROSPHAERA SYMPHORICARPI E. C. Howe, Bull. Torrey Club, 5:3. 1874.

Salmon considers this as a form of *M. diffusa* Cooke & Peck, but American mycologists have usually accorded specific rank to both.

15. MOLLISIA DEHNII (Rabenh.) Karsten.

Peziza dehnii Rabenhorst, Bot. Zeitung, 1:12. 1843.

Mollisia dehnii (Rabenh.) Karsten, Myc. Fenn.
1:206. 1871.

Plants occur in abundance on the stems and leaves of *Potentilla norvegica* and related species.

16. NECTRIA PEZIZA (Tode) Fries.

Sphaeria peziza Tode, Fungi Meckl. Sel. 2:46.
1791.

Nectria peziza (Tode) Fries, Summa Veg. Scand.
388. 1849.

Plants bright orange-red, soft, nearly globose, collapsing from above so as to become cup-shaped and very closely resembling a cup-fungus. Rather common but usually not abundant on old rotten wood and occasionally on bark.

17. NECTRIA PURPUREA (Linn.) n. n.

Tremella purpurea Linn. Sp. Plant., 2:1158. 1753.
Tubercularia vulgaris Tode, Fungi Meckl., 1:18.
1790.

Sphaeria cinnabarina Tode, Fungi Meckl., 2.9.
1791.

Nectria cinnabarina (Tode) Fries, Summa Veg.
Scand., 388. 1849.

One of the most common and variable species of the order *Hypocreales*. On branches of various kinds of trees and shrubs.

18. PERONOSPORA CORYDALIS de Bary, Ann. Sci. Nat., IV,
20:111. 1863.

Both *Bicuculla canadensis* and *B. cucullata* were growing together in the ravine where this material was collected but careful search failed to locate a single infected plant of the latter species.

19. PHYLLOSTICTA FRAXINICOLA (Curr.) Sacc. Syll. Fung.,
3:21. 1884.

Sphaeria (Depazea) *fraxinicola* Currey, Trans.
Linn. Soc., 22:333. 1857.

Phyllosticta fraxini Ellis & Martin, Am. Nat.,
18:189. 1884.

Phyllosticta fraxinicola (Curr.) Sacc. Syll. Fung.
3:21. 1884.

The infected spots are very variable in color, usually with a pronounced reddish margin, but frequently grading imperceptibly into the healthy green portions of the leaf. All intermediate variations occur.

20. PHYLLOSTICTA LIRIODENDRI Thüm., Jour. Sci. Math.
Phys. Nat., 1878.

Phyllosticta liriodendri Cooke, Grevillea, 12:26.
1883.

Phyllosticta liriodendrica Cooke; Sacc. Syll. Fung.
3:30. 1884.

Phyllosticta circumvallata Winter, Jour. Myc.,
1:123. 1885.

Phyllosticta tulipifera Passer. Real. Acad. Linecei
Rend. 4. 1888.

The names cited in the synonymy of this species are all based on material collected from the same host in different countries. The first came from Portugal, the second from South Carolina, the third is merely a renaming of the second, the fourth is from Missouri, and the last from Italy. The only points of difference which are emphasized by the descriptions are the size of the spots, the color of their margin, and such minor discrepancies in spore measurements as are to be expected. The gross characters are too variable to be of primary taxonomic value, while the spore measurements of these descriptions present less variation than is found in a single collection of material in quantity.

21. *PHYLLOSTICTA SASSAFRAS* Cooke, Grevillea, 12:26. 1883.

This species was originally described from material collected in South Carolina by Ravenel and sent to Cooke for identification and distribution. In their paper on the genus Ellis & Everhart say of this species: "All the specimens are sterile and the species must be considered doubtful" (N. Am. *Phyllostictas* 44). The present material contains an abundance of very minute spores which conform well to the original measurements.

22. *RHYTISMA ANDROMEDAE-LIGUSTRINAE* (Schw.) n. n.

Xyloma andromedae-ligustrinae Schw. Syn. Fung.
Car. 26. 1822.

Rhytisma decolorans Fries, Syst. Myc., 2:567. 1822.

This is a very poorly understood species which is probably more closely related to *Discomycopsis rhytismoides* J. Müll. than to the species with which it is usually associated.

23. *ROSELLINIA AQUILA* (Fries) de Notaris.

Sphacria aquila Fries, Syst. Myc., 2:442. 1828.

Rosellinia aquila (Fries) de Notaris, Sferiacei Ital.
1:21. 1863.

Perithecia large, seated in a byssoid stroma. On dead branches.

24. *SPHAEROPSIS ALNICOLA* Peck. Ann. Rep. N. Y. St.
Mus. Nat. Hist. 38:95. 1885.

The material agrees in gross appearance and spore characters with the present species and differs from *S. betulae* Cooke in its much smaller spores.

25. *VERMICULARIA PETIOLICOLA* Brun., Ann. Soc. Sci. Nat.
Inf. 26:39. 1890.

The present collection of material is slightly darker than the description calls for but otherwise it agrees well.

NORTH AMERICAN SPECIES OF AGARICACEAE.

A. P. MORGAN.

THE MELANOSPORAE.

Synopsis of the Genera.

X. SPORES BLACK.

I. PSATHYRELLA. Pileus membranaceous, conic or campanulate, striatulate.

II. PANAEOLUS. Pileus somewhat fleshy, without striae.

XX. SPORES PURPLISH-BROWN OR PURPLISH-BLACK.

A. Veil none.

a. *Lamellae very broad, subdecurrent.*

III. DECONICA. Pileus somewhat fleshy, hemispheric.

b. *Lamellae adnexed or adnate.*

IV. PSATHYRA. Pileus submembranaceous, conic or campanulate; stipe fragile.

V. PSILOCYBE. Pileus more or less fleshy; stipe rigid or tough.

c. *Lamellae free from the stipe.*

VI. PILOSACE. Pileus fleshy, convex then expanded.

B. Veil present.

a. *Lamellae attached to the stipe.*

VII. HYPHOLMA. Veil marginal, woven into a web which adheres to the margin of the pileus.

VIII. STROPHARIA. Veil marginal; when the pileus expands it is left behind as an annulus upon the stipe.

b. *Lamellae free from the stipe.*

IX. AGARICUS. Veil marginal, annulate upon the stipe.

X. CLARKEINDA. Veil universal, a volva inclosing the incipient pileus and stipe.

DESCRIPTION OF GENERA AND SPECIES.

I. PSATHYRELLA FRIES, EPICRISIS, 1836.

Pileus membranaceous, conic or campanulate, thin and fragile, hygrophanous, radiately striatulate. Stipe subcartilaginous, fistulous, fragile. Lamellae adnexed or adnate, at length uniformly sooty-black; spores elliptic, often large, black in mass.

A genus in appearance wholly like *Psathyra*, but the species separated out of it by the absence of any purplish tint in the spores.

§ I. FRAGILES. *Subcaespitose, growing on old wood, manure, etc. Stipe usually curved and flexuous, the surface often pruinose or furfuraceous.*

a. *Lamellae broad, adnate.*

1. PSATHYRELLA MINIMA PECK, 41 N. Y. REP. 1887.

Pileus membranaceous, hemispherical, obtuse, obscurely striatulate when moist, even and pruinose-atomate when dry, dingy-yellow or reddish brown, becoming paler in drying. Stipe capillary, white, pellucid, minutely mealy or furfuraceous. Lamellae broad, adnate, at first white, becoming yellowish-cinnamon; spores black, narrowly elliptic, 6-8 x 3-4 mic.

Growing on excrement of deer in woods. New York, *Peck*. Pileus 2-4 mm. in diameter, stipe 8-12 mm. long. About the size of and growing with *Coprinus radiatus*.

2. PSATHYRELLA PALLESCENS, AGARICUS PALLESCENS SCHAEFFER, INDEX, 1774, A. DISSEMINATUS PERSOON, COMM., 1800, A. TINTINABULUM BATSCH, EL. FUNG., 1783.

Pileus membranaceous, ovoid then campanulate, plicate-sulcate, furfuraceous becoming naked, at first whitish or yellowish, at length cinereous. Stipe subflexuous, fistulous, fragile, white, furfuraceous then glabrous. Lamellae broadly linear, adnate, whitish-cinereous, blackening; spores subelliptic, 6-8 x 3-4 mic.

Densely crowded together or caespitose, often growing in multitudes around and upon old stumps and rotten wood. Found everywhere in the world. Pileus 5-15 mm. in diameter, the stipe 2-3 cm. long, and 1-2 mm. thick.

3. PSATHYRELLA ODORATA PECK, 24 N.Y. REP. 1871.

Pileus thin, fragile, ovoid then convex and expanded, hygrophanous, chestnut colored and striatulate around the margin when moist, clay-color with a pinkish tinge when dry, subatomaceous and radiately wrinkled. Stipe fistulous, pallid, mealy and striate at the summit, below subfibrillose and with a white my-

celium. Lamellae broad, close, attached, with a slight decurrent tooth, dingy flesh-color, then rosy-brown, finally black; spores elliptic, 15 mic. long.

Gregarious or subcaespitose; growing about manure heaps. New York, *Peck*; Preston, O. Pileus 3-5 cm. in diameter; the stipe 5-7 cm. high, 2-4 mm. thick.

4. *PSATHYRELLA HIRTA* PECK, 50 N. Y. REP. 1896.

Pileus convex, hygrophanous, brown or reddish-brown and faintly striatulate when moist, grayish-brown when dry, the surface adorned with tufts of white easily detersible and evanescent hairs. Stipe fistulous, flexuous, squamulose and white. Lamellae broad, adnate often with a decurrent tooth, at first pallid becoming blackish-brown or black; spores elliptic, black, 12-14 x 6-8 mic.

Subcaespitose; growing on manure or rich soil in shaded places. New York, *Peck*. Pileus 8-12 mm. in diameter; stipe 3-5 cm. long, 2-3 mm. thick.

b. Lamellae rather narrow, adnexed or nearly free.

5. *PSATHYRELLA FALCIFOLIA* MONTAGNE, SYLL. CRYPT. 399.

Pileus membranaceous, at first globose then campanulate and expanded, in the center smooth and yellowish, blackish and striatulate around the margin. Stipe flexuous-incurved, fistulous, rufescent, pallid and striate at the apex, the base sub-bulbous. Lamellae narrow, falciform, rotundate-attached, pallid then black; spores ovoid, 6-7 mic. long.

Caespitose; growing on bark and leaves. Columbus, Ohio, *Sullivant*. Pileus 2-3 cm. in diameter, the stipe 4-10 cm. long and 1-2 mm. thick.

6. *PSATHYRELLA RUPINCOLA* MONTAGNE, SYLL. CRYPT. 400.

Pileus membranaceous, hemispheric, umber or bay-brown, in the center slightly depressed, thence to the margin striatulate. Stipe fistulous, fragile, white, smooth, incurved-ascending. Lamellae linear, attenuate-adnexed, pallid then fuliginous; spores sooty-black, oblong, 10 mic. in length.

Growing out of fissures in rocks, the mycelium rooting in fragments of rotten wood. Columbus, Ohio, *Sullivant*. Pileus 2 cm. high, 3 cm. in diameter; the stipe 5-8 cm. long, 3-4 mm. thick in the middle, 5-6 mm. thick at the base.

7. *PSATHYRELLA DEBILIS* PECK, BULL. TORR. CLUB, 1896. SYLLOGE XIV, 162.

Pileus membranaceous, campanulate, umbonate, whitish, at length grayish, striatulate. Stipe slender, weak, flexuous, hollow,

white. Lamellae narrow, close, adnate, at first whitish then black; spores broadly elliptic, 13×8 mic.

Growing on rotten trunks. Kansas, *Bartholomew*. Pileus 2-4 cm. in diameter; the stipe 5-8 cm. long, 2-3 mm. thick.

8. *PSATHYRELLA GRACILLIMA* PECK, BULL. TORR. CLUB, 1896, SYLLOGE XIV, 162.

Pileus membranaceous, convex or nearly plane, at length striatulate, pale blue, the center yellow. Stipe slender, elongated, erect, hollow, whitish or cream color. Lamellae close, rounded behind, adnexed or nearly free, at first dilute-testaceous, at length black; spores elliptic-oblong, $14-16 \times 6-8$ mic.

Growing on wet wood. Kansas, *Bartholomew*. Pileus 2-4 cm. in diameter; stipe 8-13 cm. long, 1-2 mm. thick.

9. *PSATHYRELLA FRAGILIS* EARLE, MYCOLOGICAL STUDIES I, 1902. SYLLOGE XVII, 94.

Pileus thin, fragile, subconic then expanded, plicate-sulcate, brown-gray becoming paler, the surface minutely furfuraceous. Stipe filiform, whitish and smooth above, below pale gray and minutely furfuraceous. Lamellae nearly free, rather distant, at first pale gray, at maturity slightly blackened, spores hyaline, dark in mass, elliptic-oblong, $8-9 \times 4-5$ mic. 1- guttulate.

Growing on fallen leaves of Pine. California. Pileus 4-8 mm. in diameter, stipe 2-3 cm. long.

§ 2. *GRACILES*. *Solitary or gregarious, growing on damp ground in fields and woods. Stipe usually erect and straight, glabrous.*

a. *Lamellae broad, adnate.*

10. *PSATHYRELLA GRACILIS* PERSOON, SYNOPSIS, 1801. COOKE, ILLUSTR., 634 (?).

Pileus submembranaceous, conic, striatulate, livid or brownish when wet, when dry alutaceous, pink, etc., and without striae. Stipe slender, straight, naked, pallid, villous at the base. Lamellae broadly adnate, subdistant, cinereous then blackish, the edge rose-colored; spores elliptic, $12-14 \times 6-8$ mic.

Growing along roadsides, hedgerows, etc. New York, *Peck*; Preston, O. Pileus 2-3 cm. in diameter; stipe 7-8 cm. long, about 2 mm. thick.

11. *PSATHYRELLA GRACILIOIDES* PECK, 30 N. Y. REP. 1877.

Pileus thin, conical or campanulate, glabrous, brown and striatulate when moist, when dry whitish and subrugulose. Stipe long, straight, fragile, hollow, smooth, white. Lamellae rather broad, subdistant, brown, becoming blackish-brown, the edge whitish; spores elliptic, $15-16 \times 7-8$ mic.

Growing on the ground in door yards, etc. New York, *Peck*. Pileus 2-3 cm. in diameter; stipe 10-15 cm. long 2 mm. thick. When dry the plant bears some resemblance to large forms of *Galera tenera*.

12. *PSATHYRELLA TREPIDA* FRIES, *EPICRISIS*, 1839. *ICONES*, 139.

Pileus membranaceous, campanulate, obtuse, glabrous, hygrophanous, fuliginous, closely striatulate, smooth in the center. Stipe fistulous, nearly straight, glabrous, hyaline-pellucid. Lamellae rather broad, ventricose, adnate, close, sooty-black; spores 12 mic. long.

Growing in marshy ground. New England, *Sprague*. Pileus 2-3 cm. in diameter; the stipe 6-9 cm. long, 1-2 mm. thick.

13. *PSATHYRELLA ATOMATA* FRIES, *SYST. MYC.* I, 1821. *COOKE*, *ILLUSTR.* 638.

Pileus submembranaceous, campanulate, obtuse, striatulate, livid, when dry changing to whitish and rose-color, becoming rugulose and sprinkled with shining atoms. Stipe lax, fragile, white, furfurate at the apex. Lamellae broad, adnate, cinereous, becoming black; spores elliptic, 13-15 x 6-8 mic.

Growing on the ground in pastures, along roads, etc. New York, *Peck*. Preston, O. Pileus 2-3 cm. diameter; stipe 5-8 cm. long, 2-4 mm. thick.

14. *PSATHYRELLA CRENATA* LASCH, *LINNAEA*, III, 425, 1828.

Pileus membranaceous, hemispheric, ochraceous or rufescent, becoming pallid, plicate-sulcate, atomate, the margin crenate. Stipe fragile, glabrous, whitish, striate above and farinaceous. Lamellae rather broad, subventricose, adnate, at first yellow-brown then blackening; spores elliptic, 9-11 x 5-6 mic.

Growing on the ground in rose garden, Preston, O. Pileus 1.5-2.5 cm. in diameter; the stipe 3-5 cm. long, 2-4 mm. thick. The specimens seem too near this species as described to be named otherwise.

15. *PSATHYRELLA TENERA* PECK, 47 N. Y. REP. 1893.

Pileus thin, campanulate, obtuse, reddish-cinereous when moist, paler when dry, slightly rugulose and atomate. Stipe slender, glabrous, stuffed or hollow, white, with a white floccose mycelium at the base. Lamellae broad, adnate, subdistant at first pallid, then umber, finally blackening; spores narrowly elliptical, 12-14 x 7-8 mic.

Growing in marshy ground in open woods. New York, *Peck*. Pileus 6-10 mm. in diameter; stipe 2.5-4 cm. long, scarcely 1 mm. thick. The plant resembles small forms of *Galera tenera*.

16. *PSATHYRELLA BARTHOLOMAEI* PECK, BULL. TORR. CLUB, 1895. SYLLOGE, XIV, 163.

Pileus thin, subconic or convex, glabrous, striatulate around the margin, pale brown. Stipe slender, flexuous, hollow, ornamented with a few grayish fibrils, pale brown. Lamellae broad, close, adnate, brownish then black; spores elliptic, $10-13 \times 5-7$ mic.

Growing on the ground in shaded places. Kansas, *Bartholomew*. Pileus 1.5-3 mic. in diameter; stipe 3-4 cm. long, 2 mm. thick.

b. *Lamellae narrow, linear.*

17. *PSATHYRELLA HIASCENS* FRIES, SYST. MYC. I, 1821. COOKE, ILLUSTR. 635.

Pileus membranaceous, campanulate, glabrous, sulcate, splitting and revolute, livid then yellowish. Stipe straight, rigid, fragile, glabrous, white. Lamellae linear, narrow, adnate, subdistant, pallid becoming black; spores elliptic, $10-12 \times 7-9$ mic.

Growing on wet ground in woods, New York, *Peck*. Pileus 2-3 cm. in diameter; the stipe 6-10 cm. long, 2 mm. thick, having the habit of some of the *Coprini*, but the lamellae are dry.

18. *PSATHYRELLA HYDROPHORA* BULLIARD, HERBIER FR. 1791. COOKE, ILLUSTR. 655.

Pileus membranaceous campanulate then expanded, glabrous rufescent, the margin striatulate and at length revolute. Stipe straight, fistulous, white, glabrous, sometimes incurved at the base. Lamellae narrow, linear, close, adnate, livid-blackening, spores $11-12 \times 7-8$ mic.

Growing on the ground in gardens. New England, *Sprague*. Pileus 2-3 cm. in diameter; the stipe 7-10 cm. long, 2 mm. thick.

19. *PSATHYRELLA LEUCOSTIGMA* PECK, BULL. TORR. CLUB, 1895. SYLLOGE, XIV, 163.

Pileus submembranaceous, campanulate, striatulate, bluish-white, brown when dry except the whitish center. Stipe slender, flexuous, hollow, white. Lamellae close, alutaceous, then black, the edge whitish; spores elliptic, $13-16 \times 8$ mic.

Growing on wet shaded ground. Kansas, *Bartholomew*. Pileus 9-14 mm. in diameter; stipe 2-4 cm. long, 2 mm. thick

20. *PSATHYRELLA SUBATRATA* FRIES, MONOGR. II, 1863. ICONES. HYM. 139. COOKE, ILLUSTR. 633.

Pileus membranaceous, campanulate, obtuse, glabrous, striatulate, rufescent-umber, pale rufous when dry. Stipe fistulous, straight, glabrous, whitish or pallid. Lamellae narrow, linear, close, adnate, sooty-black; spores $12-15 \times 6-8$ mic.

Growing in rich soil in grassy grounds. Pacific Coast Cat. Pileous 3-6 cm. in diameter; the stipe 8-12 cm. long, 2-3 mm thick.

II. PANAEOLUS FRIES, EPICRISIS, 1836.

Pileus somewhat fleshy, convex or campanulate, without striae; a marginal veil sometimes present. Stipe commonly fistulous, rather firm, subglabrous. Lamellae adnexed or adnate, cinereous and black variegated; spores subelliptic, usually large, black in mass.

Growing nearly always on manure or on richly manured soil. Corresponding more closely to *Hypholoma* in the purple spored series.

§ I. CAMPANULATI. *Pileus dry, not viscid, the surface smooth and shining; veil extremely fugacious or quite obsolete.*

a. *Stipe fistulous, stuffed or hollow.*

1. PANAEOLUS FIMICOLA PERSOON, SYNOPSIS, 1801. COOKE, ILLUSTR., 632.

Pileus fleshy, campanulate then convex, obtuse, glabrous opaque, sooty-gray, clay-color when dry, around the margin marked by a narrow brown zone. Stipe fragile, elongated, equal, pallid, white-pruinose at the apex. Lamellae broad, adnate, gray and sooty variegated; spores elliptic, $16 \times 8-10$ mic.

Growing on manure in pastures. Recorded in various parts of the country. Pileus 2-3 cm. in diameter; stipe 7-10 cm. long, 2-3 mm. thick.

2. PANAEOLUS ACUMINATUS SCHAEFFER, INDEX, 1774.

Pileus fleshy, conical acutely umbonate, smooth, glabrous, shining, carneo-alutaceous, zonate around the margin by a dark band. Stipe tapering upward from a thickened base, usually short, pruinose, whitish, brown below. Lamellae rather narrow, close, adnexed, becoming black; spores ———

Growing in rich soil and on manure. Preston, O. Pileus 2-3 cm. in diameter; stipe 3-4 cm. long, 3-4 mm. thick.

3. PANAEOLUS PAPILIONACEUS BULLIARD, HERB. FR., 1781.

Pileus fleshy, hemispheric, glabrous, pallid, when dry rimose scaly. Stipe equal, smooth, whitish, white-pulverulent at the apex. Lamellae very broad, adnate at length plane, becoming black; spores $15-18 \times 7-8$ mic.

Growing on manure and manured earth in fields and woods. Common everywhere. Pileus 2-3 cm. in diameter; stipe 6-8 cm. long, 2-3 mm. thick.

4. PANAEOLUS CAMPANULATUS LINNAEUS, SPEC. PL. 1753. COOKE, ILLUSTR., 629.

Pileus fleshy, campanulate, often umbonate, dry, smooth, glabrous, shining, brown becoming rufous. Stipe tall, straight, fistulous, smooth, rufescent, at first white-pruinose at the apex. Lamellae rather broad, close, adnexed, gray and black variegated; spores subelliptic, $14-18 \times 9-12$ mic.

Growing on manure and rich soil. Found everywhere in the world. Pileus 2-3 cm. high and broad; stipe 7-10 cm. long, 2-3 mm. thick.

b. *Stipe solid, glabrous.*

5. PANAEOLUS ANTILLARUM FRIES, ELENCHUS, I, 1828.

Pileus fleshy, subglobose then convex, obtuse, at first smooth and glabrous, at length arcolate-corrugate, yellow or whitish; veil plainly none. Stipe solid, equal, striate, glabrous, pallid. Lamellae broad, close, ventricose, adnexed, at first brown then livid-black; spores ———.

Growing among straw, Island of Santa Cruz, *Benson*. Stipe 10-15 cm. long, about 8 mm. thick; the pileus very small in comparison with the stipe; the lamellae 6-8 mm. broad. There were more than twenty specimens examined of various ages. They appear to have been preserved "in spiritu vini."

6. PANAEOLUS SOLIDIPES PECK, 23 N. Y. REP. 1870.

Pileus fleshy, firm, hemispherical then convex or subcampanulate, smooth, whitish, the cuticle at length breaking up into dingy-yellowish, rather large, angular scales. Stipe solid, smooth, white, striatulate at the summit. Lamellae broad, ventricose, adnexed, at first whitish, becoming black; spores very black with a bluish tint.

Growing on horse manure in pastures New York westward to Nebraska. Pileus 5-8 cm. in diameter; stipe 12-20 cm. long, 48 mm. thick. A remarkably stout, firm species to belong to this genus.

§ 2. SEPARATI. *Pileus wet or the surface viscid; the marginal veil evident, annulate or appendiculate.*

a. *Pileus wet, bibulous or hygrophanous.*

7. PANAEOLUS SPHINCTRINUS FRIES, EPICRISIS, 1836.

Pileus fleshy, parabolic, obtuse, opaque, smooth, wet, sooty-black, when dry livid and slightly silky; the flesh thin, umber; the veil white, appendiculate. Stipe equal, straight, sooty-gray, at the apex smooth and pruinose, the base only rufescent. Lamellae rather broad, close, adnate, cinereous becoming black; spores $15-18 \times 9-12$ mic.

Growing on manure. Alabama, *Underwood* and *Earle*; Preston, O. Pileus never expanded, 1.5-2.5 cm. high, the stipe 6-9 cm. long, 2-3 mm. thick.

8. PANAEOLUS CARBONARIUS BATSCH, ELENCHUS FUNG., 1783. AGARICUS RETIRUGIS FRIES, EPICRISIS, 1836. COOKE, ILLUSTR., 627.

Pileus fleshy, globose then hemispheric, subumbonate, carneo-alutaceous, atomate, reticulate with raised ribs; the veil lacerate, appendiculate. Stipe equal, pruinose, flesh-color changing to purple. Lamellae ascending, adnexed, rather broad, cinereous becoming black; spores elliptic-fusiform, 15-20 x 8-9 mic.

Growing on manure, New England westward to Ohio. Pileus 2-4 cm. in diameter, the stipe 5-10 cm. long, 2-4 mm. thick.

9. PANAEOLUS EPIMYCES PECK, N. Y. REP. 35, 133.

Pileus fleshy, subglobose then convex, white silky-fibrillose; the flesh soft white or whitish. Stipe short, stout, tapering upward, striate, minutely mealy or pruinose, solid in the young plant, hollow when mature, hairy or substrigose at the base. Lamellae rather broad, close, adnexed, dingy white becoming brown or blackish with the edge white; spores elliptic, 7-10 x 5-7 mic.

Parasitic on fungi, New York, *Peck*; Canada, *Dearness*. Parasitic on *Coprinus atramentarius*, Wisconsin, *McKenna*; on *Coprinus comatus*, *Helen Sherman*. See article in *Journal Mycology*, Vol II, p. 167. Pileus 2-5 cm. in diameter; the stipe 1-4 cm. long, 6-10 mm. thick.

10. PANAEOLUS ALVEOLATUS PECK, 54 N. Y. REP. 1900.

Pileus thin, broadly convex, glabrous, hygrophanous, pitted, dark brown when moist, grayish brown when dry. Stipe equal, slender, fistulous, glabrous, slightly pruinose at the top, pallid. Lamellae broad, close, subventricose, adnexed, blackish with a white edge when mature; spores broadly elliptic, 12-14 x 8-10 mic.

Growing on manure in woods. New York, *Peck*. Pileus 1.5-2.5 cm. in diameter; stipe 4-8 cm. long, 2-4 mm. thick. The surface of the pileus is not reticulate as in *P. carbonarius*, but is pitted with small cavities somewhat distant from each other.

11. PANAEOLUS INTERMEDIUS PECK, BULL. TORR. CLUB, 1895. SYLLOGE, XIV, 161.

Pileus convex or campanulate, glabrous, wet or hygrophanous, grayish-brown. Stipe slender, often elongated, hollow, gray-brown, white-pruinose at the apex. Lamellae ascending or subarcuate, subdistant, adnate, black when mature; spores elliptic oblong, 13-15 x 6-8 mic.

Growing on the earth in heaps of refuse. California, *McClatchie*. Pileus 1-2.5 cm. in diameter; stipe 5-10 cm. long, 2 mm. thick.

b. Pileus smooth, viscid, shining when dry.

12. PANAEOLUS PHALAENARUM FRIES, EPICRISIS, 1836. COOKE, ILLUSTR. 625.

Pileus fleshy, campanulate-convex, obtuse, smooth, glabrous, viscid, yellowish clay-color; the veil appendiculate, fugacious. Stipe equal, rather firm, nearly naked, pale rufescent. Lamellae broad, adnexed, cinereous-black; spores elliptic, 14-15 x 7-8 mic.

Growing on manure. New England westward to Nebraska. Pileus 3-5 cm. in diameter; stipe 8-12 cm. long, 2-3 mm. thick.

13. PANAEOLUS FIMIPUTRIS BULLIARD, HERB. FR. 1781. COOKE, ILLUSTR. 626.

Pileus submembranaceous, conical then expanded, somewhat gibbous, smooth, viscid, sooty-livid. Stipe slender, equal, glabrous, pallid, marked by an annular zone. Lamellae broad, adnexed, livid becoming black; spores elliptic, 8-9 x 7 mic.

Growing on manure. Lea's Catalogue. Pacific Coast Cat. Pileus 2-3 cm. in diameter; stipe 6-12 cm. long, 2 mm. thick.

14. PANAEOLUS LEUCOPHANES B. & BR., ANN. N. H. 1866.

Pileus fleshy, campanulate, viscid, shining when dry, innately silky, white, here and there with an ochraceous tinge; the veil appendiculate. Stipe tapering upwards, fistulous, fibrillose, white, farinaceous. Lamellae adnate, pale flesh-tinted gray then black; spores 9-10 mic. long.

Growing in meadows. Bib. Index N. A. Fungi. Pileus about 2 cm. in diameter; stipe 5 cm. long, 2 mm. thick.

15. PANAEOLUS SEPARATUS LINNAEUS, SP. PL. 1753. COOKE, ILLUSTR. 623.

Pileus fleshy, ovoid then campanulate, obtuse, smooth and glabrous, viscid, pale argillaceous. Stipe tapering upward from a thickened base, fistulous, smooth and shining, white; the marginal veil left behind upon the stipe. Lamellae ascending broad, adnexed, cinereous-black; spores elliptic, 16-22 x 10-12 mic.

Growing on manure, Carolina and Pennsylvania, *Schweinitz*. Pileus 2-4 cm. in diameter, stipe 8-16 cm. long. 3-5 mm. thick above, 8-12 mm. thick at the base.

(To be continued.)

THIRD SUPPLEMENT TO NEW GENERA OF FUNGI
PUBLISHED SINCE THE YEAR 1900, WITH
CITATIONS AND ORIGINAL DESCRIPTIONS.

COMPILED BY P. L. RICKER.

I. MYXOMYCETAE.

[Myxomycetae.]

LISTERELLA E. Jahn. n. g. Listerellaceae. *Berichte der Deutschen Botanischen Gesellschaft*, 24:541. pl. 22. 1907.

"Sporangia sparsa, hemisphaerica, basi applanata, regulariter valvatis dehiscentia, atra, cc. min. lata. Peridium simplex fuscens tectum quasi altera membrana, quae exiectionis granulis aliisque plasmodii purgantibus constituta est. Tubuli capillarii tennes, e margine valvarum enascentes, cateniformes, medii ex membris calyciformibus compositi. Sporidia pallide umbrina, fere laevia 7-8 μ diam."

[Myxomycetae.]

LISTERELLACEAE E. Jahn. n. fam. Myxogastrales. *Berichte der Deutschen Botanischen Gesellschaft* 24:541. 1907.

Characters of the family same as of its type *Listerella* q. v.

III. PHYCOMYCETAE.

[Phycomycetae.]

EURYCHASMA Magnus, n. g. Chytridiaceae. *Hedwigia*, 44:348. f. 1. 1905.

Based on *Rhizophidium Dicksonii* E. P. Wright, *Transactions of the Royal Irish Academy of Sciences*, 26:20. pl. 3. 1877.

[Phycomycetae.]

EURYCHASMACEAE Petersen, n. fam. Chytridiales. *Oversigt over det Kongelige Danske Videnskabernes Selskabs Forhandling*, 1905:469. 1905.

"J'attribue à cette famille un genre comprenant les trois espèces suivantes: *Eurychasma dicksonii* (Wright) Magnus, *E. sacculus mihi* et *E. lauderiae* (Gran.) mihi."

[Phycomycetae.]

PONTISMA Petersen. n. g. Holochytriaceae. *Oversigt over det Kongelige Danske Videnskabernes Selskabs Forhandling*, 1905:482. f. 10. 1905.

"Chytridinées endophytes dépourvues de radicelles. Sporangies composés lagenidioides. Reproduction par zoospores, qui ne s'entourent pas d'une membrane en sortant du zoosporange."

[Phycomycetae.]

PYTHIACYSTIS R. E. & E. H. Smith, n. g. Saprolegniales. Botanical Gazette 42:221. f. 1-3. 1906.

"Parasitic on living plants, or saprophytic with abundant moisture. Fertile mycelium delicate, septate, with numerous, terminal, sympodially developed sporangia. Aquatic mycelium typically sterile, with occasional conidia or sporangia. Filaments very large and vigorous, continuous, much branched.

Sporangia typically rounded or ovate, dividing internally into biciliate swarmspores which immediately become motile and emerge from a terminal opening.

Conidia similar to sporangia, germinating directly by a germ tube.

Sexual reproduction not observed.

Differs from *Pythium* in mode of swarmspore formation, and from *Pythiopsis* in habit; closely intermediate between *Saprolegniae* and *Peronosporae*."

[Phycomycetae.]

SIROLPIDIUM Petersen. n. g. Holochytriaceae. Oversigt over det Kongelige Danske Videnskabernes Selskabs Forhandling, 1905:478. f. 9. 1905.

"Chytridinées endophytes sans mycélium ni radicule. Zoosporanges olpidioides formés soit par le développement direct de zoospores soit par la division des corps sporangiformes (thalle, mycélium primitif). Les sporanges formés de la dernière se dissocient vite. Stades immobiles inconnus."

IV. ASCOMYCETAE.

[Ascomycetae.]

ACERBIELLA Saccardo, n. g. Sphaeriaceae. Sylloge Fungorum 17:768. 1905.

"A proximo gen. *Acerbia* differt peritheciis setigeris, ab *Ophiocerate* cum peritheciis erostibus tum indumento piloso."

[Ascomycetae.]

BONANSEJA Saccardo. n. g. Pezizales. Journal of Mycology 12:50. 1906.

"Ascomata epidermide tecta dein erumpenti-subsuperficialia, disciformia, ceracea (brunnea), disco mox aperto, applanato; excipulo brevissimo obsolete prosenchymatico. Asci cylindricei, paraphysati, octospori. Sporidia sphaeroidica hyalina, nucleata, dein brunnea."

[Ascomycetae.]

CAPNODIELLA Saccardo, n. g. Sphaeriaceae. Sylloge Fungorum 17:621. 1905. As subgenus of *Capnodium*, Sacc. op. cit. 1:74. 1882. Replacing *Sorica* Gisenh. Berichte d. Deut. Bot. Gesell. 22:195. pl. 13. 1904.

[Ascomycetae.]

COLLETOMANGINIA Hariot & Patouillard. n. g. Hypocreaceae. *Comptes Rendus Hebdomadaires des Séances de l'Académie des Sciences*, 142:225. 1906.

"Major, lignoso-carnosa, superficie cristato-alveolata; cristis sterilibus sporiferam partem in alveolis dispositam circumscribentibus; peritheciis immersis; ascis octosporis, paraphysatis; sporis continuis, atris."

[Ascomycetae.]

CRYPHONECTRIA n. g. Hypocreaceae. *Sylloge Fungorum*, 17:783. 1905.

As subgenus of *Nectria* Sacc. op. cit. 2:507. 1883. (*Hypocreopsis* sp: Starb. *Myrmaeciella* v. Hohn. not Lindr.)

[Ascomycetae.]

DELASTREOPSIS Mattiolo n. g. Tuberaceae. *Boletim da Sociedade Broteriana*, 21:95. 1905.

Based on *Terfezia oligosperma* Tul. *Fungi Hypogaei*, 176. pl. 21. f. 15. 1851.

[Ascomycetae.]

DELITSCHIELLA Saccardo, n. g. Sphaeriaceae. *Sylloge Fungorum*, 17:688. 1905.

"A *Delitschia* distinguitur ascis polysporis nec octosporis."

[Ascomycetae.]

ENDOTHIELLA Saccardo, n. g. Sphaeriales. *Annales Mycologici* 4:273. 1906.

"Stroma corticale innato-superficiale, pulvinatum, nunc discretum, nunc statui ascophoro impositum, lacte coloratum (aurantiacum v. rubrum) tenue suberosum friabile (nec carnosum), intus inaequaliter pluri-locellatum, ostiola (ubi manifesta) obtusa et interdum umbilicata. Sporulae oblongae, menatissimae, continuae, hyalinae, basidiis filiformibus ramoso-dendroideis suffultae. Adest quandoque forma epixyla stromatibus deminutis, immo saepius in pycnidia discreta, globoso-conica, subrostellata solutis."

[Ascomycetae.]

LEPTOMITELLA von Hohnel n. g. Ceratostomeae. *Botanisches Centralblatt* 102:253. 1906.

Error for *Lentomitella* von Hohnel p. v.

[Ascomycetae.]

LEPTOSPHAERULINA McAlpine n. g. *Mycosphaerellaceae*. *Fungus Diseases of Stone-fruit Trees in Australia*, 103. 1902.

"Characters as in *Pleosphaerulina*, but sporidia ultimately brown."

[Ascomycetae.]

NEOTTIOPEZIS Clements n. g. Pezizaceae. Bulletin of the Torrey Botanical Club, 30:89. 1903.

"Pro Neottiella Cooke, nomine hybrido: Gr. *pezis*, fungus sessilis."

[Ascomycetae.]

PERONOEUTYPA Berl. n. g. Sphaeriaceae. Icones Fungorum 3:80. 1902.

"Stroma late effusum, crustaceum, nigrum, peridermio tectum, corticale vel ligneum. Perithecia stromate tecta, solitaria, gregaria sed numquam in acervulos bene definitos, nalsiformes collecta, globosa vel mutua pressione angulata, monosticha, collis praelongis, cylindraceis et ostiolis integris vel sulcis nonnullis cruciatim exaratis praedita. Asci clavulati, longe stipitati, octospori. Sporidia allantoidea, minuta, virescenti-lutea.

Est Eutypa collis praelongis."

[Ascomycetae.]

PERONOEUTYPELLA Berl. n. g. Sphaeriaceae. Icones Fungorum, 3:80. 1902.

"Stroma effusum, crustaceum, corticale, epidermide, vel peridermis tectum, hinc inde circa perithecia acervulatim collecta elevatum, atrum. Acervuli plus minusne tumidi, subinde crumpentes, pulvinati. Perithecia in quoque acervulo plus minus numerosa, monopolyticha, in collum praelongum, cylindraceum attenuate, globulosa vel angulata, ostiolis integris vel sulcatis ornata. Asci clavati, longe stipitati. Sporidia allantoidea, minuta, pallide verescentia.

Est Eutypella collis praelongis."

[Ascomycetae.]

STICTOLYPEOLUM Rehm. n. g. Mollisiaceae. Hedwigia, 44:9. 1904.

"Apothecia in mycelio membranaceo tenuissimo sessilia, prinitus lata basi conoidea, poro minutissimo pertusa, dein hemiglobosa, disco urceolato, excipulo crasso, glabro, laterali parenchymatice contexto, hypothecio hyalino. Asci clavati, 8-spori. Sporae fusiformes, medio septatae, hyalinae, distichae. Paraphyses versus apicem ramosae."

[Ascomycetae.]

TREMATOVALSA Jacobesco. n. g. Sphaeriaceae. Comptes Rendus Hebdomadaires des Séances de l'Académie des Sciences, 142:290. 1906.

Il y a des périthèces profonds, de forme irrégulière, terminés par un long col cylindrique qui ne fait pas saillie au-dessus du tissu attaqué; mais ils peuvent devenir superficiels et sont alors de forme plus ou moins globuleuse, à col très court en forme de papille ou mamelon, ou même dépourvus de col. L'ostiole, ronde, est creusée en entonnoir. La paroi, noire, charbonneuse, d'épaisseur inégale, peut dans les périthèces

profonds devenir membraneuse et d'un brun très clair ou même manquer totalement à la partie inférieure.

Les périthèces sont tantôt isolés et alignés l'un à côté de l'autre, ayant l'aspect de niches s'ils sont profonds, de petites poires s'ils sont superficiels, tantôt réunis plusieurs ensemble, au moins à la base, par un stroma charbonneux très réduit, tantôt enfin complètement soudés, à cavités confluentes mais à cols séparés.

[Ascomycetae.]

TRICHOPHYMA Rehm, n. g. Myriangiales. Hedwigia, 44:7.

1904.

"Mycelium microthyrioideum e vittis tenellis centrifugis radiatim prosenchymatice contextum, hyalinum, pilis hyalinis septatis longis obessum. Perithecia sparsa, plerumque solitaria, tubercula minutissima, membrana tenuissima oblecta. Asci globosi dispersi in strato hyalino, 8-spori. Sporae oblongae, 3-septatae, demum muriformiter divisae, hyalinae."

LIST OF NEW YORK FUNGI.

F. L. STEVENS.

A list of fungi collected in Onondago county, New York, which may be of some interest to mycologists, is presented below. The specimens, with many others not determined, have been placed in the collection of the Onondago Botanical Club:

- Actinonema Rosae (Lib.) Fr. on Rosa Rubiginosa — Syracuse, 7-11-95.
- Aecidium Actaeae Opiz, on Actaea spicata var. rubra — Geddes, 8-8-95; Syracuse, 8-13-94.
- Aecidium Asterum Schw. on Solidago sp.— Otisco, 8-22-90.
- Aecidium Fraxini Schm. on Fraxinus pubescens — South Bay, 7-19-94.
- Aecidium Grossulariae Schum. on Ribes Grossularia — Cardiff, 7-8-90.
- Bremia Latacae Regel. on Lactuca leucophaea — Syracuse, 8-19-95, 9-4-99.
- Cercospora Alismatis Ell. & Hol. on Alisma Plantago — Cicero, 7-19-94.
- Cercospora Caulophylli Pk. on Caulophyllum Thalictrifolium — Syracuse, 9-13-94.
- Cercospora elongata Pk. on Dipsacus sylvestris — Syracuse, 7-18-95.
- Cercospora varia Pk. on Vibernum Cassiniodes — Tully, 6-28-94.
- Cercospora Violae Sacc. on Viola tricolor — Syracuse, 7-11-98.

- Coleosporium Campanulae* (Pers.) Lév. on *Campanula rapunculoides* — Jamesville, 9-2-96.
- Colletotrichum Spinaciae* E. & Hals. on *Spinacia oleracea* — Syracuse, 9-8-92.
- Cystopus Bliti* (Biv.) DeBy. on *Amaranthus retroflexus* — Syracuse, 9-1-97, 7-10-95, 8-18-95, '97.
- Cystopus Bliti* (with oöspores) on *Amarantus retroflexus* — Syracuse, 7-28-95, 7-8-92.
- Cystopus candidus* (Pers.) Lev. on *Sisymbrium officinale* — Syracuse, 7-10-95.
- Cystopus candidus* (Pers.) Lev. on *Brassica Sinapistrum*, 7-2-95, *Capsella Bursapastoris* — Syracuse, 7-15-95.
- Cystopus candidus* (Pers.) Lev. on *Raphinus* (cultivated) — Syracuse, 8-7-96, 7-20-95.
- Cystopus candidus* (Pers.) Lev. on *Nasturtium Armoracia* — Warners, 8-2-95.
- Cystopus Portulacae* (DC.) Lev. on *Portulaca oleracea* — Syracuse, 9-5-97, 7-10-95.
- Cystopus spinulosus* D. By on *Cirsium arvense* — Syracuse, 7-18-92; 7-8-92.
- Cystopus Tragopogonis* (Pers.) Schw. on *Ambrosia artemisiaefolia* — Syracuse, 7-4-98.
- Cystopus Tragopogonis* (Pers.) Schw. on same with oöspores — Syracuse, 8-15-98.
- Cystopus Tragopogonis* (Pers.) Schw. on *Tragopogon* — Syracuse, 7-23-98.
- Cystopus Tragopogonis* (Pers.) Schw. on *Tragapogon* (cultivated) — Syracuse, 7-27-98, 9-1-97.
- Doassantia deformans* Setch., on *Sagittaria Variabilis* — Cardiff, 8-15-95.
- Doassantia Martianoﬀiana* (Th.) Schw. on *Potamogeton* — Green Lake, 8-25-97.
- Entomophthora spacirosperma* Fres. on *Phytoniomus punctatus* — Green Lake, 8-25-97; Jamesville, 7-22-95.
- Entyloma Compositarum* Farl. on *Ambrosia artemisiaefolia* — South Bay, 7-15-95.
- Entyloma Compositarum* Farl. on *Ambrosia artemisiaefolia* — Syracuse, 7-22-95, 8-97.
- Erysiphe Phlogis* Schw., on *Phlox divaricata* — Syracuse, 7-12-95; Howlett Hill, 8-23-97.
- Erysiphe Ambrosiae* Schw., on *Ambrosia Artemisiaefolia* — Syracuse, 8-8-95.
- Erysiphe lamprocarpa* (Wallr.), on *Hydrophyllum Canadense* — Syracuse, 7-13-97; *Hydrophyllum Virginicum*, Syracuse, 7-13-94.
- Erysiphopsis Parnassiae* Hals., on *Parnassia coroliniana* — Navarino, 8-17-97; Marietta, N. Y., 8-23-97.
- Gloeosporium elasticae*, on *Ficus elastica* — Syracuse, 1-3-93.

- Gloeosporium Musarum*, on *Musa paradisica* — Syracuse, 8-17-95.
- Helotium Herbarum* (Pers.) Fr. on *Impatiens pallida* — Jamesville, 7-14-87.
- Leptosphaeria typhicola* Karst., on *Typha* — Syracuse, 1-4-92.
- Leptosphaeria Typhae* Karst., on *Typha* — Syracuse, 1-4-92.
- Marsonia Juglandis* (Lib.) Sacc. on *Juglans cinerea* — Syracuse, 6-16-94.
- Marsonia Populi* Lib. on *Populus alba* — Cicero, 7-19-94.
- Marsonia Toxicodendri* on *Rhus Toxicodendron* — Syracuse, 8-12-95.
- Melanconia Tiliae* on *Tilia* — Syracuse, 7-16-94.
- Ovularia decipiens* Sacc. on *Ranunculus acris* — Syracuse, 5-13-94.
- Peronospora Arthuri* Farl. on *Oenothera biennis* — Syracuse — 7-10-95, 7-9-92.
- Peronospora effusa* (Grev.) Rbh. on *Chenopodium album* — Syracuse, 7-8-92, 7-9-92.
- Peronospora Hydrophylli* Wait. on *Hydrophyllum virginicum* — Syracuse, 6-13-94.
- Peronospora parasitica* (Pers.) D. By on *Brassica nigra* — Onon. Valley, 7-26-95.
- Pestalozzia Guepini* Desm. on *Camellia Japonica* — Syracuse, 1-4-92.
- Phoma punctiformis* Desm. on *Lychnis* sp. — South Bay, 7-15-92.
- Phragmidium* sp. on *Potentilla Canadensis* — Syracuse, 8-2-95.
- Phragmidium subcorticum* (Schw.) Wint. on *Rosa* (cultivated) — South Bay, 8-21-96, 8-21-97.
- Phyllosticta pallida* Hals. on *Silene noctiflora* — Syracuse, 7-5-92.
- Phyllosticta bicolor* Pk. on *Rubus odoratus* — Green Pond, 9-1-96.
- Phyllosticta Syriaca* Sacc. on *Hibiscus Syriacus*, Variegated — Syracuse, 9-19-91.
- Phyllosticta typhina* Sacc. on *Typha* — Syracuse, 14-92.
- Phytophthora infestans* (Mont.) D. By, on *Solanum tuberosum* — Geddes, N. Y., 9-1-97.
- Plasmodiophora Brassicae* Wor. on *Capsella bursa-pastoris* — Syracuse, 7-10-95, 8-2-95.
- Plasmodiosphora Brassicae* Wor. on *Brassica oleracea* — Syracuse, 8-2-95.
- Podosphaera oxyacanthae* (DC.) D. By. on *Cherry* — Syracuse, 9-1-97.
- Pseudopeziza Medicaginis* (Lib.) Sacc. on *Medicago sativa* — Syracuse, 7-20-97.
- Pseudopeziza Medicaginis* (Lib.) Sacc. on *Medicago lupulina* — Syracuse, 7-10-95.
- Puccinia Anemones-Virginianae* Schw. on *Anemone* — Chittenango Springs, 8-6-97; Syracuse, 7-6-92.
- Puccinia Asteris* Duby, on *Aster* — Syracuse, 7-9-92.

- Puccinia Calthae* Lk. on *Caltha palustris* — Cedarville, 7-24-95.
Puccinia Circaeae Pers. on *Circaeae alpina* — Otisco, 8-23-95, 9-2-96.
Puccinia Circaeae Pers. on *Circaeae lutetiana* — Jamesville, 7-22-95.
Puccinia graminis Pers. on *Agropyrum repens* — Syracuse, 7-18-92.
Puccinia graminis Pers. on *Avena sativa* — Syracuse, 9-2-92, 7-26-94.
Puccinia graminis Pers. on *Berberis vulgaris* — Syracuse, 7-19-95, 5-30-90, 5-15-92, 6-19-98.
Puccinia graminis Pers. on *Dactylis glomerata* — Syracuse, 7-8-92.
Puccinia graminis Pers. on *Triticum vulgare* — Otisco, 7-7-91.
Puccinia Hieracii Mart. on *Hieracium* — Cedarvale, 7-20-97.
Puccinia investita Schw. II on *Gnaphalium decurrens* — Jamesville, 7-14-94.
Puccinia Malvacearum Mont. on *Althaea rosea* — Geddes, 7-25-95; Syracuse, 1-2-96.
Puccinia Malvacearum Mont. on *Malva rotundifolia* — Geddes, 7-25-95; Syracuse, 7-8-92, 1-2-96.
Puccinia Menthae Pers. on *Mentha viridis* — Cedarvale, 7-20-97; Syracuse, 8-11-95; Onondaga Hill, 8-18-97.
Puccinia Menthae Pers. on *Calamintha Chenopodioides* — Syracuse, 7-14-94.
Puccinia Pimpinellae (Str.) Link. on *Osmorrhiza brevistylis* — Jamesville, 7-22-95; Onondaga Valley, 7-14-94.
Puccinia Podophylli Schu. on *Podophyllum peltatum* — Onondaga Valley, 7-11-95, 7-25-97; Syracuse, 5-15-90.
Puccinia vera (DC.) Wint. on *Triticum vulgare* — Syracuse, 7-6-92.
Puccinia Sorghi Schw. II. on *Zea Mays* — Syracuse, 9-7-96, 8-7-95.
Puccinia spreta Pk. on *Mitella diphylla* — Otisco, 8-29-91; Cedarvale Green Pond, 9-2-95, 7-29-95.
Puccinia spreta Pk. on *Tiarella cordifolia* — Cedarville, 7-29-95.
Puccinia suaveolens (Pers.) Rostr. on *Cirsium arvense* — Geddes, 8-28-97; Syracuse, 6-14-98.
Puccinia suaveolens (Pers.) Rostr. *Cirsium lanceolatus* — Onon. Valley, 8-8-95.
Puccinia Veratri Niessl. on *Veratrum viride* — Manlius, 7-19-95.
Puccinia Xanthii Schw. on *Xanthium* sp. — Onondaga Lake, 7-13-95.
Ramularia brunnea Pk. on *Tussilago Farfara* — Onon. Valley, 7-24-94.
Ramularia barbarea Pk. on *Barbarea vulgaris* — Syracuse, 1-2-96.

- Ramularia Celastri* E. & M. on *Celastrus* — Jamesville, 7-14-94.
Ramularia Tulasnei Sacc. on *Fragaria Virginiana* — Warners, 8-2-95.
Ramularia variabilis Fckl. on *Verbascum Thapsus* — Syracuse, 7-13-94.
Sclerospora graminicola (Sacc.) Schr. on *Setaria* — Cross Lake, 8-14-01; VanBuren, 8-14-01; Geddes, 8-20-01; Long Branch, 8-14-01; Plainville, 8-14-01; Ionia, 8-14-01; Syracuse, 7-30-01, 7-29-01; Amboy, 8-14-01; Warners, 8-14-01; Baldwinville, 8-14-01.
Septoria Atriplicis (West) Fckl. on *Chenopodium album* — Syracuse, 7-8-92.
Septoria Cirsii Neissl. on *Cirsium arvense* — Syracuse, 6-18-94.
Septoria cornicola Desm. on *Cornus* — Jamesville, 7-14-94.
Septoria corylina Pk. on *Corylus rostrata* — Tully, 6-28-94.
Septoria Fairmani E. & E. on *Althaea rosea* — S. Bay, 7-15-92.
Septoria malvicola E. & M. on *Malva rotundifolia* — Syracuse, 7-8-92.
Septoria Oenotherae West. on *Oenothera biennis* — Syracuse, 7-8-92.
Septoria Osmorrhizae Pk. on *Osmorrhiza brevistylis* — Syracuse, 7-8-92.
Septoria Pisi West. on *Pisum* (cult.) — Syracuse, 6-14-98; Geddes, 7-14-94; Syracuse, 7-8-92.
Septoria Petroselinii apii Desm. on *Apium graveolens* — Warners, 8-2-95.
Septoria podophyllina Pk. on *Podophyllum peltatum* — Syracuse, 7-11-95, 7-13-92, 7-13-95.
Septoria silenicola E. & M. on *Silene noctiflora* — Syracuse, 7-8-92, 7-8-95.
Septoria Trillii Pk. on *Trillium grandiflorum* — Syracuse, 7-9-92.
Septoria verbascicola B. & C. on *Verbascum lychnidis* — South Bay, 7-16-92.
Sphaeropsis Malorum Pk. on *Pyrus malus* — Syracuse, 8-16-95.
Synchytrium decipiens Farl. on *Amphicarpaea monoica* — Marcellus, 8-15-95; Pompey, 8-25-90.
Synchytrium fulgens Schr. on *Oenothera biennis* — Chittenonga Spr., 8-6-97.
Uredo Agrimoniae (DC.) Schr. on *Agrimonia Eupatoria* — Otisco, 9-2-95; Marcellus, 8-15-95.
Uredo nitens Schw. on *Rubus occidentalis* — Syracuse, 6-17-98, 6-12-94.
Urocystis Anemones (P.) Schr. on *Anemone Virginiana* — Syracuse, 7-9-92.
Urocystis occulta (Wallr.) Rbh. on *Elymus* sp. — Onondaga, 7-7-90.

- Uromyces Caladii* (Schu.) Farl. on *Arisaema triphyllum* I — Syracuse, 7-19-94; III Jamesville, 7-22-95.
Uromyces pyriformis Cke. on *Acorus Calamus* — Navarino, 8-15-95.
Uromyces Trifolii (Hedw.) Lev. on *Trifolium pratensis* — Syracuse, 9-2-91.
Ustilago segetum (Bull.) Dittm. on *Hordeum* sp. — Otisco, 7-7-90.
Ustilago Maydis (DC.) Cda. on *Zea Mays* — Syracuse, 8-2-95.
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NOTES FROM MYCOLOGICAL LITERATURE. XXII.

W. A. KELLERMAN.

Arthur, J. C.

Clear and convincing "Reasons for Desiring a Better Classification of the Uredinales" are given in the July No. of the *Journal of Mycology*, 1906. No review or brief resumé can do the article justice and we content ourselves with giving a few of Dr. Arthur's extracts: "There are two especially prominent reasons for the consistent naming of the species of rusts, and for other plants as well. One is to be able to designate each particular kind as desired by using an authoritative name, and the other is to indicate the relationship which that kind holds to other kinds according to its recognized place in a natural system. * * * One of the impediments at the present time to an understanding of the interrelationship of rusts lies in the lack of reasonable segregation of genera." In support of this statement one need only recall the fact that the genus *Puccinia* as now constituted contains more than half of all known species of rusts, and what may not be so well known, that within this category are contained groups of the most diverse forms and affinities. * * * If we require that a genus should represent as fully as possible a group of organisms giving evidence of having been derived from the same ancestors, and therefore with species more closely related genetically to one-another than to those of any other genus, it becomes necessary to explain a well known parallelism, brought to our attention by Fischer of Switzerland. He showed that in many cases the teliospores of a species having an extremely abbreviated life-cycle, *e. g.* *Puccinia Leucanthemi*, closely resemble in structure those of an autoecious species, *e. g.*, *P. Aecidii-Leucanthemi*, in which the host of its aecia is the same or practically so as the host of the abbreviated species. Tranzschel has successfully applied this rule of parallelism in predicting the host of the unrecognized aecia in certain heteroecious species. In such cases of parallelism there can be no doubt that the forms in question have truly descended from a common ancestor, but dating a long way back, even to the early days when all the rusts

had four spore-forms. Searching for an adequate cause to account for the breaking up of a primitive species into two or more modern parallel species with different lengths of life-cycle, I think it may be found in the augmented influence of parasitism."

Mycological Notes. No. 22. C. G. Lloyd.

This No. issued from Cincinnati, July, 1906, contains the following: Sur quelques rares Gastromycées; Eastern Stations for Western Plants; A Novelty from Minnesota; The Genus *Holocotylon*; *Lycoperdon wrightii* in Africa and Java; *Tylostoma Berteroanum*; Un *Mitremyces* de la Nouvelle Calédonie (par N. Patouillard); *Lycoperdon subvelatum* in Europe; Puffballs of Mauritius; Boudier's Plates. The Novelty from Minnesota is a specimen sent by Dr. S. Whetstone which Mr. Lloyd makes the type of a new genus, namely *Whetstonia*. The new species is *Wh. strobiliformis*. The plant is most closely allied to the genus *Phellorina*, from which it differs in the permanent cells of the gleba.

Hedwigia, Band XLV, Heft 2, 16 Jan. 1906.

One article in Heft 2, Bd. XLV, *Hedwigia*, 16 Januar 1906, is mycological, namely: P. Magnus, Notwendige Umaeunderung des Namens der Pilzgattung *Marssonina* Fisch. [It is changed to *Marssonina* P. Mag. n. n. and all the species are renamed.]

Smith, Clayton O.

During the autumn of 1905 some diseased oleanders were sent from a nursery to the plant pathological laboratory of the University of California, says Clayton O. Smith (in October Botanical Gazette, 1905), and this investigator began a study of the olive knob of the specimens, reaching the conclusion that he had to do with "A bacterial Disease of Oleander, *Bacillus Oleae* (Arcang.) Trev." This trouble affecting the stems and leaves, forming large, hard, woody knobs, occurs in Egypt, Europe and California. It was described by the Romans but its bacterial origin has only been recognized since 1886.

Atkinson, Geo. F.

In the Botanical Gazette, October 1906, is given Professor Atkinson's paper on "The Development of *Agaricus campestris*," (with six splendid plates), which was read last winter at New Orleans. We quote his introductory words as follows: In some respects the history of the study of the Hymeniales does not present the same progress which can be seen in the other groups of fungi, or indeed in nearly all other groups of plants. The earliest period, that of the study and classification of species and genera, presents in the main the same aspects which have been characteristic of the early study of all plants; but the progress

made up to the present time is not in proportion to the time and energy expended, due to certain difficulties, some inherent in the nature of the plants themselves, and others due to the lack of an adequate knowledge of their anatomy and development. The second period, that of the study of the morphology and development, began more than half a century ago. It is true that in the early part of the 19th century, nearly a century ago, quite an elaborate theory of the development of the Hymeniales, especially the Agaricaceae, was evolved by Nees von Esenbeck. But his theory, embellished as it is with his philosophical ideas of the evolution and metamorphosis of these plants from the puffballs and truffles; in which he was evidently influenced by the philosophy expressed in the *Urwort* of Goethe's *Farbenlehre*, that in a book dealing with natural phenomena the writer should make use of a lively imagination in order to make it real to the reader; and especially because there is such a lack of definiteness as to the forms studied, though it is quite evident he refers more especially to species of *Amanita*, presents little that is helpful to the present discussion. At that early period it was an important forward step to show, as Dutrochet did, in 1834, that the large fungi were only the fruit bodies of the plants then known as "Byssus," which spread usually underground or in the substance of organic bodies; and for Trog in 1837 to recognize the two different parts in the life history, the vegetative stage or mycelium and the fruiting stage or carpophore, and that this is the product of germinating spores; though Micheli had stated as early as 1729 that the fruit bodies of some fungi did not come immediately from the seed (spores), but the seeds first produce a large root which grows for several years in the ground, and then gives rise to the fruit body (referring to *Polyporus tuberaster*). But during the early and middle portion of the 19th century the work on the morphology and anatomy of these plants, and the descriptions and illustrations of species, was far in advance of the work on development and the organization of the parts of the fruit body. Unfortunately the study of the morphology and development of the Hymeniales has not kept pace with the same studies in other groups of plants.

Kauffman, C. H.

In the 8th Annual Report of the Michigan Academy of Science, Mr. Kauffman lists many "Unreported Fungi" from Petoskey, Detroit, and Ann Arbor, for 1905, the names with localities covering about ten or more pages. A new species of *Cortinarius* is given, namely, *C. rubripes*. It has an oval bulb that is deep brick red to vermillion, shading off to a pellucid pinkish tinge at the apex of stem. The stem is attached to roots of *Acer saccharinum* and *Quercus rubra* on which it forms *mycorrhiza*.

Fink, Bruce.

This author gives "Further Notes on Cladonias" — namely, *Cladonia botrytes*, *Cladonia caespiticia*, and *Cladonia delicata*, species of wide distribution. A page of half-tone illustrations accompanies the article.

Fungi Columbiani, Century XXII, 30 Jan. 1907.

The Fungi Columbani (Ellis & Everhart's), Century XXII, was issued Jan. 30, 1907. The genera most largely represented are *Aecidium*, *Peronospora*, *Puccinia*, *Uromyces*, and *Ustilago*. Mr. Elam Bartholomew is the author of these exsiccati.

Faull, J. Horace.

A preliminary note is given in *Science*, N. S. 23:152-3, 26 Jan. 1906, by J. Horace Faull, on "Ascus and Spore formation in the Laboulbeniaceae." An effort is made to fill the gap of the differences of opinion concerning the systematic position of this group — which De Bary (1884) doubtfully referred to the Ascomycetes; Thaxter (1895) referred them to Ascomycetes; Karsten (1895) said they were not Ascomycetes at all; Engler (1903) elevated them to the rank of a class quite removed from both the Smuts and Ascomycetes. Recent investigations by J. Horace Faull of microtome sections of well preserved perithecia revealed features that are apparently of undoubted significance in their bearing on the problem of the phylogenetic position of this group; this is the basis for the statement: "Indeed, the phenomena of sporogenesis agree in all essentials with those already described for the Ascomycetes," by this author.

Blakeslee, A. F.

In *Science* of July 27, 1906, A. F. Blakeslee discusses "Zygospores and sexual strains in the common bread Mould, *Rhizopus nigricans*." He says: "Even since de Bary discovered the zygospores of *Rhizopus* in 1865 — now forty years ago — various and conflicting theories, based many of them upon the character of the substratum upon which the zygospores were accidentally found, have been brought forward to account for the rarity of their occurrence. The writer has attempted to show the insufficiency of the assumption that external conditions are of more than secondary importance." He then takes up the matter of the occurrence in nature of the strains of this species.

Mycological Notes. No. 23, C. G. Lloyd.

The principal article in this No. pertains to "The Genus *Bovistella*" defined as follows: "*Peridermium flaccid with or without a sterile base, opening by a definite mouth. Capillitium of short, separate threads or long, intertwined threads. Spores*

pedicellate." We quote Mr. Lloyd further: "We would extend the limits of the genus *Bovistella* as above, for the following reasons. When Prof. Morgan proposed the genus he knew but one species and he clearly defined it as having a sterile base and short, separate capillitium threads. If we had but this one species it would be easy to define our genus, but there are many related plants in the world; some agreeing in both these characters, some having only one of them, and others neither. The genus *Bovistella* shades by a continuous series of species into *Lycoperdon* on one hand and *Bovista* on the other." Plates 33, 70, 86, 87, 88, 89 illustrate the twenty-one species described.

Hariot, P. et Patouillard, N.

In the Bulletin de la Société de France, vol. 23, Fasc. 3, we find description and illustration of a curious new genus, the authors remarking that le genre *Colletomanginia* est donc une sorte d'*Hypoxylon* composé, au même titre que le receptacle d'une Morille est une agrégation de Pézizes. It is placed, however, in the group *Xylariaceae* with the following description: *Colletomanginia* n. g. — Major, lignoso-carnosa, superficie cristato-alveolata; cristis sterilibus sporiferam partem in alveolis dispositam circumscriptibus; peritheciis immersis; ascis octosporis, paraphysatis; sporis continuis, atris. Only one species is given, *C. paradoxa*, from East Africa.

Rabenhorst's Kryptogamen-flora, Pilze, 101 Lieferung, 20 Sept. 1906.

This number is a continuation of the genus *Torula* with a few small genera of the same group, followed by the *Echinobotryeae*, the *Periconiceae*, and the *Arthrinarieae*. Several new species are described by the author, Dr. G. Lindau.

New York State Museum, Bulletin 105 Botany 9.

The "Report of the State Botanist 1905," Chas. H. Peck, has just been received. The new species of fungi are as follows: *Boletus acidus*, *Clitopilus squamulosus*, *Cortinarius rubripes*, *Entoloma flavifolium*, *Hypomyces camphorati*, *Inocybe diminuta*, *Lentinus spretus*, *Leptosphaeria substerilis*, *Marasmius longistriatus*, *Merulius pruni*, *Merulius ulmi*, *Phyllosticta pallidior*, *Pluteus grandis*, *Polyporus underwoodii* Murr., *Psathyra vestita*, *Sporotrichum anthophilum*, *Zygodesmus pallidofulvus*, *Bulgaria rufa magna*, *Polyporus sulphureus semialbinus*, *Tricholoma unifactum*, *Lactarius rimosellus*, *Russula subsordida*, *Russula viridella*, and *Clavaria conjuncta*. Under the head of Edible Species eleven are described. Fifteen species are illustrated on 12 colored plates.

Garrett, A. O.

Some account of *Puccinia scandica* Johans., *Puccinia caricis-asteris* Arth., *Aecidium monoicum* Peck, and *Caeoma confluens* (Pers.) Schroeter is given by A. O. Garrett in the July No. of the *Journal of Mycology*, 1906, under the title "Field Notes on the Uredineae." The notes refer to collections made during the three years past at the head of Big Cottonwood Canyon, about 30 miles from Salt Lake City, the altitude ranging from 8,500 to 9,500 feet.

Arthur, Joseph Charles, and Kern, Frank Dunn.

A paper, "North American Species of *Peridermium*," read before the Botanical Section of the American Association for the Advancement of Science, New Orleans, Jan. 1, 1906, is published in the August No. of the *Bulletin of the Torrey Botanical Club*. The genus *Peridermium* as used by those authors embraces all aecial forms possessing peridia, inhabiting the Pinaceae and Gnetales. The paper describes 27 species, ranging from Mexico to Alaska, and from the Atlantic to the Pacific coasts, and also 3 species not yet found in America, but which doubtless occur as the telial forms are abundant. The authors say further that some important characters are used in the diagnoses not hitherto employed for American forms, such as those derived from the presence and form of pycnia, the structure, especially the cross-section view of the peridium, and the thickness of the wall of the spores. Only 3 of the 27 forms have been definitely associated with the telial forms. Cultures are absolutely demanded, say the authors, before the *Peridermium* tangle can be straightened. Useful keys are given both for the species and the hosts. Ten of the species are new and several new names are given besides.

Arthur, Joseph Charles.

Twelve new species are described by the author in the October *Bulletin of the Torrey Botanical Club*, 1906, under the title "New Species of Uredineae — V." They are from various parts of western Canada, western and southern United States, Mexico and the West Indies. Dr. Arthur says this assortment of species is more than usually interesting, as it embraces some belonging to little-known genera, and some that clarify knowledge of common forms.

Dietel, P.

An excellent monograph of the genus *Ravenelia* has been published in *Beihefte zum Botanischen Centralblatt*, 20 [Abt.] II:343-413, Pl. V-VI, 1906 — "Monographie der Gattung *Ravenelia* Berk.," P. Dietel. It was established in 1853 with two species; Cooke reviewed the genus in 1880 when 8 species were known; now there are 81 species — 7 of them being first de-

scribed in this paper by Dietel. About two dozen pages are devoted to a review of the literature, the Morphology Relationship, Distribution, Synopsis, etc. The species are fully described, synonymy, hosts and distribution given and the literature cited under each species. Long's *Pleoravenelia* and *Neoravenelia* are not accepted as valid genera. For the *Ravenelias* in the narrow sense the new Section *Haploravenelia* is proposed. *Pleoravenelia* is used as a Section to include the remaining species. Five new species from Mexico are described.

Nichols, Susie Percival.

This study of "the Nature and Origin of the binucleated cells in some Basidiomycetes," Trans. Wisc. Acad. Sci. Arts and Let. 15:30-70, Pl. VI, 1905, deals with *Hypholoma perplexum* Pk., *Coprinus*, *Poria*, *Pholiota praecox*, *Lepiota naucina*, *Dictyophora duplicata*, and *Lycoperdon pyriforme*. The results obtained show that the binucleated cells do not originate through the formation of an especial reproductive apparatus. Their formation is not necessarily followed immediately by the formation of a carpophore. At present there is no evidence that the binucleated cells of Basidiomycetes ever originate by a fusion of their adjacent cells such as Blackman finds at the base of the aecidium in *Phragmidium violaceum* and *Gymnosporangium clavariaeforme*.

Journal of Mycology. Vol. 13, Jan. 1907.

The table of contents is as follows: Morgan — North American Species of *Lepiota* (concluded); Kern — The Rusts of Gautemala; Beardslee — The *Lepiotas* of Sweden; Arthur — New Genera of Uredinales; Kauffman — The Genus *Cortinari* with Key to the Species; Editor's Notes.

Morgan, A. P.

In the January No. (1907) of the Journal of Mycology Prof. A. P. Morgan concludes his paper, "North American Species of *Lepiota*." It was begun in the July No. (1906); installments appeared also in the September, and November Nos. The author includes 90 species in the monograph, several of them being new. Concise but full descriptions are given. The main groups of species are eleven in number, arranged under three sections: *annuli inferi*, *annuli mobilis*, and *annuli superi*. In addition synoptic descriptive lines are used at proper intervals, greatly facilitating the use of this important paper on our *Lepiotas*. Professor Morgan's wide acquaintance with the species enables him to prepare admirable descriptions; but partial synonymy is given.

Reed, George M.

Under the title "Infection experiments with *Erysiphe graminis* DC." Mr. Reed gives in the 15th vol. (1904) of the Transactions of the Wisconsin Academy of Science, Arts and Letters, pp. 135-162, published in 1905, a full resumé of Neger's and Salmon's infection work, and then proceeds to outline his own experiments with this species — which (combining all reports) infects fifty-five species of Grasses. Of this number only sixteen belong to this country, according to Mr. Reed. We find from the tables and notes given that plants on which spores were sown were *Triticum vulgare*, *Avena sativa*, *Hordeum vulgare*, *H. jubatum*, *Bromus mollis*, *Poa pratensis*, *P. trivialis*, *P. nemoralis*, *P. compressa*, *Secale cereale*, *Lolium perenne*, *Festuca elatior*, *F. heterophylla*, *Dactylis glomerata*, *Phleum pratense*, *Glyceria fluitans*.

A. A. A. A. 1907. Sec. G. (Botany).

The report of the Secretary [Tracy E. Hazen] shows that at the New York meeting, the following Mycological papers were presented: A Natural System of the Discomycetes, F. E. Clements; Spore forms of *Spegazzinia ornata* Sacc., Ernst. A. Bessey; An Outbreak of the European Currant Rust, *Cronartium ribicola* Dietr., F. C. Stewart; The origin of the Hymenium in some Geoglossaceae, E. J. Durand; The Pathology of the Rice Plant, Haven Metcalf; Evidences of Sexual Reproduction in the Slime Moulds, Edgar W. Olive; The Plant-disease Survey of the United States, W. A. Orton; A Study of the Leaf-tip Blight of *Dracaena*.

Waite, M. B.

In Science N. S. vol. XXV, No. 34, February 22, 1907 (p. 304) a report is given of a paper by M. B. Waite presented before the Biological Society of Washington, having the title "A New Peach Blight from California." It is the gumming fungus *Coryneum beyerinckii* Oud. Spraying with Bordeaux Mixture in the fall or early winter is preventive. This *Coryneum* is also seriously injurious to the Almond and Apricot in California.

Botanical Society of America, Meeting of 1907.

The Secretary, Duncan S. Johnson, reports in Science, N. S. vol. XXV, No. 634, Feb. 22, 1907, the abstracts of papers read, of which we find the following mycological: Figures produced by Protoplasmic Streaming in Fungi and Slime Moulds, R. A. Harper; Sexuality in the Mucors, A. F. Blakeslee; A New Native Host for Pearblight, M. B. Waite; A Study of Disease Resistance in Watermelons, W. A. Orton; Cultures of Uredineae in 1906, J. C. Arthur; *Peridermium acicolum* the Aecial Stage of *Coleosporium solidaginis*, G. P. Clinton; Culture Studies on the Polymorphism of Basidiomycetes, Geo. R. Lyman; Ascigerous

Forms of *Gleoesporium* and *Colletotrichum*, C. L. Shear and Anna K. Wood; A New *Chrysanthemum* Disease—the Ray Blight, F. L. Stevens; A Potato Leaf-blotch Fungus new to America, L. R. Jones; A Bibliography of North America Lichenology, Bruck Fink.

Denniston, H. R.

Descriptions are given in the Transactions of the Wisconsin Academy of Sciences, Arts and Letters, vol. XV (1904), 1905, of "The *Russulas* of Madison and Vicinity," occurring there mostly the latter part of July and first of August, the species being as follows: *R. adusta*, *alutacea*, *amoena*, *atropurpurea*, *decolorans*, *delica*, *emetica*, *foetens*, *furcata*, *integra*, *lactea*, *lutea*, *ochrophylla*, var. *albipes*, *ochracea*, *olivascens*, *pectinata*, *roseipes*, *virescens*, *veternosa*.

Christman, A. H.

Some of the earlier observations bearing on the question as to the manner in which Rusts pass the winter are given, then experiments detailed by the author of "Observation on the Wintering of Grain Rusts," are published in the Transactions of the Wisconsin Academy of Sciences, Arts and Letters, Vol. XV (1904), 1905. The work pertained to the winter of 1902-3. The conclusion reached was, that in the latitude of Madison, in a period of three months, during which the temperature scarcely raises above the freezing point, viable uredospores may be obtained at practically any time. The spores taken from very exposed situations gave about 10% of germinations. Of Oat Rust spores collected late in January, 60% germinated.

Rabenhorst's Kryptogamen-flora, Pilze, 103 Lieferung, 15 Nov. 1906.

This part, prepared by Dr. G. Lindau is devoted to the following groups: X. Unterabteilung *Sarcopodiaceae*; XI. Unterabteilung *Myxotrichellaceae*; XII. Unterabteilung *Chloridiaceae*; XIII. Unterabteilung *Stachylidiaceae*; XIV. Unterabteilung *Characeae*.

Fink, Bruce.

Professor Bruce Fink gives in The Plant World for November, 1906, some account of "Lichens: their Economic Role;" discussing briefly the symbiotic relationship and mode of life of these plants, then outlining their use as soil-makers by attacking rocks, dealing with the uses of Lichens as food—the *Cladonias* for moose, caribou, and deer, the *Cladonia rangiferina* for the reindeer; for man the *Lecanora esculenta* (Northern Africa), *Cetraria islandica* (Iceland), also dyes of various colors have been extracted from Lichens and are still being used in various ways. These colors are usually reds, purples or blues, and they are used for coloring cloth, wood, paper, etc.

Sheldon, John L.

Under the title of "A Rare Uromyces" is given an account of observations on *Aecidium houstoniatum* Schw., on *Houstonia coerulea* L. and the Uromyces on *Sisyrinchium graminoides* Bick. Clumps of *Houstonia* with aecidia were transplanted beside plants of *Sisyrinchium*, and a short time thereafter the latter developed Uredosori. Are the two Rusts alternate forms or at all connected? That on *Sisyrinchium* differed from the description of the *U. sisyrinchii* Mont., it has uredospores, differently shaped teleospores which germinate at maturity in the living host, and the epispore is smooth. A full technical description is given. See Torreya, 6:249, Dec. 1906.

Annales Mycologici, vol. III, No. 6, Dec. 1905.

The Inhalt of this No. reads as follows: Salmon, Ernest S., On the Variation shown by the Conidial stage of *Phyllactinia corylea* (Pers.) Karst. I; Saccardo, P. A., Notae Mycologicae; Rehm, H., Ascomycetes Americae borealis; Trotter, A., Nuove ricerche sui micromiceti delle galle e sulla natura dei loro rapporti ecologici; Hoehnel, Franz v., Mycologiche Fragmente; Neue Literatur.

Salmon, Ernest S.

An interesting paper "On the variation shown by the conidial stage of *Phyllostictia corylea* (Pers.) Karst. I," is published by this author in *Annales Mycologici*, December 1905, illustrated by 3 full-page plates. The statement is made that *P. corylea* shows in its conidial stage marked and constant morphological differences confined to certain hosts. Using characters shown by the conidiophore, two morphological varieties, var. *rigida* and var. *subspiralis*, can be distinguished; a third variety, var. *angulata*, can be based on the shape of the conidium. The examination of a large number of host-plants has shown further that there are other more or less important morphological variations, some of which will probably also require to be separated from the type.

Bulletin de la Société Mycologique de France, tome 33, 3e. Fasc., 15 Sept. 1906.

The sommaire for this No. is as follows:—N. Patouillard.—Champignons Algéro-Tunisiens nouveaux ou peu connus; P. Hariot et N. Patouillard.—Note sur le genre *Colletomanginia*; G. Bainier.—Mycothèque de l'Ecole de pharmacie, V. VI, VII, VIII; F. Guêguen.—Emploi du Sudan III comme colorant mycologique, seul ou combiné au bleu coton et à l'iode; M. Boué.—Empoisonnement par *Amanita junquillea*; Demange.—Empoisonnement mortel par des Hygrophores; *Bibliographie analytique*.

Murrill, William A.

Under the title "A new Chestnut Disease," in the September No. of *Torreya*, a full account is given of a disease found on living, or recently killed branches of the American chestnut caused by *Diaporthe parasitica* Murrill n. sp.—specimens known from Bronx Park, New York City, New Jersey, Maryland, the District of Columbia and Virginia. The heretofore known species of *Diaporthe* are not parasitic. Text figures illustrate the new species.

Wilson, Guy West.

Three fungi are referred to in "Mycological Notes from Indiana" in *Torreya*, September 1906, namely, *Peronospora floerkeae* Kellerm., *Hydrogera kleinii* (van Tiegh.) Kuntze (*Pilobolus kleinii* van Tiegh.) and *Stannaria americana* Massee & Morgan.

Ricker, P. L.

An admirable paper is "A list of known Philippine Fungi," given in the *Philippine Journal of Science*, 1:277-2-4, Sept. 15, 1906, by P. L. Ricker. He says it should not be regarded as a critical revision of the species, but only an attempt to bring together all references to species credited to the Archipelago by various authors. New species are *Phyllachora merrilli* Ricker n. sp. on leaves of *Ficus* sp.; *Nummularia philippinensis* Ricker n. sp.; *Trematosphaeria palaquii* Ricker n. sp. on bark of *Palaquium latifolium*; *Stereum luzoniense* Ricker n. sp.; and *Thelephora diamesa* Ricker n. sp.

Howe, Reginald Heber, Jr.

Under the title "Some additions to the Flora of Middlesex County, Massachusetts," *Bryologist*, Sept. 1906, Mr. Howe reports 24 species not included in the Lichens attributed to said County by Messrs. L. L. Dame and F. L. Collins.

Kellerman, W. A.

Under the title "A new *Plowrightia* from Guatemala" there is described a disease of the Century Plant (*Agave americana*) found in Guatemala; the species, *P. williamsoniana*, is described, followed by a translation of the diagnosis into Latin. *Journal of Mycology*, September 1906.

Arthur, J. C.

This is a descriptive notice—published in the September No. of the *Journal of Mycology*, 1906—of Dr. Arthur's paper on *Eine Klassifikation der Uredineen* (read before the International Botanical Congress at Vienna in July 1905), "A new classification of the Uredinales." The purpose is to state some of the aids and difficulties that will beset the practical acceptance of the classification.

Bain, Samuel M. and Essary, Samuel H.

Colletotrichum trifolii Bain is described as "A new Anthracnose of Alfalfa and Red Clover" — see *Journal of Mycology*, September 1906. The disease is said to occur in Tennessee, Kentucky, West Virginia and Ohio.

Atkinson, Geo. F.

Professor Atkinson here describes (*Jour. Mycol.* 12:193-4, Pl. 91. Sept. 1906) "Two new species belonging to *Naucoria* and *Stropharia*," both from Central Ohio, namely, *N. paludosella* and *S. hardii*.

Merrill, G. K.

The "Lichen Notes No. 4" gives a study of *Umbilicaria vellea* and *Umbilicaria spadoclewa*. See *Bryologist*, September 1906.

Mycological Notes, C. G. Lloyd, No 21, April 1906.

A large part of this No. is devoted to "New Notes from Australia," "Boudier's Plates," "Professor Farlow's work," "Le genre *Calvatia* et les "Petite-saffiches," "Errors," "Notelets," "Parallel work;" it contains also an account of the genus *Arachnion* (*A. album* and *A. rufum*), of "the genus *Holocotylon*," (*H. brandegeeanum* and *H. texense*), and "A large species of *Cyphella*" (*C. grandis* Patouillard n. sp.).

Rabenhort's Kryptogamen-Flora, Pilze, 102, Lief., 10 Okt., 1906.

This *Lieferung* is devoted to the Unterabteilungen *Trichosporieae*, *Monotosporeae*, *Goratorrhodeae*, *Haplographieae*. A few new names and new species are given by the author, G. Lindau.

Journal of Mycology, Vol. 12. September 1906,

The Table of Contents of the *Journal of Mycology* for September 1906, contains the following:—Kellerman—A New *Plowrightia* from Guatemala; Arthur—A New Classification of the *Uredinales*; Bain and Essary—A New Anthracnose of Alfalfa and Red Clover; Atkinson—Two New Species belonging to *Naucoria* and *Stropharia*; Morgan—North American Species of *Lepiota* (continued); Hedgcock—Some Wood Staining Fungi from Various Localities in the United States; Kellerman—Notes from *Mycological Literature XXI*, Index to North American Mycology, Editor's Notes.

Hedgcock, Geo. G.

Condensed from the original notes, and from descriptions of the Cultural Characters, in the 17th Report of the Missouri Botanical Garden, Dr. Hedgcock discusses 8 species of *Ceratostomella*, 7 species of *Graphium*, 1 *Fusarium*, 2 species of *Hormodendron*, 1 *Hormiscium* and 1 *Penicillium*.

Rehm, H.

Ten new species are described and critical notes on a few others are given in the *Annales Mycologici* for December 1905, under the title "*Ascomycetes Americae borealis*."

Hoehnel, Franz v.

In "*Mycologische Fragmente*" the author publishes notes No. CVI-CXVII in the December No. of *Annales Mycologici*, 1905. A wide range of careful study is indicated — for the most part pertaining to European species. The author proposes a new genus, namely *Lentomitella*; Wie *Lentomita*, aber die Sporen mit aussen aufgesetzten feinen Laengstreifen versehen, daher am optischen Querschnitte ringsum mit kleinen Waerzchen besetzt.

Beardslee, H. C.

Professor Beardslee here (in *Journal of Mycology*, Jan. 1907) gives some notes on "The *Lepiotas* of Sweden," which he in company with Mr. C. G. Lloyd collected in the summer of 1905. The same pertains to six species — *L. procera*, *naucina*, *rhacodes*, *cristata*, *metulaespora* and *amianthina*. These are some excerpts: *L. procera* agreed with our plant in every detail. . . . Of *L. naucina* the spores are found to be identical with those of the American plant [*i. e.*, *A. naucinoides*]. . . . *L. rachodes* is rare in the U. S., the red color not as bright in the specimens in Sweden. . . . *L. cristata* and *L. amianthina* were in agreement with the plants known by the same names with us. . . . The Ashville specimens of *L. metulaespora* have slightly shorter spores, but agree in all of the details with the Swedish plants

Kern, Frank D.

The "Fourth contribution to Guatemalan Mycology" in connection with Professor Kellerman's study and exploration in Guatemala was published by Mr. Kern in the January No. of the *JOURNAL OF MYCOLOGY*, 1907. It comprises a critical study of 40 species, one-eighth of them being new. Specialists named the hosts and Mr. Kern states that in all determinations and the drawing up of descriptions of new species he was aided by Prof. J. C. Arthur, and enjoyed the privilege of access to his herbarium and library. This is the first report ever made on Rusts of that country and in many instances new hosts have been added and the geographical distribution has been extended. Those not before listed are *Puccinia heliotropii* Kern & Kellerm. n. sp. on *Heliotropium indicum* L.; *Aecidium guatemalensis* Kern & Kellerm. n. sp. on *Heliotropium indicum* L.; *Aecidium brysonimae* Kern & Kellerm. n. sp. on *Brysonima crassifolia* (L.) H.B.K.; *Uredo cabreriana* Kern & Kellerm. n. sp. on *Buettneria lateralis* Presl. (?); and *Uredo trixitis* Kern & Kellerm. n. sp. on *Trixis frutescens* P. Br.

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Alphabetical List of Articles, Authors, Subjects, New Species and Hosts, New Names and Synonyms.

W. A. KELLERMAN.

ABIES grandis Lindl., host to *Peridermium pseudo-balsameum* (D. & H.) Arth & Kern. Bull. Torr. Bot. Club, 33:430. Aug. 1906.

ABIES nigra Desf., see *Picea mariana* (Mill.) B. S. P.

ABIES lasiocarpa (Hook.) Nutt. [instead of *Pseudotsuga mucronata* (Raf.) Sudw.] as reported in Bull. Torr. Bot. Club, 33:431. Aug. 1906, host to *Peridermium holwayi* Syd. Bull. Torr. Bot. Club, 33:514. Oct. 1906.

ACACIA micrantha Barth., host to *Ravenelia acaciae-micranthae* Diet. n. sp. [Mexico.] Beihefte z. Bot. Centrbl. 20:372. 1906.

ACACIA pennatula Barth., host to *Ravenelia acaciae-pennatulae* Diet. n. sp. [Mexico.] Beihefte z. Bot. Centrbl. 20:373. 1906.

AECIDIUM byrsonimae Kern & Kellerm. n. sp., on *Byrsonima crassifolia* (L.) H. B. K. [Guatemala.] Jour. Mycol. 13:24. Jan. 1907.

AECIDIUM coloradense Dietel, *syn. of Peridermium coloradense* q. v.

AECIDIUM conorum-piceae Rees, *syn. of Peridermium conorum-piceae* q. v.

AECIDIUM engelmanni Thuem, *syn. of Peridermium conorum-piceae* q. v.

AECIDIUM guatemalensis Kern & Kellerm. n. sp., on *Heliotropium indicum* L. [Gautemala.] Jour. Mycol. 13:23. Jan. 1907.

AECIDIUM herrermanum Arth. n. sp., on *Senecio salignus* DC. [Mexico.] Bull. Torr. Bot. Club, 33:520. Oct. 1906.

AECIDIUM pulverulentum Arth. n. sp., on *Randia* sp. [Mexico.] Bull. Torr. Bot. Club, 33:521. Oct. 1906.

AECIDIUM pseudo-balsameum D. & H., *syn. of Peridermium* q. v.

AECIDIUM sorbi Arth. n. sp., on *Sorbus occidentalis* (Wats.) Greene. Bull. Torr. Bot. Club, 33:521. Oct. 1906.

AEGERITA candida Pers. is the imperfect form of *Peniophora candida* n. sp. [Geo. R. Lyman.] Science N. S., 25:290. 22 Feb. 1907.

AGARICUS campestris, Development of. Geo. F. Atkinson. Bot. Gaz. 42:241-264. Pl. VII-XII. October 1906.

- AGARICUS oblitus Morgan Myc. Fl. M. V., syn. of *Lepiota glischnra* q. v.
- AGAVE americana, host to *Plowrightia williamsoniana* Kellerm. n. sp. Jour. Mycol. 12:187. September 1906.
- ANTHRACNOSE, New, of Alfalfa and Red Clover. [*Colletotrichum trifolii* Bain n. sp.] Samuel M. Bain and Samuel H. Essary. Jour. Mycol. 12:192-3. Sept. 1907.
- ARACHNION, The Genus. C. G. Lloyd. Myc. Notes. No. 21:252-4. April 1906.
- ARTHUR, J. C. A new Classification of the Uredinales. [Discussion.] Jour. Mycol. 12:188-191. Sept. 1906.
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- ASCIGEROUS forms of *Gloeosporium* and *Colletotrichum*. [Abstract.] C. L. Shear and Anna K. Wood. Science N. S. 25:291. 22 Feb. 1907.
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- BACILLUS oleae (Arcang.) Trev. Bacterial disease of Oleander. Clayton O. Smith. Bot. Gaz. 42:301-309.
- BACTERIAL disease of Oleander, *Bacillus oleae* (Arcang.) Trev. Clayton O. Smith. Bot. Gaz. 42:301-309.
- BAIN Samuel M. and Essary, Samuel H. A new Anthracnose of Alfalfa and Red Clover. [*Colletotrichum trifolii* Bain n. sp.] Jour. Mycol. 12:192-3. Sept. 1907.
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- BEARDSLEE, H. C. The *Lepiotas* of Sweden [observations]. Jour. Mycol. 13:26-8. Jan. 1907.
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- BETULA, wood, host to *Nectria betulina* Rehm n. sp. Ann. Mycolog. 3:520. Dec. 1905.
- BIBLIOGRAPHY of North American Lichenology. [Abstract.] Bruce Fink. Science N. S. 25:292. 22 Feb. 1907.
- BLAKESLEE, Albert Francis. Differentiation of Sex in *Thallus* Gametophyte and Sporophyte. Bot. Gaz. 42:161-178. September 1906.
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- BOVISTELLA davisii Lloyd n. sp., Myc. Notes, 23:286. Aug. 1906.
- BOVISTELLA dealbata Lloyd, Myc. Notes [Bovista dealbata Sacc. Syll.] Myc. Notes, 23:284. Aug. 1906.
- BOVISTELLA dominicensis Lloyd n. sp. (Masse?), collected by the "West Indies' Exploration Committee" in the Island of Dominica. Myc. Notes, 23:283. Aug. 1906.
- BOVISTELLA echinella Lloyd. [Bovista echinella]. Myc. Notes, 23:286. Aug. 1906.
- BOVISTELLA lycoperdoides [Mycenastrum lycoperdoides Cke., Scleroderma lycoperdoides. Sacc. Syll.] Myc. Notes, 23:280. Aug. 1906.
- BOVISTELLA miyabei Lloyd n. sp., [Japan.] Myc. Notes, 23:282. Aug. 1906.

(To be Continued.)

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EDITOR'S NOTES.

THE somewhat belated appearance of the present No. is due to the editor's absence in Central America, being engaged the entire winter in making mycological explorations in Guatemala.

THE advantages of annual meetings of scientific workers are recognized by all—the chief being perhaps the inspiration of contact. Whether the reading of technical papers is worth the time consumed is doubted by many. Could not the time be still more limited for such, and the gist of the matter be told orally?

THE fusion of three botanical societies or organizations, as accomplished at the last meeting of the A. A. A. S., is another step in the right direction. An audience of some size is assured—and surely this is an advantage, especially if discussion is secured of the radical propositions, new ideas, and progressive work. The annual fee should be low—real students and devoted investigators are seldom money makers. They of all persons should not be debarred membership. Something can be said in favor of the custom of such societies making grants for research work, but much more against it. It is a tax on many workers who can ill afford to make such contributions to others—they themselves are in dire need of funds for experiment and research. Let the pleasure of giving still remain with those intelligent and liberal-minded men whose devotion and sagacity have enabled them to accumulate much of this world's goods.



*Prof. Dr. Fr. Bubák,
Tábor, Bohemia*

Journal of Mycology

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ARTHUR'S UREDINALES OF THE NORTH AMERICAN FLORA.

W. A. KELLERMAN.

This exhaustive monograph constitutes Part 2 of Volume 7 of an important publication which is being issued by the New York Botanical Garden, as rapidly as the Orders are worked up by specialists. This paper is the fourth Part appearing to date.

The Order Uredinales, by Joseph Charles Arthur, as here treated, consists of the three families *Coleosporiaceae*, *Uredinaceae*, and *Aecidiaceae*. The first family occupies pages 85-96, and the second, pages 97-128 of this Part of the Flora; fourteen (of the thirty-seven) genera of the family *Aecidiaceae* are included in the remaining pages (129-160) of Part 2. Only a few botanists, if indeed any outside the devotees of Uredinology, will not be surprised at the radical treatment of this group — the innovations proposed.

It is the purpose of this review to point out what Dr. Arthur has done rather than to pronounce judgment on any part of his work. For years he has devoted his energies to the study of Rusts. His culture-work, study of life cycles, genetic relationships, and morphology, have prepared the way for, and culminated in this splendid monograph, which we will now proceed to analyze.

The usual anatomical characterization is given of the Order which need not be recounted; but the series of spores can not be

understood unless given in his own words, which are as follows: Spores of five morphological sorts, not all present in every genus;

1. Basidiospores; minute, thin-walled, without surface sculpturing.
2. Pycniospores; small, smooth, of unknown function.
3. Aeciospores; verrucosely sculptured, borne in chains.
4. Urediniospores; echinately or verrucosely sculptured, singly, or sometimes in chains (*Coleosporium*, *Melampsoropsis*.)
5. Teliospores; smooth or variously sculptured but not echinulate, borne singly or in chains.

The last four named may be present but any one or all but the teliospores may be wanting in certain genera. In many genera an alternation of phases is conspicuously shown, says the author, the pycnia (rarely absent) with one other spore-structure comprising the gametophytic phases, and the telia usually with one other spore-structure, the sporophytic phase. In every species the mycelium eventually gives rise to teliospores, which produce in germination four bodies, either remaining within the spore-cell (*Coleosporium*), or borne in the air on a short mycelium, each basidium supporting a single, stalked or sessile basidiospore.

Whether the basidia are internal or external is the fundamental character determining the families: if internal, the family *Coleosporiaceae*; if external, the families *Uredinaceae* and *Aecidiaceae*. The two latter families are readily separated according to the character of the teliospores — they are compacted laterally into a crust or column (rarely solitary within the tissues) in the *Uredinaceae*, and free or fascicled in the *Aecidiaceae*.

Dr. Arthur recognizes for the first family two North American genera — *Coleosporium*, the life-cycle with all spore forms; and *Gallowaya*, with only telia. The latter genus was proposed by the author of the monograph under consideration, last year, before the Botanical Congress at Vienna, to include the single species *G. pini* (*Coleosporium pini* Gall.)

The genus *Coleosporium* is concisely but fully described. Attention is here called to one of the statements, as follows: "Teliospores sessile (by successive formation and by displacement due to lateral pressure often appearing catenulate and pedicellate), one-celled (by early division of the contents appearing four-celled)." Dietel's *Stichopsora* is not recognized as a valid genus, but placed as a synonym under *Coleosporium*.

The synopsis or key to the species (twenty-four in number) of *Coleosporium* is similar in structure to all the species-keys that follow and can be explained in a few words. The main divisions are based on the groups of the hosts. Thus, "Telia and uredinia inhabiting monocotyledonous hosts (*Orchidaceae*)" leads to *C. bletiae*; "Telia and uredinia inhabiting dicotyledonous

hosts" leads to "Hosts belonging to Grossulariaceae" (*C. ribicola*), to "Host belonging to family Loasaceae" (*C. mentzeliae*), etc. In case of some groups (say *Carduaceae*) the tribes are recognized (as *Vernonieae*, *Eupatorieae*, *Astereae*, etc.) in separating the species. Then below this, when there are two or more species, morphological characters are called into requisition. Synonymy and exact citations both for the genus and species are given. The convenient paragraphing of the full though concise descriptions is to be highly commended. Under each species the hosts are enumerated — the family in each case first given; then follow the type locality, the distribution, illustrations when any, and finally the exsiccati are cited.

Four new species of *Coleosporium* are here described, namely, *C. begoniae* from Mexico, *C. lacinariae* from Florida and Alabama, *C. arnicale* named from Washington, and *C. occidentale* also from the State last named. Some new combinations are made; thus Dietel and Holway's *Stichopsora mentzeliae* and Schweinitz's *Caeoma* (*Uredo*) *helianthi* are made *Coleosporium*s; and of the latter are listed, as synonyms, Dietel and Holway's *C. viguierae* and *C. verbesinae*. *Uredo terebinthinaceae* and *Caeoma* (*Uredo*) *terebinthinaceae* of Schweinitz are included in *Coleosporium terebinthinaceae* (Schw.) Arthur.

When we turn to the family *Uredinaceae* we realize more fully the radical and progressive mode of treatment. The diagnosis of the family, which has the basidia external, is otherwise sufficiently concise and definite, the main points expressed as follows: Telia forming a more or less definite crust or column; teliospores compacted into layers, or rarely solitary within the tissues (*Uredinopsis*), sessile. And this family includes these eighteen genera: *Uredo*, *Physopella*, *Bubakia*, *Pucciniastrum*, *Melampsoridium*, *Melampsorella*, *Hyalopsora*, *Calyptospora*, *Necium*, *Uredinopsis*, *Melampsoropsis*, *Cronartium*, *Cerotelium*, *Cionothrix*, *Alveolaria*, *Baeodromus*, *Endophyllum*, and *Puccinosira*. Even one claiming to be a uredinologist could scarcely say this list with his eyes shut — in fact he might stumble if his eyes were open!

The genus *Uredo*, *Arthuri* sensu, includes the plants mostly going under the names of *Melampsora* Cast., *Physonema* Lév., *Podosporium* Lév., *Podocystis* Fries. and *Caeoma* Tul. It is evident that this is not the form genus *Uredo* so familiar to all, in service so long, and perhaps destined to further use in the same sense. In fact Dr. Arthur has elsewhere said that he proposes "in his own work to retain such names as *Peridermium*, *Caeoma*, *Roestelia*, *Uromyces*, and *Puccinia* as form genera for imperfectly understood species, and even *Uredo* and *Aecidium* in their customary acceptance as form genera, if a better course does not become evident. These will constitute an *Anhang* for recording undistributed and imperfectly known forms." It is

understood of course that the application of the rule of priority has brought the real generic name *Uredo* uppermost. Our species then are as newly denominated: *Uredo medusae* (Thuem.) Arthur; *Uredo confluens* (Juel) Arthur; *Uredo rostrupiana* Arthur; *Uredo bigelowii* (Thuem.) Arth.; *Uredo albertensis* Arthur; and *Uredo lini* Schum.

The second genus of this family, *Physopella*, includes the *Uredo vitis* Thuem., *Uredo ficina* Juel, *Uredo fici* Cast., *Uredo artocarpi* B. & C., and *Uredo aeschynomenis* Arth. The third genus, *Bubakia*, was based on *Thichobasis crotonis* Cooke; and one more species of our flora is added, namely, *Bubakia mexicana* Arthur n. sp.

The three genera just enumerated constitute the subfamily *Uredinatae* — having their pycnia and other sori subcuticular or originating between the epidermis and mesophyll; the teliospores compacted into dense layers forming a crust; aecia when present with periderm. The next seven genera (Nos. 4-10 of this family) form the subfamily *Pucciniastratae* — having subcuticular pycnia but the other sori originating between the epidermis and mesophyll; teliospores divided by vertical partitions or one-celled, forming imperfect layers, or solitary; aecia when present with cylindrical periderm, rupturing irregularly above. The members of this subfamily are enumerated in the next paragraph.

The genus *Pucciniastrum* Otth, established in 1861, is retained, the genera proposed by Mganus in 1875, *Phragmopsora* and *Thekopsora*, being listed as synonyms. Under this we find the forms well known in literature as *Uredo goodyerae* Tranz., *Uredo hydrangeae* B. & C., *Uredo agrimoniae* Schw., *Uredo arcticus* Lagerh., *Uredo pustulata* Pers. (and *Melampsora epilobii* Fckl.), *Aecidium pyrolae* Pers. (*Melampsora pirolae* Schroet. and *Uredo chimaphilae* Peck), *Melampsora sparsa* Wint. (*Pucciniastrum arbuti* D. & H. and *Uredo copelandi* Syd.), *Uredo minima* Schw. and *Caeoma azaleae* Schw., and *Aecidium* (?) *myrtilli* Schum. (*Melampsora vaccinii* Wint.). The last named species may be taken as a fair case to display the usual synonymy that thorough study develops. The name is used in the monograph is *Pucciniastrum myrtilli* (Schum.) Arth. 1906; the synonyms being:

Aecidium (?) *myrtilli* Schum., 1803.

Uredo pustulata vaccinii Alb. & Schw., 1805.

Uredo vacciniorum DC., 1815.

Caeoma vacciniorum Link, 1825.

Thekopsora (?) *vacciniorum* Karst., 1879.

Melampsora vaccinii Wint., 1881.

Melampsora vacciniorum Schroet., 1887.

Pucciniastrum vacciniorum Dietel, 1897.

The fifth genus, *Melampsoridium*, established by Klebahn, 1899, includes one species, *M. betulae* (Schum.) Arthur — the aecia on *Larix* not yet found in America, the uredinia and telia on *Betula*, widely distributed. The sixth genus also includes but one species — *Melampsorella elatina* (Alb. & Schw.) Arthur, the aecia on *Abies* and the I and II forms on *Alsine* and *Cerastium*. The seventh genus has this representation: *Hyalopsora aspidotus* (Peck) Magn., *Hyalopsora polypodii* (DC.) Magn., *Hyalopsora laeviuscula* (Diet. & Holw.) Arthur, and *Hyalopsora cheilanthis* (Peck) Arthur; the hosts for these all being plantae polypodiaceae. The next occurs on *Vaccinium* (the aecia on *Abies* not recorded for America), namely *Calyptospora columnaris* (Alb. & Schw.) Kuehn. Then we have a new genus, *Necium*, with the single species, *N. farlowii* Arthur n. sp. on *Tsuga canadensis* (L.) Carr. The tenth genus is exclusively filicicolous, *Uredinopsis*, founded by Magnus in 1893. The American species are *U. osmunda* Magn., *U. mirabilis* (Peck) Magn., *U. pteridis* Diet. & Holw., *U. copelandi* Syd., *U. struthiopteridis* Stroemer, and *U. phegopteridis* Arthur n. sp.

The last two subfamilies of the Order Uredinaceae are *Chrysomyxatae*, with the single genus *Melampsoropsis*; and *Cronartiatae*, with the genera *Cronartium*, *Cerotelium*, *Cionothrix*, *Alveolaria*, *Baeodromus*, *Endophyllum*, and *Puccinosira*. In both these subfamilies the pycnia and other sori originate beneath the epidermis, and the teliospores are catenulate. In *Chysomyxatae* the aecia (if present) rupture their periderm apically; in *Cronartiatae*, when present their inflated periderm has circumscissile dehiscence. The urediniospores in the first are catenulate; in the second they are borne singly on pedicles.

We content ourselves with a mere enumeration of the species of the two subfamilies just outlined, most of which will be at once recognized by mycologists: *Melampsoropsis empetri* (Pers.) Arth.; *M. pyrolae* (DC.) Arth.; *M. ledicola* (Peck) Arth.; *M. cassandrae* (Peck & Clinton) Arth.; *M. abietina* (Alb. & Schw.) Arthur; *M. arctostaphyli* (Dietel) Arth.; *M. piperiana* Arthur n. sp.; *M. chiogenis* (Dietel) Arth.; *Cronartium comptoniae* Arth.; *Cr. comandrae* Peck.; *Cr. quercus* (Brondeau) Schroet.; *Cr. ribicola* Fisch. de Waldh.; *Cr. coleosporoides* (Diet. & Holw.) Arthur; *Cerotelia canavaliae* Arth.; *Cionothrix* Arthur n. gen. and *C. praelonga* (Wint.) Arthur; *Alveolaria cordiae* Lagerh.; *Baeodromus eupatorii* Arthur; *B. holwayi* Arth.; *B. californicus* Arth.; *Endophyllum rivinae* (B. & C.) Arthur; *End. vernoniae* Arthur; *Puccinosira pallida* (Speg.) Lagerh.; and *P. brickelliae* Diet. and Holw.

An analysis of the Aecidiaceae will be reserved until the next part of the North American Flora appears with the conclusion of that family.

Here it may be remarked that the large page, clear type,

careful citation, admirable descriptions, host lists, etc., as well as the synoptic keys to the families, the genera, and the species, are all to be most highly commended.

This publication deals with minute plants and as has been well said they must be studied with a corresponding minutia. We may regret it but it was inevitable—the simplicity of the old order of things has disappeared. To know the Rusts is to know their life histories, their spore forms, the structure of the sorus, and the various morphological characters—all of which, together with apparent phylogenetic relationships, have been employed by the author in constructing this exhaustive monograph, epoch making and destined to become classic.

AN APPLE ROT DUE TO VOLUTELLA.

F. L. STEVENS AND J. G. HALL.

N. C. Agr. Exp. Station.

A black rot of apples closely imitating in appearance that caused by *Sphaeropsis*, but differing from the *sphaeropsis* rot in several details, has been observed frequently in various sections of this State, on native apples and on apples shipped into the State from a distance.

In general appearance the disease consists of a rotten black spot upon the fruit. The central and older portions of the decayed region are of an intense coal black color. The younger region of the spot, its outer border, a zone about 14 mm. in width, is brownish.

Close inspection reveals the presence of slightly elevated pimple-like places in the cuticle. These are found to within 3 or 4 mm. of the edge of the spot, and become larger and more pronounced as the center of the spot is approached. Indeed the black color of the spot is due to the thick setting of these black pimples all over its surface. In many instances unless the spot be very old no other development is seen, and the disease might readily be considered to be the ordinary black rot caused by *Sphaeropsis*, and doubtless often passes for it. In older spots however, the pimples are seen to have broken through the cuticle of the apple, and each pimple appears as a small wart-like excrescence, and a good lens shows that it is thickly beset with stiff black hairs. These hairs constitute the distinctive character of this disease, and serve to separate it with ease and certainty from the *Sphaeropsis* rot, provided the rot has developed far enough to exhibit this character.

On slicing the apple open it is seen that the zone most recently invaded is brownish, while all the older portion is black.

While the decayed portions are softer than the healthy, this is in no sense a wet rot, the softness being due to a spongy dryness rather than to a watery dissolution. Upon microscopic examination the cells of the old, dark, diseased portion of the apple are found to be filled with a tangled mass of black or dark brown fungous threads which are richly septate and much branched (Fig. 1). In thickness they vary from 5 to 7 μ in the older portions. In the newly invaded cells the mycelium is usually only about 2 μ thick and is colorless.

As the spot ages the mycelium develops more abundantly in a few layers of cells next to the cuticle, particularly immediately under the cuticle. From this sub-cuticular layer of tangled mycelium there develops a cushion of hyphae which are arranged parallel and stand upright, perpendicular to the substratum. These hyphae are quite uniform in thickness and regular in arrangement, composed of short, rectangular cells (Fig. 2). These upright hyphae increase in length, rupture the cuticle and develop the tubercular mass, "sporodochium," characteristic of the order Tuberculariales. The sporodochia attain a height of 100 to 125 μ and a diameter nearly twice as great. About midway from base to top of the sporodochium the hyphae become narrower and the setae have their insertion. The setae develop directly from hyphae which stand amid sporophores and are indistinguishable from them, their only point of difference being that the setigerous hyphae broaden out at the end and develop into typical setae while the sporogenous proceed to spore development. Each setum is produced from the tip of a single hypha (Fig. 3). The setae are from 100 to 400 μ long, tapering from the base to tip. At base they are 5 to 8 μ broad and bear from 2 to 5 septae (Fig. 4).

At the upper end of the erect fuscous or black hyphae, which constitute the sporodochium is a simple, slender hyaline stalk "conidiophore" from 25 to 35 μ by 3 μ which bears the spore. The conidiophores together constitute the outermost layer of the sporodochium. The spores are produced acrogenously, being cut off from the tips of the conidiophore by constriction of the fertile hyphae.

The spores are oblong-fusoid to falcate-fusoid with acute ends (Fig. 5) hyaline or very slightly olivaceous, continuous, though with the low power of the microscope they often appear uniseptate owing to peculiarities of the protoplasm in this region. They measure from 17 to 23 μ long by 2.5 to 3.5 μ broad.

Placed in apple agar in hanging drop cultures they germinate in about three hours; at first by a single hyphal thread near one end of the spore, but later other points of germination can be seen. When germination begins the spores become very coarsely granular. The granules become fewer in number and larger as germination proceeds. Later by the migration of the

granules into the young hyphae clear spaces appear. Often the end of the germ tube swells, becomes cut off by a wall and rapidly assumes a dark color and, in general, takes on the appearance of the black bodies which are so characteristic a feature in the germination of the anthracnoses. As with the anthracnoses this body may remain without further development or it may germinate immediately (Fig. 6).

There has been much doubt as to the true nature of these structures. Frank¹ regarded them as holdfasts to assist in securing penetration into the host. Hasselbring² as the result of recent investigation regards them in the same light. Other writers have variously considered them as spores, secondary spores, buds, gemmae chlamydospores, etc. References to the literature regarding these bodies is to be found in Hasselbring's article.

These structures have been described for *Colletotrichum* and *Gleosporium*, one of the authors of this paper having studied them in some twenty-five species from these two genera,³ in *Polystigma*, *Fusicladium* and *Volutella*.⁴

Transfers into solidified pea agar and apple agar plates were made under aseptic conditions from the regions immediately beneath the skin in a diseased spot, also from the diseased tissue near the boundary between diseased and healthy portions, and in every instance pure cultures of the fungus were obtained. Pure cultures were also obtained by plating from water containing the spores of the fungus.

Grown upon plain agar or pea agar the mycelium was hyaline with many black tubercles; on agar containing carbohydrates as starch or sugar the mycelium was densely black.

In none of the cultures upon artificial media were spores formed. On sterilized apple twigs, however, spores were formed in great abundance. The mycelium on this medium was at most only slightly fuscous and was in most cases hyaline.

Inoculations were made from mycelium grown in pure cultures by pricking the skin of an apple and laying on, or inserting, a bit of the mycelium. Within a few days a well developed spot was obtained.

Many attempts were made to secure inoculations through unbroken cuticle but in no instance with success. It is evident that a bruise or break of some kind is necessary. This evidence correlates well with the fact that the disease, as is true of so many fruit diseases, is much more common at the blossom end,

¹ Ueber einige neue und weniger bekannte Pflanzenkrankheiten. Ber. Deut. Bot. Ges. I: 29-34, 58-63. 1883.

² The Appressoria of the Anthracnoses Bot. Gaz. 42, 135.

³ See article by Halsted: The Secondary Spore in Anthracnoses, N. J., Agr. Experiment Station Report. 1892, 203.

⁴ Stoneman, A Comparative Study of Some Anthracnoses, Bot. Gaz. 26: 69, 1898. Plate 13, fig. 82 and Plate 14, fig. 86.

or the stem end, than at other points. The rot occurs at either end of the fruit more often than elsewhere, because it is at these places that the cuticle is most liable to injury.

The tubercular development places the fungus unquestionably among the Tuberculariales. Further the road is not so clear. Judging strictly from the color of the mycelium it must go to the Dematiaceae, but a glance over its possible kin there reveals none which are of certain affinity. Admitting that it is possibly a Mucedineae, it clearly must belong to the genus *Volutella*. This genus is made up mainly of light colored fungi, though several of the genus are very dark, notably *V. Acalyphae*, *oxyspora*, *Violae*, *Citrulli* and *Allii*. From a structural viewpoint this fungus seems much closer to *Volutella* than to any of the Dematiaceae. In view of the purely physiological nature of the color character, as shown by our cultures, it being dependent upon the presence of carbohydrates — which is present in abundance in the natural medium of the apple — we believe we are doing no violence to facts in placing it in the genus *Volutella*.

As a *Volutella* it stands closest to the species named above, yet is distinct enough from them to be regarded as a separate species for which a description is herewith proposed.

It differs from *oxyspora* in larger sporodochium, 150-400 μ and longer setae, shorter spores and longer basidia; from *Citrulli* in shape of spores; from *Allii*, sporodochia larger not convex or elongate, setae longer; from *Violae* in character of sporodochium, see Bot. Gaz. 26:85, Pl. XIV; from *Acalyphae* in size of spores.

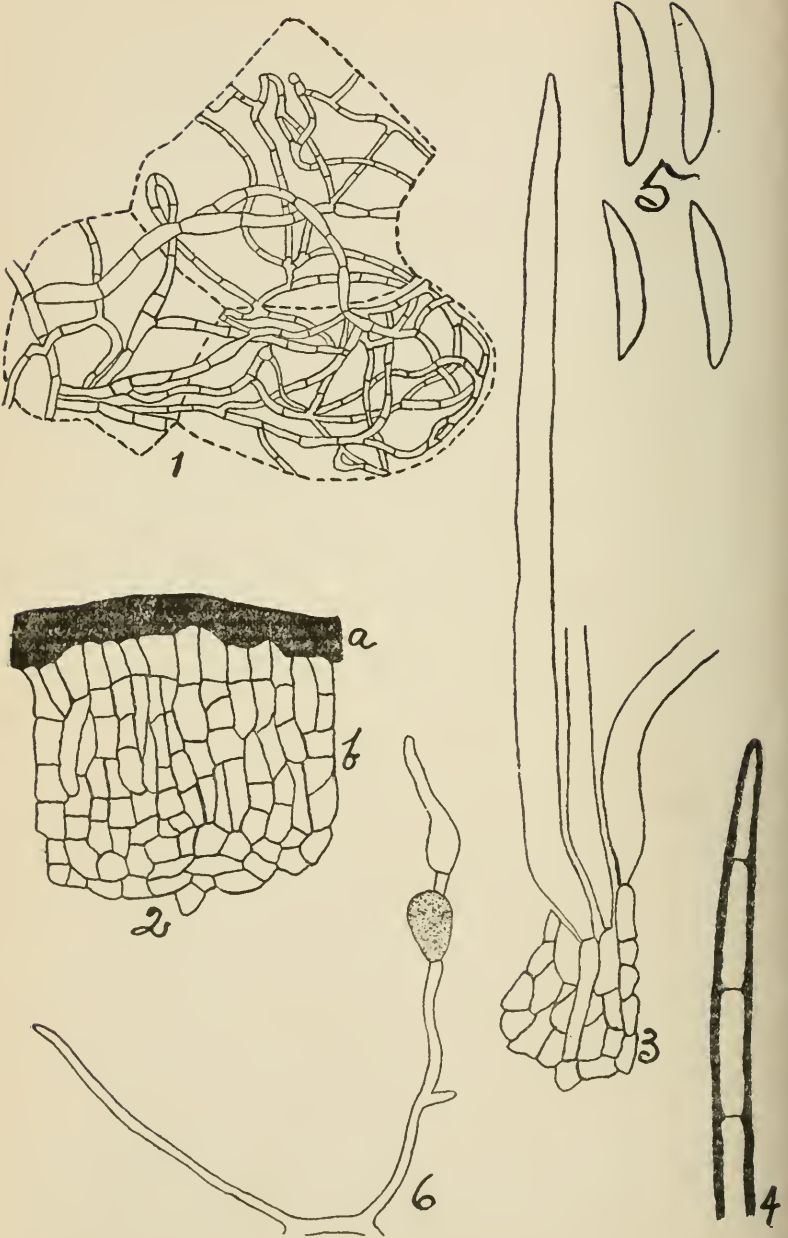
***Volutella fructi* Stevens & Hall n. sp.**

Sporodochia numerous in concentric circles, early subcuticular then erumpent, elevated, black, 150-400 μ diameter; mycelium, black in presence of carbohydrates, otherwise hyaline. Setae; distributed throughout sporodochium, black 0.5 septate, acute, smooth, 100-400 μ long, 5 to 8 μ thick. Sporophores; elongate, hyaline, simple, 25-35 by 3 μ . Conidia; hyaline or very slightly olivaceous, continuous, smooth, oblong-fusoid to falcate-fusoid 17 to 23 by 2.5 to 3.5 μ .

Habitat: fruit of *Pyrus Malus*. North Carolina, type N. C. Agr. Experiment Station No. 780.

EXPLANATION OF FIGURES.

- FIG. 1. Three apple cells invaded by the mycelium of *Volutella*.
FIG. 2. Showing early stages in the development of the sporodochium before the rupture of the cuticle. (a) Cuticle of the apple; (b) Columnar arrangement of the fungous hyphae.



VOLUTELLA FRUCTI.

- FIG. 3. Showing origin of setum from a single hypha.
FIG. 4. Portion of setum showing septae.
FIG. 5. Spores.
FIG. 6. A germinated spore (a); showing also one of the appressoria (b).
-

FUNGI SELECTI GUATEMALENSIS. EXSICCATI DECADE II.*

W. A. KELLERMAN.

In this decade specimens of three new species (recently described in the Journal of Mycology) are presented, namely *Aecidium byrsonimae* Kern & Kellerman, *Puccinia heliotropii* Kern & Kellerman, and *Uredo trixitis* Kern & Kellerman; also species on heretofore unreported hosts are shown, as well as specimens exhibiting an extended range of the fungus. The species and their hosts are as follows:

11. *Aecidium byrsonimae* Kern and Kellerman on *Byrsonima crassifolia* (L.) H. B. K.
12. *Balansia trinitensis* Cooke & Massee on *Panicum* sp. indet.
13. *Coleosporium plumierae* Patouillard on *Plumiera rubra* L.
14. *Puccinia conoclinii* Seymour on *Eupatorium rafaense* Coulter.
15. *Puccinia heliotropii* Kern and Kellerman on *Heliotropium indicum* L.
16. *Puccinia purpurea* Cooke on *Sorghum vulgare* Pers.
17. *Puccinia tetramerii* Seymour on *Blechnum brownei* Juss.
18. *Puccinia tithoniae* Dietel & Holway on *Tithonia tubaeformis* Cass.
19. *Uredo biocellata* Arthur on *Pluchea odorata* Cass.
20. *Uredo trixitis* Kern and Kellerman on *Trixitis frutescens* P. Br.

II. *Aecidium byrsonimae* Kern & Kellerman

On *Byrsonima crassifolia* (L.) H. B. K.

Sierra de las Minas (Departamento Baja Verapaz), opposite El Rancho, alt. 615 m. 2050 ft.) Guatemala, C. A.

March 10, 1905.

W. A. Kellerman, No. 4325.

The published note concerning this *Aecidium* by Mr. Kern is as follows: An interesting species because of the hypertrophy it produces,

*Contributions to Guatemalan Mycology. V.

the prominent subcuticular pycnia, and the long and numerous aecia, but especially on account of the very odd spores, which are exceedingly large, with coarsely marked thick walls, much thickened above. The characters of the pycnia and aecia are so unlike those of autoecious species on Malpighiaceae that it is assumed to be heteroecious. The fact that the pycnia are subcuticular indicates that it does not belong to the *Uromyces-Puccinia* group but to some genus of the *Raveneliatae* or *Uropyxidatae*. Both host and fungus of a specimen in the New York Botanical Garden, collected at Rancho Guerro, Jalisco, Mexico, June 15, 1892, by M. E. Jones, said to be on an Ericaceous host, agree perfectly with this Guatemalan specimen. Because of the long, bladdery peridia there is a resemblance to *Peridermium*, and the Mexican specimen has been so labeled, but there can now be no doubt that it belongs here.

12. *Balansia trinitensis* Cook & Massee

On *Panicum* sp. indet.

Sierra del Mico, between Los Amates and Izabal, alt. 360 m. (1200 ft.), Depart. Izabal, Guatemala, C. A. February 23, 1907.

W. A. Kellerman, No. 6079.

This fungus was found in a single locality, a moist mountain ravine, infesting a dense clump of the large grass which for the most part had succumbed to the parasite. The material was submitted to Professor Atkinson for identification. This species was first detected in Trinidad, the host being *Panicum palmifolium*.

13. *Coleosporium plumierae* Patouillard

On *Plumiera rubra* L.

El Palmar, alt. 615 m. (2050 ft.), Depart. Quezaltenango, Guatemala, Central America. February 11, 1906.

W. A. Kellerman, No. 5460.

The material was placed in the hands of Frank D. Kern for identification; he reports as follows: This is the first time this species has been collected on the continent, the other collections coming from the West India Islands. The host has been identified by John Donnell Smith.

14. *Puccinia conoclinii* Seymour

On *Eupatorium rafaellense* Coulter.

Volcano Cerro Quemado, alt. 2700 m. (9000 ft.), Departamento Quezaltenango, Guatemala, C. A. February 8, 1906.

W. A. Kellerman, No. 5449.

The host was determined by J. M. Greenman; the Rust was identified by Frank D. Kern. The Rust has been collected in the United States on *Eupatorium* (*Conoclinium*) *coelestinum* and *Eupatorium incarnatum*, extending from Illinois to Louisiana; in Guatemala it was obtained on *Eupatorium pycnocephalum* and on the host named above.

15. *Puccinia heliotropii* Kern & KellermanOn *Heliotropium indicum* L.

Gualán, alt. 122 m. (400 ft.), Dept. Zacapa, Guatemala, Central America. March 12, 1906.

W. A. Kellerman, No. 4326.

Host No. 4326 bears the type, of which material the specimen here issued is a part. The collection on host No. 4372 (determined by John Donnell Smith), as stated by Mr. Kern also bears aecia which without doubt belong to an entirely distinct species of rust. The species here under consideration is of the ordinary leptopuccinia type. It differs from *Puccinia heliotropicola* Speg. by the longer and more oblong spores with a thickened apex.

16. *Puccinia purpurea* CookeOn *Sorghum vulgare* Pers.

Antigua, alt. 1520 m. (5066 ft.), Depart. Sacatepéquez, Guatemala, Central America. February 8, 1907.

W. A. Kellerman, No. 6074.

Apparently not common in Guatemala; found in only one locality — a few plants in the court of the hotel "El Manchén," at Antigua, these being seriously infected.

17. *Puccinia tetramerii* SeymourOn *Blechnum brownei* Juss.

Laguna (Lake Amatitlán), alt. 1200 m. (3950 ft.), Depart. Amatitlán, Guatemala, C. A. January 17, 1906.

W. A. Kellerman, No. 5400.

The host was determined by John Donnell Smith. The Rust was passed on by Frank D. Kern and Dr. Arthur. The type specimen of this species was collected in Oaxaca, Mexico, (issued in Pringle's Mexican Fungi, No. 9, Sept. 1, 1896), on leaves of *Tetramerium aureum* Rose.

18. *Puccinia tithoniae* Dietel & HolwayOn *Tithonia tubaeformis* Cass.

Laguna (Lake Amatitlán), alt. 1200 m. (3950 ft.), Depart. Amatitlán, Guatemala C. A. January 30, 1906.

W. A. Kellerman, No. 5425.

The Rust was determined by Frank D. Kern and Dr. Arthur, the host by John Donnell Smith. It seems to be common in Guatemala. It was originally collected in Mexico by E. W. D. Holway, on *Tithonia tubaeformis* and *T. tagetiflora*. The authors of the species remark that it is much like *P. helianthi* Schw., but the spores are darker, average smaller, and the septum is less thickened at the sides.

19. *Uredo biocellata* Arthur

On *Pluchea odorata* Cass.

Amatitlán, alt. 1200 m. (3950 ft.), Depart. Amatitlán, Guatemala,
Central America. January 25, 1906.

W. A. Kellerman, No. 5388.

The Rust was determined by Frank D. Kern and Dr. Arthur, and the host by J. M. Greenman. Mr. Kern says: The sides of the spore in this species are inflated in a very conspicuous manner making them unusually odd. It has been known before only from the type locality, Florida Keys, on *Pluchea purpurascens*.

20. *Uredo trixitis* Kern & Kellerman

On *Trixis frutescens* P. Br.

San Lucas (Toliman), alt. 1515 m. (5050 ft.), Depart. Solalá,
Guatemala, Central America. February 15, 1906.

W. A. Kellerman, No. 5432.

Mr. Frank D. Kern states: This host was determined by J. M. Greenman and belongs to a section of the *Carduaceae* which does not include any other genera known to bear rusts.

THE PHALLOIDEAE OF TEXAS.

BY WILLIAM H. LONG.

The fall of 1902 was unusually wet for this State and cold weather was late in coming, as our first good frost did not occur until Nov. 22. Such climatic conditions brought forth a wealth of fungi; the Basidiomycetes and Gastromycetes being especially abundant. It was the good fortune of the writer to collect and have photographed five species of that unique and interesting group of Gastromycetes — the *Phalloids*.

He was especially fortunate in securing an abundance of eggs, expanded plants, etc., of two species, thereby making possible a study of the variations that occur in a given species. The habitats of these plants are much the same, at least for four out of the five species collected. They require a soil loose enough so that the eggs can form readily, and it must be fairly rich in decaying vegetable matter and usually *not shaded*.

In an old sandy field, that had not been ploughed for seven or eight months, four species were found, viz: *Mutinus caninus*, *Phallus rubicundus*, *Phallus impudicus* var. *imperialis*, and *Simblum sphaerocephalum*. This field was on the north slope of

a hill that was originally covered with post oak (*Quercus minor*) and black jack (*Q. nigra*), but the trees had been cut off for some years and the old stumps were in various stages of decay.

At the base and in the immediate vicinity of these rotting stumps the plants mentioned were usually found. On the margin of this field in the grassy unbroken sod *Simblum texense* was collected. This field was planted in wheat in the fall of 1901 and was used as a pasture for cattle during 1902.

Nearly all of the photographs secured were taken by a local photographer on cloudy days and in some instances when the rain was falling, as this group will not admit of delay if photographs of the freshly expanded plants are desired. Some here reproduced therefore do not show details as well as could be desired.

The abundance of material at hand of some species made it possible for the writer to determine the relative values of the various characters of a given species.

The following characters were found to be constant for any given species, viz: Color of stipe, pileus and eggs, surface markings of cap, structure of stipe as to number, shape and openings of the chambers; variable characters were: shape of both stipe and pileus within narrow limits, presence or absence of a veil, size of stipe and cap and shape and size of eggs.

Take the cap of *Phallus impudicus* for instance. It was invariably white and strongly reticulate, but its size and shape was very variable in some plants being very unsymmetrical but more or less conic to campanulate but even in specimens only two inches tall the surface had the characteristic crests and ridges. On some specimens no veil could be detected, while on others there was a strongly developed veil, but this point will be discussed more in detail later in this article.

In *Simblum texense* the variation in shape and size of pileus and stipe was very marked; the stipe being cylindrical, fusiform, clavate, attenuate downward or upward, terete or angular, while its color and structure was constant; the pileus likewise was very variable as to shape and size, some specimens being deeply constricted at juncture of pileus and stipe, while in others there was no constriction. Some had the *Simblum* characters well defined, while others looked more like a *Lysurus* with short arms than a *Simblum*. Indeed it is difficult to determine the genus of this plant from the ordinary field specimens.

The first specimens found of *Phallus impudicus* var. *imperialis*, consisted of two separate bunches of eggs. One bunch of four eggs from a common rhizomorph, the other of eight plants also from a common root. All of the eggs in the first group were infested by the larvae of some unknown fly (*Muscidae*), also several eggs in the second group. This is the first instance to the writer's knowledge of an insect attacking the eggs of

any of the Phalloids, altho it is well known that various species of flies (*Muscidae*) eagerly suck the syrupy mass of spores as the gleba deliquesces — by this means the wider distribution of the spores is accomplished; while the passage through the digestive tube of the fly may aid in the germination of the spores. A microscopic examination of the excreta from the flies that are feeding on the deliquescent gleba shows it to be composed largely of spores, apparently unharmed. This syrupy mass acts on them like a dose of salts, producing a kind of diarrhoea.

A third insect was found feeding on all the Phalloids except *Simblum texense* — a species of dung beetle or “tumble bug” (*Geotrupes opacus* Hald.). The beetles first attack the stipe. One was found on the stipe of *Phallus impudicus* eating a circle around it, thereby cutting it down; its mate was at the base of the plant, busily engaged in digging a hole in the ground; when the stipe fell both beetles attacked it.

This species of dung beetle apparently makes no balls but digs holes under the mass of dung on which they may be feeding. It is interesting to note that the same process was followed while feeding on the Phalloids. They eat the stipe down to the ground but do not attack the volva; the entire stipe and cap was often devoured so that nothing was left but the stump of the stipe in the volva and the numerous holes that the beetles had dug near by. I found specimens of *Phallus rubicundus*, *Phallus impudicus*, *Mutinus caninus*, and *Simblum sphaerocephalum*, all attacked and eaten by this beetle, but strange to say, not one plant of the many specimens found of *Simblum texense* was eaten — probably because this plant has not the foetid odour so characteristic of this group.

At one time I had about one hundred and fifty to two hundred eggs of the various species of Phalloids in my “incubator” and during the course of their expansion it was noticed that cold had a marked effect on the elongation of the stipe — in all cases checking it; and when the thermometer was below or near freezing point stopping all elongation. This was so marked that I had to resort to artificial heat to get some of my eggs to expand. This indicates that the elongation of the stipe or receptaculum is a growth process as advanced by Errera and Burt. The large number of eggs of the various species of Phalloids that I collected, together with the cool weather during November, forced me to devise some means whereby I could with little trouble hatch them, as there was no hot house convenient. At first, I used with fairly good success the following plan. I took a pine box one and a half to two feet deep and covered the bottom with clean white sand to the depth of eight to ten inches. The eggs were then washed and wrapped with tissue paper, leaving only the upper part free; they were then put into holes in the sand with only the upper and free surface

exposed, the sand being previously thoroughly wetted. The box was then covered with glass and placed near a wood stove and every eight or twelve hours—usually once at night and again early next morning, a gallon of water, hot as the hand could stand, was poured over the eggs and on the sand; by this means the sand and the air in the interior of the box was kept warm and moist. Eggs of *Phallus impudicus*, *Phallus rubicundus*, *Mutinus caninus*, and *Simblum texense* were thus hatched. The writer found great trouble in getting the eggs of *Simblum texense* to hatch in a moist chamber on account of a species of white mould attacking and destroying them. In warm weather all that is necessary is to keep the sand wet and the box in the sun light with the glass over it. Some sixty to a hundred eggs of *Simblum texense* were expanded by this means.

Later, when some one hundred or more eggs of *Phallus impudicus*, some as large as a man's fist and weighing one pound, were found, it became necessary to devise another way for hatching, as such a quantity of large eggs occupied much space and could not be kept warm by the methods given above. A hole was dug on the south side of my house and into this was set a large box about three feet long, three wide, and two feet deep; which was filled with sand to a depth of twelve to fourteen inches. Into the sand after wetting it were put the eggs, the box covered with glass and left exposed to the sun's rays during the day; at night it was covered with a blanket. In this box I hatched most of my *Phallus impudicus* specimens. The last egg expanded on January 23rd, two months after they were put in; but very few of the eggs of the other species would expand under these conditions. *Simblum sphaerocephalum* was exceedingly difficult to hatch; only two good specimens were obtained.

A careful study of the specimens of *Phallus impudicus* and *Phallus rubicundus*, as they were expanding, seems to indicate that *Dictyophora* is not a good genus. Many of the plants, especially of *Phallus impudicus*, showed veils of varying degrees of permanency—from a mere film to one of appreciable thickness, and in every respect, as to texture, size, thickness, and position comparable to the so-called veil of *D. ravenelii*. This veil in *Phallus impudicus* and *Phallus rubicundus* lies in the unexpanded plant as a zone of tissue next to the stipe. As the stipe elongates this membrane usually ruptures at edge of cap or beneath it, then as elongation continues bands and shreds of it may be left on the stipe. It will be found in one of three places and sometimes in all of them; first, as a veil hanging from top of stipe beneath the cap; second, as a distinct membrane in bands and patches on the stipe; third, as an enveloping sac-like membrane around the base of the stipe inside of the volva; here it seems to be a prolongation of the inner cup-like membrane of the volva

that fits closely to the base of the stipe. This membrane like that of *Phallus ravenelii* is not composed of pseudoparenchyma, but in every other respect it is a true veil. It seems to me that on the believers in the genus *Dictyophora* falls the burden of proving that the veils of those plants that they place under this genus are not *homologous* to this veil in *Phallus impudicus*.

That those species with a persistent, well developed, meshed pseudoparenchymatous veil, like *Phallus duplicatus*, deserve special rank seems not proven—for intergrading forms of more or less persistent and well defined veils are present in many species of *Phallus*; furthermore, the presence of a well defined veil in *Phallus impudicus*, the original type of the *Phallus* genus, would make this genus have as one of its characters a veil and the genus *Dictyophora* would now be identical in all respects to *Phallus* and would therefore be reduced to synonymy.

The fact that the earlier writers did not mention this veil on *Phallus impudicus* is no proof that it did not exist, and when found would become as much a character of the genus as if it had been described at first. I have in my collection three species of Phalloids, *Phallus impudicus*, *Phallus rubicundus*, and *Phallus aurantiacus* (?)—the last from Hawaii, on which even when dry the veils show plainly, as much so as on *D. ravenelii*. I have further a specimen of *D. duplicata* from New York that shows two veils, one the usual meshed veil beneath the cap, the other membranous and in patches on the stipe just as in the other Phalli. Now this second veil may be one of two things, either a part of a true *second* veil that was formed *beneath* the usual veil, or, what is more probable, it is the lower part of the usual veil left clinging to the stipe. That such is the character of the lower part of the veil of *D. duplicata*, see Burt in the Phalloideae of the United States, II. Systematic Account, pp. 387 and 388.

The veils in my specimens were especially pronounced in plants that were slow in opening both in *Phallus impudicus* and *Phallus rubicundus*. Those eggs that had been some three or four weeks in the "incubator" usually had thicker and more permanent veils than those that opened two or three days after collecting, while those found in the open fields had veils well developed if eggs opened during rainy weather. Also those plants that opened after cold weather came had veils. Specimens of *Phallus rubicundus* collected at Austin, Texas, during April, May and June, have no sign of a veil of any kind, not even the alcoholic material (of which I have some ten to fifteen specimens) shows any trace of a veil. Considering these facts it would seem that this layer of tissue that sometimes tears loose and forms a veil and sometimes does not, acts as an organ of nutrition in which is stored, or through which passes, food to be used by the stipe and cap; if this be the case then in warm damp weather the matur-

ing stipe and cap would use most of this in their development, so that at elongation of plant no real veil would appear. In other words, it would cling to the under side of the cap and to the inner surface of the volva; but if the amount of water during the growing season was in excess of the quantity usually present, then this tissue with others would be more strongly developed than normally and therefore would be more likely to appear as a veil at maturity of the plant; or if from any cause, as cold, removal from earth, etc., the later development of plant should be checked, then this tissue would appear as a veil; this is only an hypothesis the proof of which remains yet to be worked out. At any rate the fact remains that in these two species the veil may or may not be present, and when present may be a mere thin membrane or one of appreciable thickness and permanency that will and does persist when the plants are dried or when kept in fluids. The presence of a veil on *Phallus impudicus* has been noted and discussed before by Van Bambeke,* also by Ed. Fischer.†

Phallus impudicus, L. var. *imperialis*, Schw. (Figs. 1-4).—Eggs usually solitary, but sometimes in groups of two to eight individuals from a common root like rhizomorph, the mycelium and eggs pink changing to a dark purple tint when injured. Eggs ovate to irregularly globose, from two cm. tall by one and a half to two cm. thick to twelve cm. tall by ten cm. thick. Stipe fusiform hollow, white changing to cream white with age, four to twenty cm. tall by two to four cm. thick. Walls of stipe of several layers of chambers thick, which open into both inner and outer surface of the stipe as pits, chambers isodiametric pseudoparenchymatous, stipe open at apex (perforate) and joined to pileus by a broad white collar.

Pileus conic-campanulate, strongly and deeply alveolate, reticulate, white, three to seven cm. tall and two to five cm. broad, floccose, gleba at first a greenish brown turning black-brown in age, strongly foetid. Veil wanting or when present membranous floccose, white beneath pileus or in bands and patches on stipe or clinging to stipe inside volva, attached to and continuous with inner cup-like part. Spores oblong, one and a half by four μ . Volva pink rupturing irregularly.

In rich loose soil, in open fields or near margins of thickets, along creeks, etc., never in well shaded places. Denton, Texas, and one specimen from Austin, Texas, Nov. to Jan.

This was our most abundant *Phallus* in Fall of 1902. It was first collected October the twentieth and specimens were found from then till the middle of January, 1903. On October the

* De l'existence probable chez *Phallus impudicus* d'un involucre ou indusium rudimentaire. 1890. Botanisch Jaarboek.

† Neue Untersuchungen zur Vergleichenden Entwicklungsgeschichte und Systematik der Phalloiden. pp. 12-14. 1893.

twentieth the two large bunches of eggs were found in a low damp place, rich in vegetable debris, one bunch was so badly eaten by the fly larvae that none of the eggs hatched, but two of the eggs of the larger bunch hatched. This bunch is seen in photograph No. 1 then No. 2 shows it with two eggs hatched, and some had been removed from bunch being destroyed by the larvae.

On November the fourteenth, in an old cornfield near a small creek in a low but well drained place, some four or five eggs, also as many expanded plants and quite a number of decayed ones were found. All of the gleba had been cleaned off of the older plants by the flies and one with the gleba just beginning to deliquesce was a perfect mass of large blue bottle flies, so thoroughly had the flies done their work that not a drop of the gleba had fallen on the stipe or on the ground from any of the expanded plants. On November the twentieth in an old cornfield in a patch of Johnson grass (*Sorghum halapense*), I found a second lot of eggs and plants, some twenty to thirty in all, and finally on November the twenty-third I collected fifty-three eggs and eight to ten expanded plants in twenty minutes' time, from a spot about ten yards square. Some of these eggs were as large as a man's fist, and one weighed fourteen ounces. This was also in an old corn field, on the margin of the same creek. These eggs were by far the finest and the largest I had yet found and their abundance fairly made my "eyes bulge;" from this "garden" alone, I gathered in all about one hundred eggs and plants. They were growing in limited areas, as if the mycelium had started from some central point and had spread for four or five yards in more or less of a circle.

I had to be careful not to step on the eggs they were so thick in the center of this circle; I just piled them up in heaps like potatoes, some fifteen to twenty in a pile. The eggs were usually about one-third to one-fourth out of the ground and being of a purplish tint and in bare soil they were easily seen. They were especially numerous in the old corn rows, often from one to four or more eggs being found at the base of each old corn stalk, the mycelium usually filling the corn roots and extending down into the soil twelve to eighteen inches and then branching out in all directions. All of this lot were collected after our first frost and freeze, but most of them were opened in my "incubator."

As late as the middle of January, after snow, sleet and severe cold, I collected some four or five live eggs and two or three freshly expanded plants. The expanded plants were very short, the pilei barely being clear of the volva. The large eggs did not make such tall plants, the extra size making a larger pileus, more jelly, and thicker peridium of the volva. Often this inner peridium would be so thick and tough that it did not rupture

sufficiently for the entire pileus to emerge and so a large part — more than half in some cases — of the pileus and often all the gleba was torn off and remained in the volva.

Some of the eggs that remained in the incubator for three or four weeks before expanding had the lower part of the stipe, especially the portion remaining in the volva, stained with the purplish hue of the volva. This was noticeably true of plants from small eggs, which apparently were not fully matured when collected. These eggs opened, but did not make large plants, and the bases of the stipes and the inner cup adjacent to the stipe were stained by the purple juice from the volva.

It was on immature and depauperate specimens of this plant that Cragin founded "*Phallus purpuratus*." Here is a description made from plants hatched from the same lot of eggs as the normal *P. impudicus*, only the eggs were small and apparently immature. A comparison of this description with Cragin's will show that the plants are identical. Eggs globose, $1\frac{1}{4}$ to $1\frac{1}{2}$ inches, smooth or wrinkled, firm or somewhat soft, of a purple-pink color, portion of plant exterior to volva about 2 inches, stipe of a spongy-cellular appearance, equal or fusiform, of 3-several layers of chambers thick, inner chambers largest, portion of stipe enclosed in volva suffused with pink, also inner portion of volva or cup in which the base of stipe rests, a deeper pink; stipe 3 in. tall by $\frac{1}{2}$ -inch thick, pileus pitted and reticulate about $\frac{3}{4}$ -inch tall, conic-campanulate. The eggs from which this description was drawn were collected November 25 and opened December 26.

There is no doubt that Cragin's plant is only an immature and depauperate form of *P. impudicus* var. *imperialis*, caused by cold weather, for the plant on which his description was based was collected in October; in Kansas this would be after cold, frosty weather had come.

In eggs that stand for several weeks before opening, the jelly becomes watery and shrink in size, until the outer region of the volva lies against the unexpanded stipe and pileus, while the lower half of the volva being firmer and not so gelatinous, holds its shape and size. Eggs under such conditions look much like an acorn in its cup. This was noticed of other species of Phalloids also. It was probably such an immature specimen as this that Mr. Lloyd speaks of in his Mycological Notes. Among the 100 or more plants that expanded from the eggs were several with the margin of the pileus sterile for $\frac{1}{4}$ to $\frac{1}{2}$ inch and more or less strongly crinkled to sinuate-dentate: this form would correspond to *Phallus iosmos* Burt, while *P. roseus* would be a larger form of *P. purpuratus* and probably due to the same causes. None of these seem to deserve even a variety rank.

Phallus rubicundus Bosc. (Figs. 5-8).—Eggs white, solitary or in groups of 2-6 individuals from a common mycelium, when in groups usually one large plant surrounded by small

ones, ovate to globose, 2-3 cm. tall by 1-3 cm. thick. Stipe cylindric-fusiform to fusiform, hollow, scarlet, 9-15 cm. tall by $1\frac{1}{2}$ to $2\frac{1}{2}$ cm. in diameter, walls of several chambers thick, which open onto outer and inner surfaces of stipe as pits; chambers isodiametric, pseudoparenchymatous; apex perforate or imperforate, but usually perforate as the plant ages, by scarlet top of apex falling entirely off of plant; joined to pileus by a narrow irregular scarlet collar or ring. Pileus conic, smooth or rugose, scarlet, sometimes extending below gleba into a narrow sterile border, whose edges are finely crinkled to dentate, pseudoparenchymatous, 1-2 cm. wide to 2-3 cm. tall. Gleba at first isabella color, becoming a dirty yellowish brown when deliquescing, odor very foetid. Veil wanting or when present, membranous floccose, white beneath pileus or in hands or patches on the stipe or clinging to stipe within volva as in *P. impudicus*. Spores oblong $2 \times 4 \mu$ or ovate-oblong $3-4 \times 6-8 \mu$. In lawns and open grassy places Austin, Tex., April, May and Nov., 1900, or in old sandy fields near rotting oak stumps and along fences in sandy soil. Denton, Tex., Nov. to Jan., 1902 and 1903.

This species was very abundant at Austin, Texas, during the months of April and May, 1900, caused by the excessively wet season. All the Austin specimens were found on lawns or in other grassy unshaded places, often in groups of 4-6 plants, usually one large expanded plant surrounded by eggs of various ages, which usually produced much smaller plants than the first and central one, all attached to a common net work of mycelium, but usually not in contact as were the eggs of *P. impudicus*. Some eggs were two or three inches from central plant, but all within a radius of 4 inches and when the dirt was washed away were seen to be attached to a common network of white mycelial strands. This mycelium ramified in all directions among the old and decaying grass roots that lie some 3 or 4 inches below the living turf. The eggs in some of these bunches produced wee plants, often only one inch tall but perfect copies of their larger brothers.

The mycelium seems to be perennial in the soil as the owners of the lawn from which most of the plants were obtained, stated that every year for ten years they had noticed "the red stinking things on their lawn."

The caps of the Austin specimens show all degrees of roughness, some are smooth, other have upper part smooth and lower part wrinkled, some have one side smooth, the other rugose, while still others—usually the large plants—are strongly wrinkled over the entire surface, the ridges in all cases are longitudinal and more pronounced on lower half and at margin of the pileus. (See Fig. 6.) The caps of the Denton plants are smooth or only slightly rugose. This shows that too much stress should not be laid on the smoothness or rugosity of the pileus as it

varies materially in the same species. The Austin specimens were larger and in greater numbers than the Denton plants, due to the warmer weather and richer soil. The Austin plants often showed a sterile fringe from 2-4 mm. broad at base of caps while the Denton specimens did not have this sterile border; the Denton plants were solitary while the Austin ones were grouped. The spores of the Austin plants are of two types, one of the common size and shape $2-4\mu$ but intermixed with the more found ovate to ovate-oblong spores from $3-4$ and $6-8\mu$ in size; these large spores cling together in bunches of 2-8 at their smaller ends, indicating that they might not be true spores but only *basidia*, otherwise they have every appearance of true spores; the Denton plants have the usual type of spore. No veils were noticed on any of the Austin specimens at the time they were collected and a careful examination of alcoholic material (some 20 plants) shows no sign of a veil; apparently only the Denton plants have this character and some of them did not show it. The veil in this species is not as well developed or as persistent as the veil of *P. impudicus*. It was usually a mere membrane that disappeared as the plants aged, but is identical in position and characters with that of *Dictyophora ravenelii*. It was more pronounced on plants slow to expand under artificial methods. The volva occasionally ruptures circumscissily and the upper part is carried on the apex of the pileus. This is caused by the egg becoming too dry and the volva adhered to the apex, when the stipe elongated the volva ruptured as indicated. The same thing was seen by the writer at Ithaca, N. Y., in a specimen of *Mutinus caninus*, due to the same cause; it is a common occurrence with *Simblum texense*. That *P. rubicundus* is only a red form of *D. ravenelii* as suggested by Burt (The Phalloideae of the United States, II. Bot. Gaz. 22:385, 1896) I do not believe as I have never found any white forms or any approach to white ones among the many plants I have seen and collected in this state.

Mutinus caninus (Huds.) Fries (Fig. 9).—Eggs white, except exposed part which is pinkish brown, ovate to pyriform $2-3 \times 3-4$ cm., usually in groups of 4 to 20 individuals from a common network of mycelium. Stipe cylindric below gleba, but gleba bearing portion tapering to a point, 6-12 cm. tall by $1-1\frac{1}{2}$ cm. thick, lower part of stipe orange red, upper part for about 2 cm. below gleba a deeper orange, gleba flesh color, 4-5 cm., conic, perforate. Sporogenous tissue or one layer of cells whose walls are very thick and open to inside of stipe, sterile part of thin walled chambers one or two cells thick. In sandy soil near base of *Quercus* stumps. Denton, Texas, Nov. and Dec. 1902.

Simblum sphaerocephalum Schlecht. (Fig. 10).—Stipe geranium pink, 6-11 cm. tall $\times 1-1\frac{1}{2}$ cm. thick, hollow, cylindrical

or slightly tapering toward base, walls of 1-2 or several chambers thick, which are many times longer than broad, opening outwardly as pits but not inwardly, constricted at juncture of pileus, pileus depressed globose, scarlet, 1 cm. tall by 2 cm. broad, meshes regular of 4-6 sides, isodiametric, 10-20 in number, each 3-4 mm. across, walls of meshes transversely rugose, left as a hollow net work after gleba deliquesces. Spores oblong, $2 \times 4 \mu$.

Volva white, solitary, globose to ovate 2-3 x 3-4 cm., rooting. Gelatinous portion of eggs not continuous but divided into chambers by cortical plates that extend from bars of pileus to outer layer of the volva. On lawns, Austin, Texas, and at margin of thickets and in open sandy fields or along ravines in black soil. Denton, Texas. Oct., Nov. and Dec. 1902 and 1905. A rather rare plant.

Stmblum texense (Atkinson and Long) Long (Fig. 11). *Dictybole texense*, Atkinson and Long. — Stipe 4-8 cm. tall by 1-2 cm. thick, cylindrical or slightly tapering toward base, more or less angular and longitudinally furrowed, hollow, pale yellow, walls composed of 2-3 layers of chambers thick at middle of stipe but of only one layer of chambers at base, inner layer usually much larger than the others and composed of longitudinal chambers which are many times longer than broad, irregularly polygonal in cross section, opening neither inwardly nor outwardly. Pileus depressed hemispherical or often, in field specimens, cap-like and usually with remains of volva adhering to apex, composed of more or less isodiametric meshes, the outer row of which is usually free from stipe at its outer and lower margin, meshes very irregular in shape and size from 10-20 in all, 8-10 marginal, usual size 4-5 mm. across and of 4-6 sides, bars pale yellow only faintly transversely rugose, pileus on plants in field always more or less distorted so that the true character of the plant is difficult to determine, gleba mass brown, not readily deliquescent but usually persistent between the bars till rains or dews wash it off, when it does deliquesce, it blackens and has the odor of carrion. When *fresh* gleba and *entire* plant has a very pronounced and *pleasant amyl acetate* odour.

Volva circumscissile, upper part borne aloft on pileus, spores greenish hyaline, oval to ovate $3 \times 7 \mu$. Eggs depressed globose to globose-ovate, 1-4 cm. in diameter, rooting, solitary, rarely in pairs from a common root, occasionally twin plants from same egg, gelatinous layer not continuous but divided into chambers by cortical plates which are prolonged from bars of meshes outward to the outer layer of volva and downward toward the base of the egg, the number of chambers corresponding approximately to the number of meshes in the pileus. In open grassy pastures, Sept.-Dec. This was by far our most abundant Phalloid during 1902, several hundred eggs and expanded plants being found. After every rain the eggs appear in great numbers over

the prairie pastures. This species seems to be especially adapted to xerophytic conditions, as the eggs will persist during dry weather in a dried up condition, but when rain comes they swell up and finally elongate. Several eggs were collected and allowed to dry and shrink till they became hard and apparently dead, they were then placed in water, which was at once absorbed and the eggs gradually assumed their normal condition, they were then put in a moist chamber and several expanded.

This plant is unique in many respects. First, its agreeable odour so different from the usual Phalloid; second, its ovate spores; third, its persistent gleba, which in the field specimens rarely deliquesces but dries up and remains on the pileus as a hard brownish mass to be finally washed off by the rains; fourth, the utter absence of all visits from insects of any kind, no flies were ever seen to visit them, even when the gleba had deliquesced and become black and foetid; no herbarium insects even will eat the dried plants, for I have them in my herbarium now after a lapse of 5 years, absolutely untouched by anything and yet exposed in an open box, while most of my other Phalloids have been badly damaged by a small beetle. Fifth, the great variability of its pileus as to shape, no two plants being alike especially when the elongation occurs in the open field. Sixth, its circumscissile volva, on most plants the upper part of the volva is carried up on top of the pileus as the stipe elongates and remains there as a persistent cap, usually covering all of the meshes except the outer and marginal row. This method of rupturing the volva is caused by the eggs becoming partially dried before elongation and the outer layer of the volva is thus brought into contact with the top of the pileus and adheres more or less firmly to it according to the amount of drying that the eggs have undergone, now when the plant begins to elongate the volva ruptures *below* this adhering portion and thus becomes circumscissile, the same phenomenon was noticed in eggs of *P. rubicundus* which had dried before expanding, also in eggs of *Mutinus caninus*. Eggs of *S. texense* that have not dried any before collection when put into a moist chamber ruptured the volva at the apex in the usual way as do most Phalloids. Some specimens of this plant when dry look much like a *Lysurus* so that this may be Ellis's *Lysurus texensis*.

It has been four years since the body of this article was written and only a stray Phalloid has been seen in that time; except in Oct. 1905, when some 30 or 40 specimens of *Simblum sphaerocephalum* were collected in a low damp place among tall grass and weeds; a few of these plants were nearly *white*.

Two other Phalloids have been reported from Texas, both of which are supposed to be in the Ellis Collection, now the property of Columbia University, but twice within the last four years has a careful search through this collection failed to bring to

light either plant. *Lysurus texensis* Ellis, and *Laternea triscapa* Turp. are the two plants reported from Texas, but apparently the specimens are lost as both Burt and myself have been unable to locate them.

EXPLANATION OF PLAES 102-106.

- Fig. 1. Group of 8 eggs of *Phallus impudicus* var. *imperialis* from a common rhizomorph.
- Fig. 2. Expanded plants from group of fig. 1.
- Fig. 3. *Phallus impudicus* var. *imperialis*, typical plants.
- Fig. 4. *Phallus impudicus* var. *imperialis*, showing veils; the middle plant a dried specimen with veil still pendent below pileus.
- Fig. 5. *Phallus rubicundus*, showing rugosity of pileus. All specimens from Austin, Texas, and alcoholic material.
- Fig. 6. *Phallus rubicundus*, non perforate plant.
- Fig. 7. *Phallus rubicundus*, showing shreds of veil on stipes and one plant perforate.
- Fig. 8. *Phallus rubicundus*, showing veil at base of pileus and remnant of volva at apex.
- Fig. 9. *Mutinus caninus*.
- Fig. 10. *Simblum sphaerocephalum*.
- Fig. 11. *Simblum texense*.

All $\frac{2}{3}$ natural size.

North Texas State Normal, Denton, Texas.

NOTES FROM MYCOLOGICAL LITERATURE. XXIII.

W. A. KELLERMAN.

Peck, Charles H.

"A New Species of *Galera*" — *G. kellermani* — is described in the July No. of the Journal of Mycology by Professor Peck, who adds: The distinguishing characters of this species are its broadly expanded or plane grayish brown pileus with its minutely granulose or mealy surface, its persistently striate margin and its very narrow gills becoming brownish with age. The indication of a veil is also unusual. A full-page half tone illustrates the new species.

Hedgcock, Geo. G. and Spaulding, Perley.

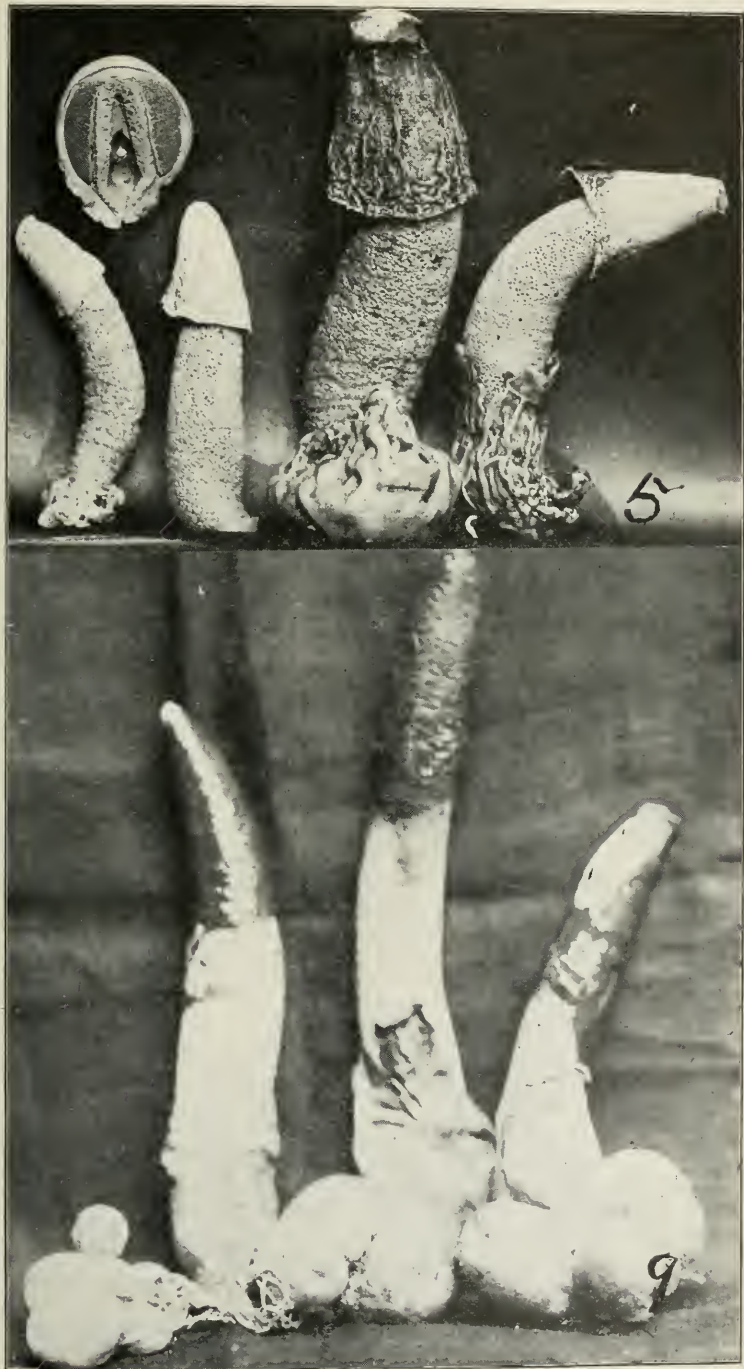
These authors outline a "New Method of Mounting Fungi Grown in Cultures for the Herbarium." The plan is to grow the specimens on rather stiff agar-agar and protect them (the agar plates having been divided into square blocks) by means of perforated cardboard — see Journal of Mycology for July 1906. They say that "This method of mounting has proven very convenient with specimens of *Stilbum*, *Graphium*, *Ceratostomella*, *Hormodendron* and other similar fungi; it is best, however, to poison the specimen after mounting, by spraying it with a strychnine solution."



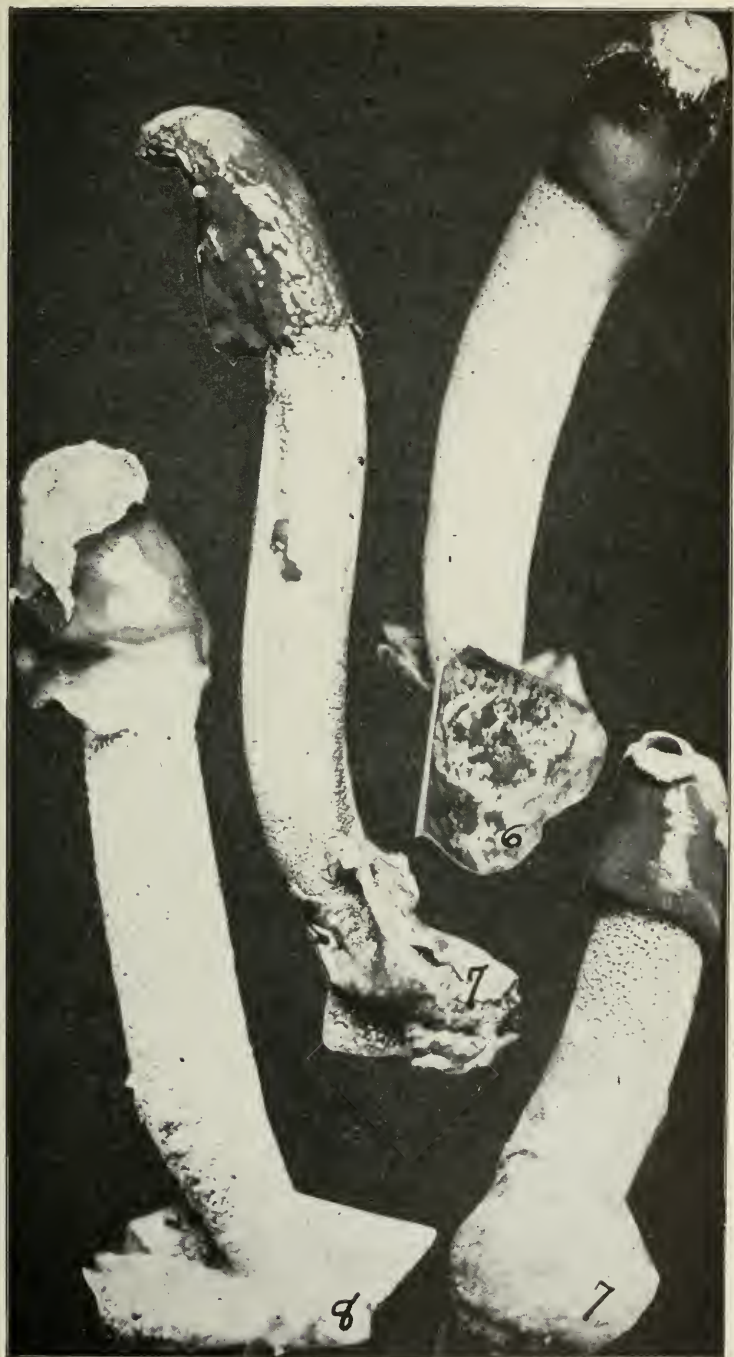
PHALLUS IMPUDICUS VAR. IMPERIALIS.



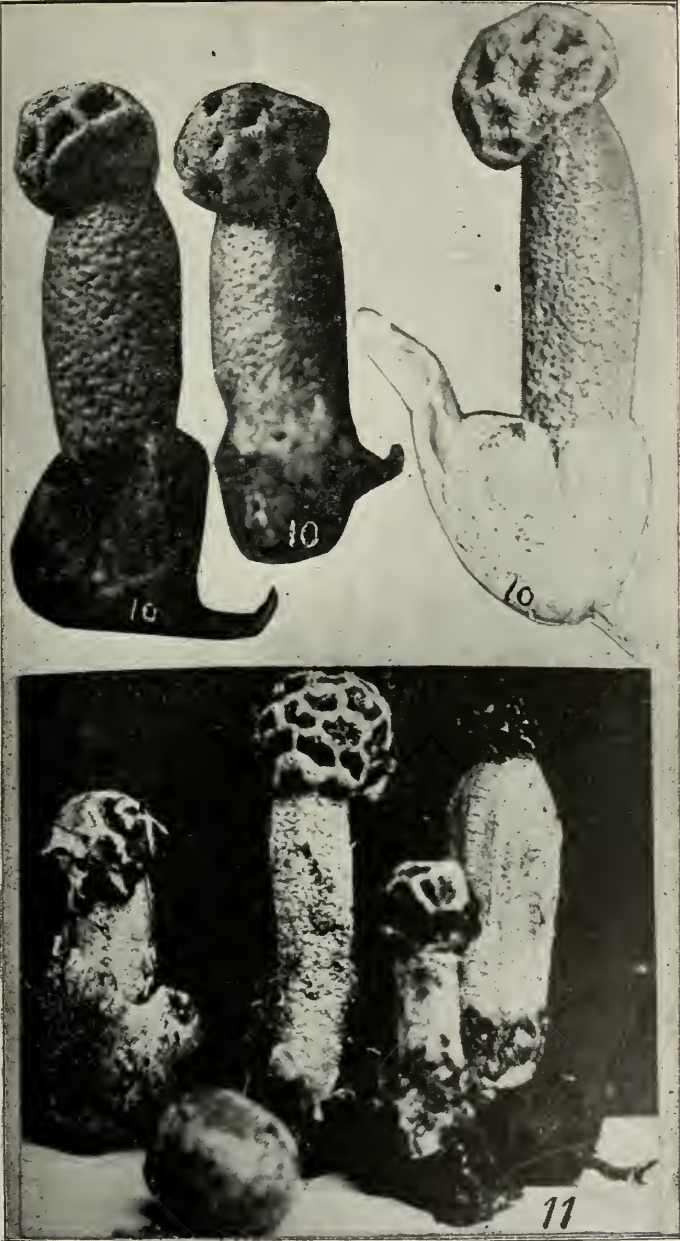
PHALLUS IMPUDICUS VAR. IMPERIALIS.



5. PHALLUS RUBICUNDUS. 9. MUTINUS CANINUS.



PHALLUS RUBICUNDUS.



10. SIMBLUM SPHAEROCEPHALUM. 11. SIMBLUM TEXENSE

Journal of Mycology, Vol. 12, July 1906.

This contains the following: Kellerman—Mycological Expedition to Guatemala; Charles—*Lasiodiplodia* on *Theobroma cacao* and *Mangifera Indica*; Hedgcock and Spaulding—New Method of Mounting Fungi Grown in Cultures for the Herbarium; Peck—A New Species of *Galera*; Arthur—Reasons for Desiring a Better Classification of the Uredinales; Morgan—North American Species of *Lepiota*; Morgan—Descriptive Synopses of Morgan's North American Species of *Marasmius*; Garrett—Field Notes on the Uredineae; Kellerman—Notes from Mycological Literature XX; Editor's Notes.

Kellerman, W. A.

An itinerary of a "Mycological Expedition to Guatemala" is given in the July number of the *Journal of Mycology* (1906), with some account of the general topography of the country, the climate, hydrography, the general character of the vegetation in the several regions visited, including Lakes Atitlán and Amatitlán, also three of the highest volcanoes.

Charles, Vera K.

The "Occurrence of *Lasiodiplodia* on *Theobroma cacao* and *Mangifera indica*," see *Journal of Mycology*, July, 1906, deals with a preliminary study of infected plants from Brazil and Florida. It is supposed that the species is *L. tubericola* E. & E.—to be determined by cultures, and reported later.

Bergen, Joseph Y. and Davis, Bradley M.

In a new and excellent text book called "Principles of Botany," Messrs. Bergen and Davis devote two chapters to Fungi, the first entitled "The Fungi and Their Relation to Fermentation and Disease" (pp. 227-271), and the second, "Summary of the Life Histories and Evolution of the Fungi," (pp. 272-4). The five classes are considered: Bacteria, *Schizomycetes*; Yeasts *Saccharomycetes*; the alga-like fungi, *Phycomycetes*; the sac fungi, *Ascomycetes*; and the basidia fungi, *Basidiomycetes*. Many text figures are used, also two full-page plates—one (colored) illustrating a Lichen, and the other an Agaric, a wound parasite (*Pleurotus ulmarius*).

Garrett, A. O.

Fascicle Two of "Fungi Utahenses," collected and distributed by A. O. Garrett, High School, Salt Lake City, Utah, is devoted exclusively to Puccinias, including two species of *Aecidium*. "Commencing with the next fascicle, the printing of the original descriptions will be discontinued."

Blakeslee, Albert Francis.

In the September number of the Botanical Gazette (1906) Albert Francis Blakeslee discusses the "Differentiation of sex in Thallus Gametophyte and Sporophyte." Referring to the previous paper in which was given an account of Zygosporic Germinations in Some Mucorineae, the author says the purpose of the present paper is to point out the bearing which the investigations already made in this group may have upon the questions of sexuality in other forms.

Kauffman, C. H.

A contribution from the Botanical Department of the University of Michigan, published in the Botanical Gazette, September 1906, is devoted to "Cortinarius as a Mycorrhiza-producing Fungus." The author, C. H. Kauffman, publishes a new species, *Cortinarius rubipes*, and its study is the basis for the article here noted. He says his own observations seem to show that it is undoubtedly a fact that one fungus may be attached to trees of very different families. *Cortinarius rubipes* Kauff. is connected with three forest symbionts.

Smith, Ralph E. and Smith, Elizabeth H.

Under the title of "A New Fungus of Economic Importance" the authors give an account of a destructive rotting of lemons in Southern California, which proved to be caused by a hitherto undescribed fungus. A new genus is proposed, *Pithiacystis*, which differs from *Pithium* in mode of swarmspore formation, and from *Pithiopsis* in habit. It is more exactly intermediate between the *Saprolegnieae* and *Peronosporae* than either of these genera. The new species is called *Pithiacystis citrophthora*, parasitic on lemons, and occasionally on other Citrus fruits, causing decay of green fruit on the tree and in the storehouse.

Journal of Mycology, Vol. 13. Jan. 1907.

The table of contents of this No. reads as follows: Long — Notes on New Species of *Ravenelia*; Atkinson — A New *Entoloma* from Central Ohio; Kellerman — *Fungi Selecti Guatemalenses*, Exsiccati, Decade I; Morgan — North American Species of *Lepiota* (continued); Kellerman — Index to North American Mycology; Index to Volume 12.

Long, W. H.

In the "Notes on new or rare Species of *Ravenelia*," Prof. W. H. Long publishes critical comments on many species of this interesting genus, and describes two new species, namely: *Ravenelia piscidia* (for Florida) and *Ravenelia arthuri* (from Jamaica). He states that three characters of great importance should always be noted, to-wit, (1) the position of the sori,

whether sub-epidermal or sub-cuticular; (2) the number and position of the germ spores of the uredo-spores; and (3) the position and number of the cysts. In his opinion *R. mexicana*, *R. mimosae-sensitivae* and *R. inconspicua* are all one and the same species. Four other species [he continues] are so closely related that they should be considered as one species, viz.: *R. expansa* Diet. & Holw., *R. fragrans* Long, *R. humphreyana* P. Henn. and *R. pulcherrima* Arthur.

Fungi Columbiani, Century XXIII. Dec. 10, 1906.

Mr. Elam Bartholomew distributed this installment of his exsiccati December 10, 1906. A wide range of species is represented—the only very large number of species in any genera being those of *Puccinia*, over a dozen; and *Uromyces*, little less than a dozen.

Atkinson, Geo. F.

A description and a full page plate is given by Professor Atkinson of "A new *Entoloma* from Central Ohio," *Entoloma subcostatum*. See *Journal of Mycology*, November, 1906.

Kellerman, W. A.

The labels are printed for the first decade of "Fungi Selecti Guatemalenses exsiccati," in the November No. of the *Journal of Mycology*. The species are as follows:

1. *Graphiola phoenicis* (Moug.) Poit., on *Thrinax* sp. indet.
2. *Melampsora bigelowii* Thüm., on *Salix humboldtiana* H. B. K.
3. *Puccinia cannae* (Wint.), P. Henn., on *Canna indica* L.
4. *Puccinia cognita* Syd., on *Verbesina fraseri* Hemsl.
5. *Puccinia cynanchi* Lagerh., on *Philibertiella crassifolia* Hemsl.
6. *Puccinia heterospora* B. & C., on *Sida cordifolia* L..
7. *Puccinia rosea* (D. & H.) Arthur, on *Ageratum conyzoides* L.
8. *Ravenelia humphreyana* Diet., on *Poinciana pulcherrima* L.
9. *Ravenelia spinulosa* Diet. et Holw., on *Cassia biflora* L.
10. *Ustilago panici-leucophaei* Bref., on *Panicum leucophaeum* H. B. K.

In following decades new and interesting tropical species are promised.

Kellerman, W. A.

The alphabetical list of articles, authors, subjects, new species and hosts, new names and synonymys, entitled "Index to North American Mycology," which is complete for the time subsequent to Dec. 31, 1900, was continued in the *JOURNAL OF MYCOLOGY* throughout the year 1906, installments appearing in the March, May, September, and November Nos.

Mangin, L. et Viala, P.

The Bureaux de le "Revue de Viticulture," Paris, issues a 17-page illustrated account of the new fungus — "Sur le *Stearophora radicola*, champignon des Racines de la Vigne" — which the authors detected in the living tissues and of which they say: "nous avons d'abord songé a rattacher cette espè nouvelle au groupe, d'ailleurs mal nommé, des *Endoconidium*; les données vague et insuffisantes, publiées sur la genèse des spores dans ce genre, ne nous ont pas permis de confirmer cette assimilation, et nous espérons pouvoir établir, dans un travail ultérieur, que le *Stearophora* constitue un groupe spécial représentant vraisemblablement un type primitif d'*Ascomycetès* à asques dissociés."

Fungi Utahenses, Fascicle Three, July 19, 1906.

The Nos. 51-75 include twenty pkts. of *Puccinia*, one *Caeoma*, two *Chrysomyxa*, one *Hyalospora*, and one *Aecidium*. Author, A. O. Garrett.

Lawrence, W. H.

In Bulletin 70, Experiment Station, State of Washington, we find an account of the "Powdery Mildews of Washington," the *Erysiphaceae*. Following the general account is a key to the genera, then the genera and species are fully described, the appendages and spores illustrated by one full-page plate.

Douglas, Gertrude E.

This is a very interesting study, "The Rate of Growth of *Panaeolus Retirugis*," Contribution No. 113 from the Department of Botany of Cornell University. Measurements were taken morning and evening during the latter part of March and early April — complete records obtained for 18 plants, the rate of growth then worked out in curves. The stem grows slowly at first, then very rapidly 40 to 56 hours, for about 24 hours slowly again until it ceases. Growth is more rapid by night than by day.

THIRD SUPPLEMENT TO NEW GENERA OF FUNGI
PUBLISHED SINCE THE YEAR 1900, WITH
CITATIONS AND THE ORIGINAL
DESCRIPTIONS.

COMPILED BY P. L. RICKER.

(Continued from page 67.)

VI. AECIDIOMYCETAE.

[Aecidiomycetae.]

ALLODUS Arthur, n. g. Aecidiaceae. Résultats scientifiques du Congrès international de Botanique Wien, 1905:345. 1906.

"Pyknien kugelartig oder flaschenförmig, mit mündungsparaphysen; Aecien mit Peridium, Aeciosporen mit farbloser (selten goldgelber) membran; Telien gewöhnlich zuerst in den Aecien oder um dieselben entstehend, später unabhängig; Teliosporen zweizellig mit farbiger membran; Uredinen fehlen."

[Aecidiomycetae.]

AMERIS Arthur, n. g. Aecidiaceae. Résultats scientifiques du Congrès international de Botanique Wien, 1905:342. 1906.

"Telien nackt, Teliosporen einzellig, membran farbig, stark warzig, Keimporen zwei oder mehr, seitlich. Aecien und Uredinen fehlen."

[Aecidiomycetae.]

ARGOTELIUM Arthur, n. g. Aecidiaceae. Résultats scientifiques du Congrès international de Botanique Wien, 1905:343. 1906.

"Pyknien kugelartig oder flaschenförmig; Uredinen pulverig, Urediniosporen mit farbiger Membran, stachelig; Teliosporen zweizellig durch Querwände, membran farbig; Aecien fehlen."

[Aecidiomycetae.]

BUBAKIA Arthur, n. g. Uredinaceae. Résultats scientifiques du Congrès international de Botanique Wien, 1905:338. 1906.

"Pyknien und Aecien unbekannt. Uredinen ohne Paraphysen oder Peridium; Urediniosporen einzeln auf Stielen gebildet, membran gefärbt, stachelig, keimporen undeutlich; Telien subepidermal, mehr als eine Schicht dick. Teliosporen kompakt, membran farbig, dünn oder in den obersten zellen oben verdickt."

[Aecidiomycetae.]

CERATELIUM Arthur, n. g. Uredinales. Bulletin of the Torrey Botanical Club, 33:30. 1906.

"Pycnia and aecia unknown. Uredinia with peridium, centrally dehiscent, urediniospores borne singly on pedicels, wall nearly colorless, echinulate, pores obscure, contents colored. Telia with spores united into a short column, or globoid mass, arising at first from bed of the uredinia, waxy; teliospores one-celled, wall smooth, nearly or quite colorless."

[Aecidiomycetae.]

CHNOOPSORA Diet. n. g. Uredinales. Annales Mycologici, 4:423. 1906.

"Pycnidiis depressis, sub epidermide plantae nutricis immersis. Aecidiis epidermidem perrumpentibus irregularibus sine peridio; aecidiosporis catenulatis. Soris telutospoiferis ceraceis crustaceis, sub epidermide erumpentibus nudis; telutospoiris unilocularibus, rarius, septo transverso vel obliquo divisus, non omnibus in eodem soro simul muturantibus, sed posterioribus inter prius formatas se immittentibus, maturatis promycelio quadriloculari mox germinantibus."

[Aecidiomycetae.]

CIONOTHRIX Arthur, n. g. Uredinaceae in Underwood and Britton, North American Flora, 7:124. 1907.

"Cycle of development includes only pycnia and telia, both subepidermal.

"Pycnia deep-seated, flask-shaped, with ostiolar filaments.

"Telia erumpent, the catenulate spores adhering to form a filiform column, horny when dry. Teliospores ovoid, one-celled; wall slightly colored, thin, smooth."

[Aecidiomycetae.]

CYSTINGOPHORA Arthur, n. g. Aecidiaceae. In Underwood and Britton, North American Flora, 7:131. 1907.

"Cycle of development includes pycnia, aecia and telia, with distinct alternating phases; autoecious. Pycnia subcuticular, other sori subepidermal.

"Pycnia low-hemispherical; hymenium flat; ostiolar filaments wanting.

"Aecia erumpent, cylindrical. Peridium dehiscent at apex, margin erect. Aeciospores ovoid; wall colored, finely verrucose.

"Telia erumpent, definite, teliospores fascicled on compound stalks, forming heads bordered by hyaline cysts, each spore one- or two-celled; wall colored, smooth or verrucose."

[Aecidiomycetae.]

DENDROECIA Arthur, n. g. Aecidiaceae. Résultats scientifiques du Congrès international de Botanique Wien, 1905:340. 1906.

"Pyknien subkutikular; Telien subkutikular oder subepidermal, Teliosporen in zusammengesetzten Köpfen, die Cysten tragen."

[Aecidiomycetae.]

DICHEIRINIA Arthur, n. g. Aecidiaceae. In Underwood and Britton, North American Flora, 7:147. 1907.

"Pycnia and aecia unknown, the latter possibly wanting.

"Uredinia encircled by paraphyses, subepidermal. Urediniospores borne singly on pedicels, echinulate.

"Telia subepidermal. Teliospores free, more than one on each pedicel, 1-celled; pore one, terminal."

[Aecidiomycetae.]

DISCOSPORA Arthur, n. g. Aecidiaceae. In Underwood and Britton, North American Flora, 7:149. 1907.

"Cycle of development includes pycnia and telia. Pycnia subcuticular, telia subepidermal.

"Pycnia hemispherical or frustum-like; hymenium flat; ostiolar filaments wanting.

"Telia erumpent, definite. Teliospores borne singly on pedicels, one-celled, flattened above and below; wall colored, verrucose."

[Aecidiomycetae.]

EARLEA Arthur, n. g. Aecidiaceae. Résultats scientifiques du Congrès international de Botanique Wien, 1905:341. 1906.

"Pyknien subkutikular; Aecien ohne Peridium, unbestimmt Aeciosporen mit farbloser, warziger membran; Telien subepidermal, Teliosporen vier- oder mehrzellig durch Querwände, membran gefärbt, Keimporen zwei in jeder Zelle und seitlich. Uredinien nicht vorhanden."

[Aecidiomycetae.]

GALLOWAYA Arthur, n. g. Coleosporiaceae. Résultats scientifiques du Congrès international de Botanique Wien, 1905:336. 1906.

"Telien hervorbrechend, in die Augen fallend, gallertartig, Teliosporen sessil, seitlich zusammengedrückt, einzellig, Membran glatt, farblos, am Scheitel verdickt und gallertartig; Aecien und Uredinien abwesend."

[Aecidiomycetae.]

KLEBAHNIA Arthur, n. g. Aecidiaceae. Résultats scientifiques du Congrès international de Botanique Wien, 1905:345. 1906.

"Pyknien kugelartig oder flaschenförmig, mit mündungsparaphysen; Urediniosporen mit farbiger Membran; Teliosporen einzellig mit farbiger Membran; Aecien fehlen."

[Aecidiomycetae.]

LYSOSPORA Arthur, n. g. Aecidiaceae. Résultats scientifiques du Congrès international de Botanique Wien, 1905:340. 1906.

"Merkmale der Gattung Tranzschelia, aber ohne Uredinien."

[Aecidiomycetae.]

MACALPINIA Arthur, n. g. Aecidiaceae. Résultats scientifiques du Congrès international de Botanique Wien, 1905: 340. 1906.

"Teliosporen mehr als eine auf einem Stiel gebildet, einzellig. Aecien und Uredinien fehlen."

[Aecidiomycetae.]

MAPEA Patouillard, n. g. Uredinales. Bulletin trimestriel de la Société Mycologique de France, 22: 46. 1906.

"Uredinaearum. Sori erumpentes, applanati, orbiculares, lati; ceracei, radio-plicati, ambitu sinuosolobati, undique fertiles.

"Sporae (uredosporae) fuscidulae, ovoideae, verruculosae, stipitatae."

[Aecidiomycetae.]

MELAMPSOROPSIS (Schröt.) Arthur, n. g. Uredinaceae. Résultats scientifiques du Congrès international de Botanique Wien, 1905: 338. 1906.

"Typus Chrysomyxa Ledi (A. u. S.) De B. auf Ledum palustre."

[Aecidiomycetae.]

NECIUM Arthur, n. g. Uredinaceae. In Underwood and Britton, North American Flora, 7: 114. 1907.

"Cycle of development includes telia, which fill epidermal cells, and possibly pycnia.

"Telia indehiscent, forming continuous layers, more or less distinguishable as compound sori. Teliospores oblong or prismatic, apparently one-celled, wall smooth, slightly colored."

[Aecidiomycetae.]

NEPHLYCTIS Arthur, n. g. Uredinales. Journal of Mycology, 13: 31. 1907.

"Cycle of development includes pycnia and telia, both subcuticular.

"Pycnia hemispherical, hymenium flat, without ostiolar filaments.

"Telia erumpent, without peridium or paraphyses; teliospores two-celled by transverse septum, colored, with a usually obscure hygroscopic layer, sparsely papillose, pores one in each cell, apical in upper cell, near the pedicel in lower cell; pedicels without appendages."

[Aecidiomycetae.]

NYSSOPSORA Arthur, n. g. Aecidiaceae. Résultats scientifiques du Congrès international de Botanique Wien, 1905: 342. 1906.

"Teliosporen in drei dreieckige Zellen durch schräge Scheidewände geteilt, Membran farbig, stachelig, Keimporen zwei oder mehr, seitlich. Aecien und Uredinien fehlen."

[Aecidiomycetae.]

PHYSOPELLA Arthur, n. g. Uredinaceae. Résultats scientifiques du Congrès international de Botanique Wien, 1905: 338. 1906.

"Pyknien und Aecien unbekannt. Uredinien von zahlreichen eingebogenen Paraphysen umgeben, ohne Peridium; Urediniosporen einzeln auf Stielen gebildet, Membran farbig, stachlig, Keimporen undeutlich; Telien unter der Epidermis, mehr oder weniger linsenförmig, mehr als eine Schicht dick. Teliosporen kompakt, Membran farbig, dünn, oder die obersten Zellen oben verdickt."

[Aecidiomycetae.]

POLIOMA Arthur, n. g. Uredinales. Journal of Mycology 13. 29. 1907.

"Cycle of development includes pycnia and telia, both sub-epidermal.

"Pycnia flask-shaped or globoid, central cavity usually large, ostiolar filaments apparently wanting.

"Telia erumpent, somewhat indefinite, without peridium or paraphyses; teliospores pedicelled, two-celled, wall very pale or colorless, homogenous, smooth, one pore in each cell and apical. Spores usually germinate upon maturity."

[Aecidiomycetae.]

POLYTHELIS Arthur, n. g. Aecidiaceae. Résultats scientifiques du Congrès international de Botanique Wien, 1905: 341. 1906.

"Merkmale der Gattung Tranzschelia, aber ohne Aecien und Uredinien."

[Aecidiomycetae.]

PROSPIDIUM Arthur, n. g. Uredinales. Journal of Mycology, 13: 31. 1907.

"Cycle of development includes pycnia, uredinia and telia, all subcuticular.

"Pycnia hemispherical, hymenium flat, without ostiolar filaments.

"Uredinia early naked, encircled by paraphyses; urediniospores borne singly on pedicels, wall colored, echinulate, often with a gyroscopic layer.

"Telia erumpent, surrounded more or less by paraphyses; teliospores two-celled by transverse septum, wall colored, with a thin, hygroscopic, hyaline layer, sparsely papillose, pores one in each cell, apical in upper cell, near the pedicel in lower cell; pedicel refractive, usually appendaged."

[Aecidiomycetae.]

SPIRECHINA Arthur, n. g. Uredinales. Journal of Mycology, 13: 30. 1907.

"Cycle of development imperfectly known; only uredinia and telia recognized, both subepidermal, but judging from analogy also possessing subcuticular pycnia.

"Uredinia erumpent, definite, without peridium or paraphyses; urediniospores borne singly on pedicels, ellipsoid, wall nearly colorless, echinulate-verrucose, pores obscure; contents colored.

"Telia erumpent, definite, without peridium or paraphyses; teliospores borne singly on pedicels, obovate, one-celled, wall nearly or quite colorless, smooth, pore apical."

[Aecidiomycetae.]

TELOSPORA Arthur, n. g. Aecidiaceae. Résultats scientifiques du Congrès international de Botanique Wien, 1905: 346. 1906.

"Pyknien kugelartig oder flaschenförmig mit Mündungsparaphysen; Teliosporen einzellig, Membran farbig; Aecidien und Uredinien fehlen."

[Aecidiomycetae.]

TRANZSCHELIA Arthur, n. g. Aecidiaceae. Résultats scientifiques du Congrès international de Botanique Wien, 1905: 340. 1906.

"Pyknien subkutikular, kegelartig; Aecien mit Peridium, das am Scheitel aufbricht, Aeciosporen mit farbiger, warziger Membran; Uredinien nackt, mit Paraphysen, die mit den einzeln auf Stielen gebildeten, warzigen, oben dunkler gefärbten Sporen vermischt sind; Telien etwas pulverig, Teliosporen zweizellig und sich leicht in zwei Teile spaltend, Membran stark warzig."

[Aecidiomycetae.]

UROMYCOPSIS (Schröt.) Arthur, n. nov. Aecidiaceae. Résultats scientifiques du Congrès international de Botanique Wien, 1905: 345. 1906.

"Pyknien kugelartig oder flaschenförmig, mit Mündungsparaphysen; Aecien mit Peridium, Aeciosporen mit farbloser (selten goldgelber) Membran; Telien gewöhnlich zuerst in den Aecien oder um dieselben entstehend, später unabhängig, Teliosporen einzellig, Membran farbig; Uredinien fehlen."

(To be continued.)

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BOVISTELLA ohiensis Morgan. [Mycenastrum ohiense Ellis & Morgan. Scleroderma ohiense De Toni, Sacc. Syll.] Lloyd, Myc. Notes, 23:279. Aug. 1906.

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(To be continued.)

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EDITOR'S NOTES.

In a Paris letter of July last Mr. C. G. Lloyd says: "There has been so much changing of names lately in the Polyporii that we feel it well to state our position in this regard. The most and best systematic work on Polyporus was done by Fries. His system and names have been in use for two generations, and are familiar to all. We therefore feel that no attempt should be made to change them, except in very exceptional cases. . . . As to the genera, the question is not so simple. The genus Polyporus is too large and should be broken up, but I feel that as much of the old should be retained as possible, particularly the four leading sections with which we are all familiar." I need not add that Mr. Lloyd condemns very emphatically the work that has been done the last few years in making new genera of polyporoids. In fact we must admit that at the hands of a number of competent mycologists the work here alluded to has not found favor.

We quote the above and allude to the situation there commented upon, to emphasize the difference that obtains between that case and the one presented by such work as is outlined in the review in the first part of this No. of the Journal. To Dr. Arthur's scheme it is expected that some, possibly many, will object; for here too is "a vast array of new names." When we read "Pyropolyporus," "Ganoderma," "Coriolus," we get no new idea, at least no new information is suggested. But when we are presented with "Uredinatae," "Pucciniastratae," "Chrysomyxatae," "Cronartiatae," we must form a new conception, and look from a new point of view. So also the "vast array" of new genera or new meaning in old genera, as "Cronartium," "Cerotelium," "Cionothrix," "Alveolaria," "Baeodromus," "Endophyllum," and "Puccinosira," stand in each case for advanced views based on advanced knowledge and new valuations.



Yours truly
C. G. Lloyd

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POLYPORUS PENNSYLVANICUS SP. NOV.

DAVID R. SUMSTINE.

Pileus orbicular, entire, convex to depressed, subumbilicate, 2-6 cm. broad, even, glabrous or with few scattered innate fibrils, pale ochraceous, tan-colored to isabelline, margin thin, acute, inflexed, with few fugacious cilia; context white, 1-10 mm. thick; tubes white, unequally hexagonal, irregular, angular, 0.5-1 mm. long, about 2 to a mm., varying in shape and size, dissepiments thin, edges becoming serrulate or fimbriate, decurrent; spores large, elliptic-fusoid, nucleate, hyaline; stipe central or sometimes somewhat excentric, 2-4 cm. long, 2-10 mm. thick, concolorous with the pileus or a little lighter, yellow tomentose, especially so at the base, solid, white within, increasing above and expanding into the pileus, sometimes the tubes are decurrent to the base of the stipe giving the stipe a lacerated or reticulated appearance.

The fresh plants emit a very perceptible nitrous odor.

Growing on fallen sticks, Fern Hollow, Allegheny County, Pennsylvania.

June 12, 1906. (Type.) Also collected at Sandy Creek, Allegheny County.

Type specimens are in the Herbarium of the Carnegie Museum, Pittsburgh, Pennsylvania.

This plant is related to *P. polyporus*, *P. arcularius*, *P. elegans*, *P. lentus*. It is most closely related to *P. lentus* if published descriptions of this species are reliable. It seems, however, that *P. lentus* has not yet been found in America. *P.*

lentus is said to have a squamulose pileus and a thin and short stipe. This description is not applicable to my specimens. Twelve sporophores in different stages of development were collected and none of them appear squamulose. The pileus of an old weathered specimen of *P. lentus* may become smooth just as we find it to be the case in old specimens of *P. polyporus* and *P. arcularius*. All my specimens both old and young have a smooth pileus.

The following table may aid in distinguishing these related species:

Tubes regular or nearly so,	1.
Tubes irregular or hexagonal,	2.
1. Pileus villose, usually dark colored,	<i>P. polyporus</i> .
1. Pileus glabrous, ochraceous, stipe black at base,	<i>P. elegans</i> .
2. Pileus squamulose, grayish fuscous, pores large,	<i>P. arcularius</i> .
2. Pileus squamulose, ochraceous-pallid, pores large,	<i>P. lentus</i> .
2. Pileus glabrous or nearly so, tan-colored or isabelline, pores smaller,	<i>P. pennsylvanicus</i> .

Dr. W. A. Murrill kindly compared some of my specimens with material in the Herbarium of the New York Botanical Garden.

Wilkesburg, Pa.

A STUDY OF THE LEAF-TIP BLIGHT OF *DRACAENA FRAGRANS*.

JOHN L. SHELDON.

Last winter, several diseased plants of *Dracaena fragrans* were noticed in the greenhouses of the West Virginia Experiment Station. Most of the lower leaves were dead and the middle ones were dead at the tips. There were small black specks scattered through the dead portions of the leaves, for the most part on the upper side. A microscopical examination showed that the leaves had probably been killed by a species of *Gloeosporium*.

After consulting the pathological literature in the station library, I decided that Dr. Halsted¹ had found the same disease some years before and had called it a "leaf-tip blight." He says in his description of it, "The fungus which was destroying the

¹ Halsted, B. D. Leaf-tip blight of *Dracaena fragrans*. Rept. N. J. Agr. Exp. Sta. 14:413. 1893.

leaf inch by inch is a species of anthracnose of the genus *Gloeosporium*."

Several anthracnoses were being studied when this one on the dracaena was found. Pure cultures of it were obtained for comparison with the others. Conidia began to develop in the cultures when they were only a day old. These conidia were borne on the ends of hyphae from the sides of the filaments of the radiating mycelium. A little later, acervuli began to appear in the cultures, the mature conidia collecting in little pinkish masses on the surface of the culture medium.

Developing along with, and for some time after, the acervuli, were small black bodies resembling young acervuli; these bodies proved to be perithecia, containing long, slender paraphyses and club-shaped asci with hyaline, single-celled spores. In size and general appearance, the conidia and ascospores were alike except that most of the ascospores were slightly curved. The perithecia varied from spherical to flask-shaped and long-rostrate, the long-rostrate forms being for the most part deeper in the culture medium. There was a tendency to produce only the perithecial stage after the fungus had been grown for several generations on artificial media.

After perithecia were obtained in the cultures, the leaves were examined and patches of perithecia were found on them. Pure cultures were then obtained from some of these perithecia, and both conidial and perithecial stages developed from the ascospores, proving that the acervuli and perithecia on the leaves were stages of the same fungus.

Inoculation experiments were now begun by inoculating pieces of sterilized bean stems with conidia from the pure cultures. In a few days acervuli began to show on the bean stems, and later, perithecia. These perithecia were superficial, somewhat hairy and flask-shaped, while those on the dracaena leaves were sub-epidermal and sub-spherical.

Three plants of *Dracaena fragrans* were placed side by side in the greenhouse. After waiting several weeks to see whether they had the same disease, two of them were inoculated with conidia from a pure culture. Several of the leaves were killed back from the tips from one to three inches and one had a spot on it. Acervuli developed in all the dead areas and perithecia in one. The fungus was transferred from the inoculated plants to the third by spraying them with a hose. The fungus spread very rapidly on the infected leaves when they were removed and placed in a moist chamber, acervuli and perithecia developing in abundance.

I am in doubt about the taxonomy of this fungus. Dr. Halsted² called it a species of *Gloeosporium*, and so it seems to

² l. c.

be in one of its conidial stages, but where does its perithecial stage belong? Species of *Gloeosporium*, and their near kin, the *Colletotrichums*, are so common that it does seem as if some one must have found the perithecial stage of a few of them and described them as species of long-established genera. This might have been done without a knowledge of the acervial stage. There are a few records of species of *Laestadia*, *Physalospora*, and the comparatively new genus *Glomerella* with known conidial stages of species of *Gloeosporium* and *Colletotrichum*; there is also a considerable number of hosts which have species of *Gloeosporium* and *Colletotrichum* (one or both) and species of *Laestadia* and *Physalospora* (one or both) occurring upon them, but whether any relationship exists between these acervial and perithecial stages is probably unknown.

This fungus, which causes the leaf-tip blight of *Dracaena fragrans*, is very similar to species of *Laestadia*, *Physalospora*, and *Glomerella* having both acervial and perithecial stages, especially *P. Vanillae* A. Zimmerm., *P. Cattleyae* Maubl. & Lasnier, and the apparently composite species *Glomerella rufomaculans* (Berk.) Sp. & v. Schr. If the presence of paraphyses is taken into consideration, it cannot be a species of *Laestadia*, since this genus is not paraphysate; neither can it be a species of *Glomerella*, as this genus was originally described,³ for the perithecia in the leaves and many of the cultures are simple instead of "caespitose or more or less compound and immersed in a stroma" and paraphysate instead of "apapophysate." Since it corresponds more nearly to the genus *Physalospora* than to either *Laestadia* or *Glomerella*, it is placed in this genus for the present and the name *Physalospora Dracaenae* n. sp. proposed.

West Virginia Experiment Station,
Morgantown, W. Va., June 10, 1907.

³ Schrenk, Hermann von and Spaulding, Perley. The bitter-rot of apples. Bul. U. S. Dept. Agr. Bu. Pl. Ind. 44:29. 1903.

THE MYCOLOGICAL WRITINGS OF THEODOR HOLMSKJOLD AND THEIR RELATION TO PERSOON'S COMMENTATIO.

ELIAS J. DURAND.

The writer has had occasion recently to gather information concerning the writings of Theodor Holmskjold and their relation to Persoon's *Commentatio de fungis clavæformibus*. The desired facts were finally obtained with some difficulty, and then only after considerable time had been spent in looking through literature in several libraries. Some of the publications consulted are rare in American collections, and there is reason to believe that they are not common in those of Europe. Since the facts obtained have already been found to be of value to several workers it seems desirable to put them on record in the hope that they may be of interest to some other mycologists.

Theodor Holm, or Holmskjold, to give him his title of nobility, was born in Nyborg, Denmark, June 14, 1732, and died at Copenhagen, September 14, 1794. His only important mycological work was a volume published at Copenhagen, in 1790. I have not seen a copy of this first edition, but according to Persoon it bore the title: *Beata ruris Fungis danicis a Theodoro Holmskjold impensa*. There is every reason to believe that it bore also the secondary title "*Coryphaei clavarias ramariasque complectentes cum brevi structuræ interioris expositione*." It was in folio form with 118 pages of text in both Danish and Latin in parallel columns, and accompanied by 33 plates in color with elaborate explanation. Since the volume was issued for private circulation only and was not offered for sale very few copies came into the hands of the public. At the death of the author distribution ceased entirely. This work was regarded as of great value by Persoon, and was regularly referred to by him as "*Holmsk. Coryph.*", but mention of it is not common in the writings of other authors.

Holmskjold's work was first made generally accessible in 1795 when the latin text was printed in Usteri's *Annalen der Botanik* of which it constituted pages 30-149 of Stück 17. This article bore the title *Coryphaei*, etc., as above. This and the next were in octavo form.

Two years later, in 1797, Persoon published in separate form a new edition of Holmskjold's work under the following title: "*Coryphaei clavarias ramariasque complectentes cum brevi structuræ interioris expositione auctore Theodoro Holmskjold. Denuo cum adnotationibus editi nec non commentatione de fungis clavæformibus aucti a C. H. Persoon.*" There were 239 pages illustrated by 4 colored plates. Pages 1-119 of this volume

correspond very closely to the text printed in Usteri's *Annalen*, with the publication of which Persoon did not seem to have been acquainted at the time since he made no mention of it. Persoon's "adnotationes" occupied pages 120-130, while the "Commentatio de fungis clavaeformibus" constituted pages 133-236 of the text, pages 237-239 being explanations of the four colored plates.

In the same year (1797) Persoon's *Adnotationes* and *Commentatio* alone were printed separately by the same publisher (Wolf), and under the title: "C. H. Persoonii commentatio de fungis clavaeformibus sistens specierum huius usque notarum descriptiones cum differentiis specificis, nec non auctorum synonymis." There were 124 pages of text with 4 colored plates. While I have not collated the texts, pages 1-104 correspond page for page to pages 133-236 of the volume mentioned in the last paragraph, except that on pages 101-104 a slight difference in the spacing of some of the paragraphs makes a slight change in the lines on the pages. The "adnotationes" occupied pages 107-116. The explanation of figures on pp. 117-118 is more condensed, while the addenda, pp. 105-106, and the indices, pp. 119-124, are new matter. The 4 plates are the same.

This separate publication of the *Commentatio*, Persoon said, was intended for the convenience of those who already possessed the 17th fascicle of Usteri's *Annalen* in which Holmskjöld's *Coryphaei* had appeared.

After the death of Holmskjöld, in 1794, his effects were sold at auction, and the whole edition of his 1790 publication together with all his descriptive notes and copper plates were purchased by the agent of the king. From these manuscripts a second volume treating of the other groups of fungi was prepared under the editorship of Eric Viborg, so that in 1799 the "*Beata ruris*" was issued in two volumes. Whether volume one of this work consisted of the remaining undistributed copies of the 1790 publication or was a reprint from the original plates could not be determined. The work does not seem to be very rare and is frequently referred to in mycological literature.

From what has been said it will be noted that Holmskjöld's text has appeared in four forms: (1) as a privately distributed folio volume with plates, 1790; (2) as a contribution to Usteri's *Annalen* without plates, 1795; (3) as a volume edited by Persoon without plates, 1797; (4) as volume 1 of "*Beata ruris*," etc., with plates, 1799. Persoon's *Commentatio* appeared first in his edition of Holmskjöld, 1797, and in the same year as a reprint from the last with a modified title and slightly modified text.

NORTH AMERICAN SPECIES OF AGARICACEAE.

A. P. MORGAN.

THE MELANOSPORAEE. (Continued.)

(Continued from page 62.)

III. DECONICA W. SMITH, JOURNAL OF BOTANY, 1870.

Pileus fleshy, thin, convex then expanded, the surface smooth and glabrous, the margin at first incurved. Stipe subcartilaginous, fistulous, smooth or fibrillose. Lamellae very broad, adnate, or subdecurrent, becoming purple or brown; spores purplish-brown or purplish-black.

This genus is intended to correspond to *Omphalia* in the *Leucosporae*; it is a subsection of *Psilocybe* in the arrangement of Fries.

I. COPROPHILAE. *Growing on manure or in rich soil in fields, pastures, etc.*

a. *Pileus smooth, not striatulate.*

1. DECONICA COPROPHILA BULLIARD, HERB. FR. 1791. COOKE, ILLUSTR. 608.

Pileus fleshy, hemispheric then expanded, umbonate, smooth and glabrous, alutaceous, rufescent.

Stipe tapering upward, fistulous, pruinose at the apex, glabrate. Lamellae arcuate-subdecurrent, broad, livid-brown; spores 13-14 x 8 mic.

Growing on dung heaps and in pastures. Probably common everywhere. Pileus 2-4 cm. in diameter; stipe 5-8 cm. long, 2-3 mm. thick. Stipe at first short and flocculose, becoming elongated, glabrous and shining.

2. DECONICA DIGRESSA, PANAEOLUS DIGRESSUS PECK, BULL. TORR. CLUB, 1895. SYLLOGE XIV, 161.

Pileus hemispheric or convex, glabrous, red-brown. Stipe short, fistulous, striate at the apex, toward the base floccose-fibrillose, paler than the pileus. Lamellae very broad, distant, adnate, purple-black, the edge whitish; spores broadly elliptic, 13-15 x 9-10 mic.

Growing on manure. California, McClatchie. Pileus 1-1.5 cm. in diameter; stipe 2-3 cm. long, 2-3 mm. thick.

b. Pileus striatulate, at least when wet.

3. DECONICA BULLACEA BULLIARD, HERB. FR. 1791. COOKE, ILLUSTR. 608.

Pileus fleshy, hemispheric then expanded, glabrous, at length umbonate, striatulate to the middle, tawny-bay, alutaceous when dry. Stipe short, fistulous, equal, fibrillose, yellowish, at the base brown-ferruginous. Lamellae adnate, triangular, plane, close, brown-ferruginous; spores elliptic, $7-9 \times 5-6$ mic.

Growing on manure and in rich soil. Michigan, *Kauffman*. Pileus 2-2.5 cm. in diameter, stipe 2-3 cm. long, 2-3 mm. thick. A smaller plant with smaller spores than *D. coprophila*.

4. DECONICA SCATIGENA B. & C., FUNGI CUB. 1867.

Pileus convex, yellow-brown. Stipe glabrous above, at the base tomentose. Lamellae broad, adnate by a tooth; spores minute.

Growing on manure. Cuba, *Wright*. Pileus 6-7 mm. in diameter; stipe 2 cm. high, 2 mm. thick. The minute spores distinguish this species from *D. bullacea*.

5. DECONICA SUBVISCIDA PECK, 41 N. Y. REP., 1887.

Pileus thin, subconical then convex or nearly plane, often slightly umbonate, glabrous, hygrophanous, pale chestnut or reddish tan color, slightly viscid when moist and striatulate, pallid or dull buff when dry. Stipe equal or tapering downwards, fibrillose, hollow, brownish toward the base, paler above. Lamellae broad, subdistant, adnate or subdecurrent, at first whitish then brownish ferruginous; spores ovoid, brown, $7-8 \times 5$ mic.

Growing on horse manure and in rich soil. New York, *Peck*. Pileus 6-12 mm. in diameter; stipe 2-3 cm. long, 2 mm. thick. The species is closely related to *D. bullacea*; it is gregarious and in wet weather appears in great abundance and in successive crops.

II. AMMOPHILAE. *Growing in sand and gravel in woods and open places.*

a. Growing among mosses.

6. DECONICA POLYTRICHOPHILA, PSATHYRA POLYTRICHOPHILA PECK, 30 N. Y. REP. 1877.

Pileus thin convex, or subcampanulate, glabrous, fragile, hygrophanous, brown and striatulate when moist, buff or dull ochraceous when dry. Stipe slender, equal, subflexuous, stuffed,

concolorous, mealy at the summit, white fibrillose below. Lamellae broad, sub-distant, adnate or subdecurrent, colored almost like the pileus; spores purple-brown, subelliptic, $7-8 \times 5$ mic.

Growing on the ground among *Polytrichum*. New York, *Peck*. Pileus 4-10 mm. in diameter; stipe 3-5 cm. long.

7. *DECONICA BRYOPHILA* PECK, 46 N. Y. Rep. 1892.

Pileus submembranaceous, somewhat conical, becoming convex or nearly plane, glabrous, hygrophanous, brown and striatulate on the margin when moist, pallid or grayish when dry. Stipe slender, fistulous, silky-fibrillose, pallid or brown. Lamellae broad, distant, adnate or subdecurrent, at first pale brown, becoming purplish-brown; spores brown, elliptic, $7-8 \times 5$ mic.

Growing in sandy soil among mosses. New York, *Peck*. Pileus 6-12 mm. in diameter; stipe 1.5-2.5 cm. long.

b. Not growing among mosses.

8. *DECONICA ATRORUFA* SCHAEFFER, INDEX 1774. *AGARICUS MONTANUS* PERSOON, SYNOPSIS, 1801.

Pileus fleshy, hemispheric-convex, obtuse, glabrous, dark rufous or purple brown, the margin striatulate, when dry smooth and expallent. Stipe slender, equal, fistulous, glabrous or fibrillose, pale brown. Lamellae broad, subdecurrent, umber; spores ovoid, $6-8 \times 4-5$ mic.

Growing in open sandy, gravelly places and in woods. N. Carolina, *Schwecinitz*. Pileus 1-2 cm. in diameter; stipe 3-5 cm. long, 2 mm. thick.

9. *DECONICA AMMOPHILA* DURIEU ET LEVEILLE, EXPL. SCIENTIFIQUE DE L' ALGERIE. COOKE ILLUSTR. 606.

Pileus fleshy hemispheric, then expanded, subumbonate, glabrous, yellowish-brown. Stipe tapering upward from an elongated clavate base sunk in the sand, the upper portion white and hollow. Lamellae rather narrow, subdecurrent by a tooth, smoky, black-pulverulent; spores elliptic, $8-10 \times 5-6$ mic.

Growing in the sand along the Ohio river, *Morgan*, and near Lake Erie, *Kellerman*. Pileus 3-4 cm. in diameter; stipe 4-6 cm. long. The rooting base emits fibrous rootlets which clothe it with a layer of sand.

10. *DECONICA SEMISTRIATA* PECK, 51 N. Y. Rep. 1897.

Pileus fleshy, thin except on the prominent, broadly umbonate disk, glabrous, striatulate, grayish brown, paler when dry, the umbo yellowish. The stipe short, equal, stuffed, floc-

cose, fibrillose, concolorous with the pileus. Lamellae broad, subdistant, adnate or subdecurrent, purplish brown, the edge whitish; spores compressed, orbicular, 6-8 x 6 mic.

Growing on damp ground in woods. New York, *Peck*. Pileus 8-10 mm. in diameter; stipe 1.5-2.5 cm. long, 1 mm. thick.

III. TROPICALES. *Growing on old leaves, herbaceous stems, etc.*

11. DECONICA BULBOSA PECK, 46 N. Y. Rep. 1892.

Pileus submembranaceous, convex becoming nearly plane, glabrous, striatulate around the margin, whitish tinged with brown. Stipe firm, slender, fistulous, grayish-fibrillose, arising from a bulbous base. Lamellae broad, distant, adnate, purplish-brown; spores purplish-brown, elliptic, 7-8 x 5 mic.

Growing on dead stems or herbs. New York, *Peck*. Pileus 6-12 mm. in diameter; stipe 1.5-2.5 cm. long, scarcely 1 mm. thick.

12. DECONICA MODESTA, HYPHOLOMA MODESTUM PECK, 32 N. Y. Rep. 1879. Sylloge, IX, 139.

Pileus thin, convex or subconic, at length expanded, rarely subumbonate, glabrous, hygrophane, when wet reddish brown or pale chestnut, when dry dark ochraceous-brown, the margin at first whitish, sometimes striate. Stipe equal, hollow, fibrillose, brownish. Lamellae plane, broad, adnate or somewhat emarginate, commonly decurrent by a tooth, at first gray or nebulous, afterward purplish-brown, the edge white; spores purple-brown, broadly ovate, compressed, 6-8 mic. long.

Growing on fallen branches in woods. New York, *Peck*. Pileus 8-10 mm. in diameter; stipe 2-3 cm. long, about 2 mm. thick.

IV. PSATHYRA FRIES, SYST. MYC. I, 1821.

Pileus submembranaceous, conic or campanulate, fragile, hygrophane, the margin at first straight and pressed close against the stipe. Stipe subcartilaginous, fistulous, fragile. Lamellae adnexed or adnate, becoming purple or brown; spores in mass purplish-brown or purplish black, sometimes brown.

Growing commonly in grassy grounds and in shaded places. Corresponding to *Mycena* in the *Leucosporae*.

I. CONOPILAE. *Surface of the pileus smooth and glabrous, even or striatulate. Stipe polished and shining.*

a. *Surface of the pileus even or only rugulose.*

1. PSATHYRA LIMBATA, AGARICUS LIMBATUS HOLMSKIOLD, BEATA OT. II. 32; AGARICUS CORRUGIS PERSEON, DISP. METH. FUNG. 1797; COOKE, ILLUSTR. 576, 592.

Pileus submembranaceous, campanulate, umbonate, subrugose, glabrous, rose-color or pale flesh-color when moist, becoming pallid when dry. Stipe fistulous, equal, smooth and glabrous, whitish or rufescent. Lamellae sinuate-attached, ventricose, violaceous then blackening; spores elliptic-oblong 12-14 x 6-8 mic.

Growing in gardens and woods. Pacific Coast Cat. Pileus 2-4 cm. in diameter; stipe 5-10 cm. long, 2-3 mm. thick.

2. PSATHYRA CONOPILA FRIES, SYST. MYC. I. 504. BERKELEY OUTLINES, 173.

Pileus submembranaceous, campanulate, smooth and glabrous, whitish becoming pallid. Stipe tall tapering upward, glabrous, silvery shining. Lamellae slightly adnexed, close, brown becoming purple; spores 14 x 7-8 mic.

Growing in grassy grounds and gardens. N. Carolina, Schweinitz. Pileus 2-3 cm. in diameter; stipe 10-15 cm. long, 2-4 mm. thick.

3. PSATHYRA BULBILLOSA FRIES, NOVAE SYMB. MYC. 1851.

Pileus fleshy, elongate-conic, smooth and glabrous, dirty-yellow or tawny brown. Stipe fistulous, smooth, glabrous, yellowish, arising from a bulbous base. Lamellae ascending, linear, brown then blackening.

Growing on the ground, near Cartago, Costa, Rica, Oersted, Ic. 13. Pileus 1-1.5 cm. in diameter; stipe 2-3 cm. long, 2-3 mm. thick. It recalls to mind Psilocybe callosa but is a firmer plant.

4. PSATHYRA PSEUDOTENERA FRIES, NOVAE SYMBOLAE MYC. 1851.

Pileus fleshy, campanulate, smooth and glabrous, fulvous becoming pallid. Stipe fistulous, equal, naked, at the apex whitish, downward ferruginous. Lamellae ascending, close, brown.

At Naranjo in Costa Rica. OERSTED. Ic. 14. Pileus 2-3 cm. high and broad; stipe 5-6 cm. long, 2 mm. thick. With the habit of Galera tenera or rather of G. siliginea but of firm texture and the lamellae fuscous.

5. PSATHYRA OBTUSA, AGARICUS OBTUSUS PERSEON, SYNOPSIS 1801. PS. OBTUSATA FRIES, SYST. MYC. 1821.

Pileus submembranaceous, campanulate then expanded, obtuse, glabrous, wrinkled, hygrophanous, umber, paler when dry. Stipe fistulous, equal, smooth, nearly naked, pallid, incurved at the base. Lamellae adnate subdistant, subventricose, pallid then umber; spores elliptic-oblong, $7-9 \times 4-6$ mic.

Simple and caespitose; growing on old trunks. Recorded in various parts of the country. Pileus 2-3 cm. in diameter; stipe 5-8 cm. long, 2-4 mm. thick. It is a smaller plant than *Psilocybe spadicea* with which it was figured by Schaeffer.

6. PSATHYRA CONICA PECK, 54 N. Y. REP. 1900.

Pileus thin conical, rarely convex, glabrous, hygrophanous, dark brown, pale ochraceous when dry. Stipe slender, fistulous, silky, fibrillose, brown. Lamellae very broad, close, adnate, at first whitish or pallid, at length dark brown; spores elliptic, $5-6 \times 4$ mic.

Growing on old prostrate trunks of spruce. New York, Peck. Pileus 8-12 mm. in diameter; stipe 2.5-4 cm. long, 1 mm. thick.

b. *Margin of the pileus striate, at least when wet.*

7. PSATHYRA SPADICEO-GRISEA SCHAEFFER, INDEX, 1774. AGARICUS STIPATUS, FLORA DANICA.

Pileus submembranaceous, conic, campanulate then expanded, subumbonate, glabrous, striate to the middle, hygrophanous, brown then gray. Stipe firm, tapering upward, shining, white, striate at the apex. Lamellae adnexed, rather close, narrow, brown; spores 8-10 mic. long.

Growing on and about old trunks and rotten wood. Carolina and Pennsylvania, Schweinitz. Pileus 5-7 cm. in diameter, stipe 7-9 cm. long, 3-4 mm. thick. Simple end subcaespitose.

8. PSATHYRA GYROFLEXA FRIES, EPICRISIS, 1836. COOKE, ILLUSTR. 970.

Pileus membranaceous, conic, campanulate, striate, atomate, gray, rufescent in the center, becoming pallid. Stipe slender, flexuous, silky-shining, white. Lamellae narrow, close, adnexed, purplish-gray; spores dark purple, $8-10 \times 4-5$ mic.

Subcaespitose; growing along the grassy margins of woods. Cuba, Wright. Pileus 1.0-1.5 cm. in diameter; stipe 4-6 cm. long, about 2 mm. thick. With almost the habit of *Psathyrella pallescens*.

9. PSATHYRA FLAVOGRISEA BERKELEY, ANN. N. H. 1845.

Pileus membranaceous, conic-campanulate, at first tawny-alutaceous, at length the margin sulcate and gray. Stipe slender, flexuous, white, fistulous. Lamellae alutaceous becoming purple, distant, ventricose, adnexed; spores elliptic, purple-brown.

Growing among dead leaves. Nebraska, *Clements*. Pileus 2-3 cm. in diameter; stipe 5-8 cm. long, 2 mm. thick. Closely related to *Ps. gyroflexa*.

10. PSATHYRA FAGICOLA LASCH, LINNAEA III, 1828.

Pileus membranaceous, campanulate, obtuse, striatulate, viscid, bluish to brownish. Stipe equal, fragile, fibrillose, furfuraceous, becoming pallid. Lamellae adnexed, seceding, subliquescent, brown; spores brown.

Subcaespitose; growing on trunks of Beech trees. N. Carolina, *Curtis*. Pileus 3-5 cm. in diameter; stipe 5-6 cm. long, 4-6 mm. thick.

11. PSATHYRA EPIBATES FRIES, NOVAE SYMB. MYC. 1851.

Pileus membranaceous, rather tough, parabolic, glabrous, egg-yellow, striate around the margin. Stipe fistulose, almost capillary, smooth, glabrous, egg-yellow, arising from an orbicular base. Lamellae ascending, brown.

Growing on rotten wood at Naranjo, Costa Rica, OERSTED, Ic. 10. Pileus parabolic (taller than broad) 4-6 mm; stipe about 2 cm. long. The base of the stipe resembles that of *Mycena stylobates*.

12. PSATHYRA SILVATICA PECK, 42 N. Y. REP.

Pileus membranaceous, campanulate, glabrous, viscid, hygrophanous, dark brown and striatulate when moist, grayish-brown when dry. Stipe slender, fistulous, subflexuous, brown. Lamellae broad, ascending, subdistant, feruginous-brown with a white edge; spores brown, 10 x 6 mic.

Growing on mossy ground in woods. New York, *Peck*. Pileus 8-10 mm. in diameter; stipe 3-5 cm. long, 1 mm. thick.

13. PSATHYRA UMBONATA PECK, 50 N. Y. REP.

Pileus submembranaceous, campanulate, umbonate, hygrophanous, purplish-brown and striatulate when moist, grayish-white when dry, atomate. Stipe slender, flexuous, hollow, white, slightly mealy at the summit, tomentose at the base. Lamellae

rather broad, ventricose, subadnate, brownish-red, becoming purplish-brown; spores blackish-brown, 12-15 x 7-8 mic.

Growing among chip dirt. New York, *Peck*. Closely related to *Ps. limbata*. The umbo is very prominent.

14. *PSATHYRA SULCATA*, *PSATHYRELLA SULCATA* CLEMENTS, NEB. REP. III. 1893.

Pileus campanulate then expanded, smooth and yellow in the center, gray verging into black beyond and deeply radiately sulcate. Stipe slender, fistulous, smooth, shining, white above, rufescent below. Lamellae adnexed, slightly ventricose, cinereous, then brownish-black; spores ovoid, fuscous or brownish-purple. 8-10 x 5-6 mic.

Growing on the ground. Lincoln, Neb., *Clements*. Pileus 1-2.5 cm. in diameter; stipe 4-6 cm. long, 1-2 mm. thick.

15. *PSATHYRA HYMENOCEPHALA*, A. (*HYPHOLOMA*) *HYMENOCEPHALUS* PECK, 31 N. Y. REP. 1878.

Pileus thin, fragile, campanulate, then expanded, sometimes umbonate, hygrophanous, brown and striatulate when moist, pallid or whitish and radiately rugulose when dry, subatomate; the whitish veil evanescent. Stipe slender, brittle, hollow, striate and mealy at the summit, white. Lamellae narrow, close, dingy then brown; spores brown, elliptic, 7-8 x 4 mic.

Growing on the ground in the shade of alders. New York, *Peck*. Pileus 3-5 cm. in diameter; stipe 7-10 cm. long, 2-3 mm. thick. Apparently referable to *Psathyra* in every way except the slight evanescent veil.

II. *FIBRILLOSAE*. *Pileus and stipe from the first floccose-scaly or fibrillose.*

a. Pileus striatulate, at least when wet.

16. *PSATHYRA FIBRILLOSA* PERSEON, SYNOPSIS, 1801. FRIES HYM. EUR. 1874. KARSTEN, HATTSMAMPAR.

Pileus submembranaceous, campanulate-convex then expanded, striatulate, at first fibrillose, livid, white when dry. Stipe elongated, very fragile, white, fibrillose-scaly. Lamellae adnate, plane, very broad behind, purple-black, spores dark purple.

Growing on the ground among old leaves. New England, *Frost*. Pileus 3-4 cm. in diameter, the lamellae 7-11 mm. broad, stipe 8-12 cm. long, 4-7 mm. thick. Berkeley's figure in Cooke's Illustrations does not appear to be this species.

17. *PSATHYRA NOLI-TANGERE* FRIES, *EPICRISIS*, 1836. FRIES, *ICONES*, 138, COOKE, *ILLUSTR.* 612.

Pileus membranaceous, campanulate then expanded, radiately striate, scaly around the margin, hygrophanous, pale amber, becoming pallid when dry. Stipe very fragile, nearly naked, smooth at the apex, brownish. Lamellae broad, adnate, pale brown; spores elliptic-oblong, 12×5 mic.

Gregarious; growing among oak chips. Pacific Coast Cat. Pileus 2-2.5 cm. in diameter; stipe 2-3 cm. long, 2 mm. thick. An extremely fragile species.

18. *PSATHYRA PHOLIDOTA* MONTAGNE, *SYLLOGE CRYPT.* 1856.

Pileus membranaceous, campanulate then expanded, scaly in the center, the margin striatulate, violaceous. Stipe fistulous, nearly equal, silky-fibrillose, concolorous with the pileus. Lamellae rather narrow, attenuate-attached, purplish, at length fuliginous; spores oblong, 12-13 mic. in length.

Caespitose; growing in grassy ground. Columbus, Ohio, *Sullivant*. Pileus 1-3 cm. in diameter; stipe 4-8 cm. long, 2-3 mm. thick. The whole fungus violaceous, fragile and evanescent.

19. *PSATHYRA PLUMIGERA* B. & C. *FUNGI CUB.* 1867.

Pileus convex, then plane, pubescent, striatulate, brown, clothed with white scales; the umbo obtuse. Stipe slender, fragile, fistulous, subpellucid, white. Lamellae broad, adnexed, brown.

Growing on sticks in woods. Cuba, *Wright*. Pileus 12 mm. in diameter; stipe 3.5-4 cm. high, 2 mm. thick.

20. *PSATHYRA SENEX*, *PSILOCYBE SENEX* PECK, 41 N. Y. REP. 1887.

Pileus thin hemispherical, obtuse, hygrophanous, dark brown and striatulate when moist, pale cinereous and shining when dry, somewhat squamose with superficial subfasciculate whitish fibrils, the margin appendiculate with the same. Stipe slender, hollow, fragile, minutely floccose-pruinose, subpellucid, white. Lamellae broad, subdistant, adnate, at first grayish, then brown or blackish-brown, the edge white; spores brown, elliptic, $7-8 \times 5$ mic.

Growing on decayed wood in woods. New York, *Peck*. Pileus 1-2 cm. in diameter; stipe 4-7 cm. long, 2 mm. thick.

21. PSATHYRA OBSCURA, PSILOCYBE OBSCURA PECK.
BULL. TORR. CLUB. 1897.

Pileus thin, convex, hygrophanous, striatulate, brown or reddish-brown, more or less flecked or scurfy with a white floccose tomentum. Stipe slender, fistulôus, a little paler than the pileus, whitish-tomentose at the base. Lamellae broad, subdistant, adnate, brown becoming almost black, the edge white; spores elliptic, $10-13 \times 6-8$ mic.

Growing in rich leaf mold in woods. Kansas, *Bartholomew*. Pileus 1-2 cm. in diameter; stipe 2.5-4 cm. long, 2 mm. thick.

22. PSATHYRA SUBNUDA KARSTEN, SYMB. MYC.
X. 60.

Pileus thin, fragile, conic-convex then expanded, umbonate, atomate, striatulate, with a few fugacious fibrils, pallid or pale livid, whitish when dry. Stipe fistulous, straight, at first slightly silky, villous at the base, becoming smooth and shining, white or whitish. Lamellae close, subventricose, adnate, at first pale cinereous with a tinge of violet, at length brown; spores fuscous, elliptic, $8-9 \times 4$ mic.

Growing on the grounds in woods. Preston, Ohio. Pileus 4-6 cm. in diameter; stipe 7-10 cm. long, 2-4 mm. thick.

23. PSATHYRA MIAMENSIS MORGAN SP. NOV.

Pileus submembranaceous, thin and fragile, convex then explanate, striate nearly to the center, rufescent, at an early stage the surface ornamented with tufts of white flocci, which soon disappear. Stipe arising from a white mycelial bulb, tapering upward, fistulous, rufescent beneath the white-fibrillose cuticle. Lamellae broad, rather distant, adnate, pallid then fuliginous; spores purplish-black, elliptic-oblong, $9-11 \times 6-7$ mic.

Growing in loose sand along the Miami river; Preston, Ohio. Pileus 1.5-2.5 cm. in diameter; stipe 3-4 cm. in length and 2-3 mm. thick. The species seems most nearly related to *Ps. helobia* Kalch.

b. Pileus not striatulate.

24. PSATHYRA MICROSPERMA PECK, BULL. TORR.
CLUB. 1899. SYLLOGE XVI, 126.

Pileus ovoid or subhemispheric then convex or subcampanulate, obtuse, smooth, hygrophanous, brown, paler when dry, at first flocculose; the flesh brownish. Stipe equal, hollow, fibrillose. Lamellae close, adnate, brown; spores brown, elliptic, $5-6 \times 3-4$ mic.

Growing around old stumps. Ohio, *Lloyd*; Michigan, *Kauffman*. Caespitose; pileus 1-2.5 cm. in diameter; stipe 2.5-3 cm. long, 2-3 mm. thick.

25. *PSATHYRA TIGRINA* PATOUILLARD, BULL. SOC. MYC. 1899.

Pileus at first ovoid, white, covered with brown or blackish scales, afterward campanulate, smooth or scarcely striatulate and villous, finally diffuent and purple-brown. Stipe cylindric, slender, fragile, white. Lamellae linear, whitish, afterwards becoming purple; spores purple, ovoid, $7-10 \times 5-8$ mic.

Growing on rotten trunks, Guadalupe, Duss. Plant 3-5 cm. high; related to *Ps. gyroflexa*.

26. *PSATHYRA VESTITA* PECK, N. Y. REP. 1905.

Pileus submembranaceous, ovoid, conic or sub-campanulate, obtuse, rufescent, when young clothed with white floccose fibrils, soon paler or white and silky-fibrillose. Stipe equal, flexuous, hollow, fibrillose, white. Lamellae narrow, close, adnate, at first white, becoming blackish-brown; spores purplish-brown, elliptic, $8-10 \times 5-6$ mic.

Growing among fallen leaves and grass. New York, Peck. Pileus 1-1.5 cm. in diameter; stipe 2.5-4 cm. long. 2-3 mm. thick.

27. *PSATHYRA ATOMATOIDES*, A. (*PSILOCYBE*) *ATOMATOIDES* PECK, 29 N. Y. REP. 1876.

Pileus rather thin, fragile, subcampanulate or convex then expanded, rugulose, subhygrophanous, atomate, grayish or ochraceous-brown, at first clothed with tufts of white flocci, which are fugacious. Stipe equal, fistulous, when young minutely floccose-scaly, pruinose at the summit, whitish. Lamellae rather broad, subventricose, rounded behind, cinereous then dark brown; spores subelliptic, blackish-brown, $7-8 \times 4$ mic.

Growing on the ground and on decaying wood under pine and hemlock trees. New York, Peck. Pileus 1.5-2.5 cm. in diameter; stipe 4-5 cm. long, 2 mm. thick.

(To be continued.)

THIRD SUPPLEMENT TO NEW GENERA OF FUNGI
PUBLISHED SINCE THE YEAR 1900, WITH
CITATIONS AND THE ORIGINAL
DESCRIPTIONS.

COMPILED BY P. L. RICKER.

(Concluded from page 124.)

VII. BASIDIOMYCETAE.

[Basidiomycetae.]

GALLACEA Lloyd, n. g. Lycoperdaceae. The Lycoperdaceae of Australia, New Zealand and neighboring islands. 37 1905.

"Peridium single. Gleba of permanent cells forming a thin layer adhering to the peridium, the plant being hollow at the center; capillitium none; spores fusiform.

"This genus is based on 'Mesophellia scleroderma' (Grev. 14-II.)."

[Basidiomycetae.]

WHETSTONIA Lloyd, n. g. Tylostomaceae. *Mycological Notes* 22:270. pl. 90. 1906.

"Peridium stalked, distinct from the stalk by a definite membrane. Gleba consisting of spores contained in persistent cells. Capillitium none."

[Basidiomycetae.]

HIRNEOLINA (Pat.) Bres. n. g. Tremellaceae. *Saccardo, Sylloge Fungorum*, 17:208. 1905.

As a subgenus of *Sebacina*, Patouillard, *Essai Taxonomique*, 25. f. 17. 1900. Replacing *Eichleriella* Bresadola, *Annales Mycologici* 1:116. 1903.

[Basidiomycetae.]

GRANDINIOIDES Banker, n. g. Hydnaceae. *Memoirs of the Torrey Botanical Club*, 12:179. 1906.

"Plant pileate, thin, membranaceous or subgelatinous, teeth minute, papilliform or subcylindrical, subciliate."

[Basidiomycetae.]

LEAIA Banker, n. g. Hydnaceae. *Memoirs of the Torrey Botanical Club*, 12:175. 1906.

"Plants pileate or resupinate, epixylous, dark to light-umber or grayish, subiculum of branched processes clothed above with a dense shaggy coat of coarse tomentum; teeth slender, terete, acute; spores minutely papillose, elliptical, guttulate, hyaline or white.

VIII. DEUTEROMYCETAE.

[Deuteromycetae.)

ANAPHYSMENE Bubak, n. g. Melanconiaceae. Annales Mycologici 4:124. f. 1-5. 1906.

“Stroma tuberkelartig, im unteren Teile pseudoparenchymatisch, im oberen aus senkrechten Zellenreihen gebildet, subepidermal; Konidienträger aus dem Innern der dekapitierten obersten Stromazellen hervorwachsend, einfach, hyalin; Konidien, mehr oder weniger gebogen, 2-zellig, hyalin, akrogen.

“Fruchtlager durch einen Längsspalt geöffnet.”

[Deuteromycetae.)

ASCOCHYTOPSIS Henn. n. g. Sphaeropsidaceae. Bot. Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie 39:117. 1905.

“Stromata superficialia subcarbonacea atra, 1-paucilocularia, conidia falcata, pluriguttulata, hyalina. Ascochytae similis, Septoriellae diversa.”

[Deuteromycetae.)

BOTRYOCONIS Syd. n. g. Melanconiaceae. Annales Mycologici 4:344. 1906.

“Acervuli primo subcutanei (ut videtur), demum erumpentes, pulvinato-effusi. Conidia in capitula unita vel botryoso-aggregata, colorata, continua. Drepanconi Schroet. et P. Henn. videtur affinis.”

[Deuteromycetae.)

CORYNESPORA Güssow, n. g. Dematiaceae. Zeitschrift für Pflanzenkrankheiten, 16:13. 1906.

Die Conidien werden terminal an langen septierten Conidiophoren in Ketten gebildet und sind untereinander und mit den Conidiophoren durch kurze hyaline Zwischenstücke verbunden. Die Kettenform ist überaus vergänglich, und nur ein Conidie bleibt am Conidiophor sitzen. In diesem Zustande kann eine Verwechslung des Pilzes mit Cercospora nur dann möglich sein, wenn man das charakteristische glasige Zwischenstück, mit welchem die Sporen aufsitzen, unbeachtet lässt. Die Conidien haben vorherrschend die Form einer Keule, jedoch kommen sehr verschiedene Variationen vor; ihre Färbung ist etwas heller wie die der Conidiophoren, ihre Oberfläche nallig glatt und die derbe, dicke Zellwand ist an den Septen nicht eingeschnürt. . . . Die vegetativen Hyphen sind fast farblos, oder doch bedeutend blässer wie die Sporen, welche wie vorher bemerkt, heller wie die Conidienträger sind. . . .

Sporen, welche ich von befallenen Blättern auf eine Agar-agar oder Gelatine mit einer sterilen Abkochung von Karotten säte, keimten nach 6 Stunden an den beiden Endzellen aus; ich

habe niemals Keimschlauche von Zwischenzellen entspringen sehen, auch nicht in Tage lang beobachteten Sporen in Wasser, dem eine geringe Quantität Nährlösung beigegeben wurde.

[Deuteromycetae.]

DICHAENOPSIS Paoli, n. g. Excipulaceae. Nuovo Giornale Botanico Italiano. Nuova Serie, 12:97. 1905.

"Pycnidia tipice beogena, innato-erumpentia, irregulariter elliptica, hysteriiformia, coriaceocarbonacea, atra, rima longitudinali notata, in maculas irregulares plerumque aggregata. Sporulae oblongae 2-pluriseptatae, fuscae."

[Deuteromycetae.]

FAIRMANIA Sacc. n. g. Sphaeroidaceae. Annales Mycologici 4:276. 1906.

"Pycnidia superficialia, globoso-papillata, membranaceo-subcarbonacea, nigra, glabra. Sporulae semilunato-reniformes, continuae, fuligineae. Basidia parum evoluta. Praecipue forma peculiari sporulae, soleae calcaneum exacte imitantis, ab Epithyrio subgenere Coniothyrii dignoscitur."

[Deuteromycetae.]

FIORIELLA Sacc. n. g. Leptostromataceae. Annales mycologici 3:168. 1905.

"Pycnidia innato-erumpentia, longitudinaliter elongata, membranaceo-carbonacea, nigricantia, rima lata longitudinaliter dehiscentia. Sporulae elongatae, fusoidae, brevissime pedicellatae, 1-septatae, hyalinae.

[Deuteromycetae.]

HEMISPORA Vuillemin. n. g. Mucedineae. Bulletin Trimestriel de la Société Mycologique de France 22:128. pl. 7. 1906.

"Mycélium de Mucédinée-Macronémée, abondant, hyalin, fin, cloisonné, ramifié.

"Tubes fertiles, ramifés à la base.

"Chaque rameau conidiophore se termine par une vésicule (protoconidie) précédée d'un étranglement annulaire à paroi épaisse, brune, rigide.

"La vésicule se transforme, en tout ou en partie, en une série de segments sporiformes (déutéroconidies). Parfois elle s'allonge en un nouveau conidiophore ou émet des ramifications susceptibles de se comporter de même."

[Deuteromycetae.]

HYSTERIDIUM Karst. n. g. Leptostromaceae. Acta Societatis pro Fauna et Flora Fennica, 274:10. 1905.

"Pyrenia dimidiata, lanceolata. Sporulae fusoides-bacillares, 3-septatae, hyalino lutescens."

[Deuteromycetae.]

LINDAUOPSIS A. Zahlbruckner, n. g. Hyphomycetae. *Berichte der Deutschen Botanischen Gesellschaft* 24:145. 1906.

"Fungus in hymenio lichenum parasitans, hyphis dichotome divisis, flaccidis, inaequalibus (non cylindricis), decoloribus, lateraliter gemmiferis, apice furcatis, conidiis binis, terminalibus, hyalinis, uniseptatis, membrana tenui et laevi cinctis."

"In hymenio caloplacae callopismatis parasitans et apothecia deformans."

[Deuteromycetae.]

MELANOBASIDIUM Maublanc, n. g. Tuberculariaceae. *Bulletin trimestriel de la Société Mycologique de France* 22:69. t. 13. 1906.

"Foliolum, maculicolum; sporodochia minima, erumpentia, atrax, ex hyphis ramosis, septatis, intricatis composita, sporophoris cylindricis, densis, septatis, concoloribus vestita; conidia solitaria, acrogena ovoidea, hyalina."

[Deuteromycetae.]

MUCHIMORIA Sacc. n. g. Dematiaceae. *Annales Mycologici* 4:277. 1906.

"Hyphae septatae, brunneae, caespitosae; steriles ramosae, decumbentes, fertiles assurgentes, apice in vesiculam globulosam inflatae; vesicula ubique muricato-conidiophora. Conidia ovato-ellipsoidea v. oblonga, 1-septata, non catenulata, fuliginea. A genere cordana conspicue differt hyphis densiuscule caespitosis, fertilibus apice inflatis et muricato-conidiophoris."

[Deuteromycetae.]

MYCORHYNCHUS Sacc. n. n. Nectrioidaceae. *Sylloge Fungorum* 18:418. 1906.

Rhynchomyces Sacc. & March. 1885. not Wilk. 1866.

[Deuteromycetae.]

PLATYCARPIUM Karst. n. g. Leptostromaceae. *Acta Societatis pro Fauna et Flora Fennica*, 27⁴:10. 1905.

"Pyrenia dimidiata, subsuperficialia, membranacea, effusa, astoma, rufa. Sporulae continnae, falcatae, hyalinae."

[Deuteromycetae.]

PSEUDOSTEGIA Bubak, n. g. Melanconiaceae. *Journal of Mycology* 12:56. 1906.

"Fruchtlager flach, rundlich im Umrisse, subepidermal, später deckelartig die Epidermis aufhebend, dann flach schusselartig und am Rande mit Borsten besetzt. Sporen sichelförmig, einzellig, hyaline. Sporenträger aus dem Inneren der obersten dekapierten Zellen hervorbrechend, zylindrisch, hyalin oder schwach gelblich."

[Deuteromycetae.)

RAMULASPERA Lindroth, n. g. Moniliaceae. Acta Societatis pro Fauna et Flora Fennica, 22³:5. 1902.

"(= Ramularia, aspera, d. h. eine Ramularia mit stacheligen Konidien). Gattungscharaktere wie bei Ramularia aber mit Konidien, die mit reichlichen, gleichmässig zerstreuten und zugespitzten winzigen Stache versehen sind."

[Deuteromycetae.)

SCHOENHORNIA Bubak, n. g. Excipulaceae. Bulletin de L'Herbier Boissier II. 6:483. 1906.

"Pykniden anfangs subepidermal, kuglig geschlossen, später nackt, schusselförmig, am Rande an der Basis borstig, weich. Gehäuse aussen schwarz-grünlich, innen hellgelblich bis olivenbraun. Sporen ellipsoidisch bis spindelförmig, schwarzlich-olivengrün. Sporenträger sehr lang stäbchenförmig, einzellig, oben mit einem schwärzlich-olivengrünen Kragen versehen und darüber oft konisch verlängert, hell-gelbbraun."

[Deuteromycetae.)

TRICHOUSARIUM Babak, n. g. Tuberculariaceae. Bulletin de L'Herbier Boissier II. 6:488. 1906.

"Sporenlager polsterförmig, subepidermal, bald hervorbrechend, klein, hellgefärbt, gelatinös, von zerstreuten helleren Borsten umgeben. Sporenträger strauchartig verzweigt. Konidien spindel förmig, einzellig, hyalin."

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Englm. and *Picea mariana* (Mill.) B.S.P. (*Abies nigra* Desf.)
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Larg.); *Picea canadensis* (Mill.) B.S.P. (*Picea alba* Link);
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- TRIDAX procumbens L., host to Puccinia tridacis Arth. n. sp. [Cuba.] Bull. Torr. Bot. Club, 33:517. Oct. 1906.
- TRIFOLIUM pratense, host to Colletotrichum trifolii Bain n. sp. Jour. Mycol. 12:193. Sept. 1906.
- TRIXIS frutescens P. Br., host to Uredo trixitis Kern & Kellerm. n. sp. [Guatemala.] Jour. Mycol. 13:26. Jan. 1907.
- TSUGA mertensiana (Boug.) Carr., host to Uredo holwayi. Arth. n. sp. Bull. Torr. Bot. Club, 33:518. Oct. 1906.

- ULMUS alata, host to Phyllactinia corylea angulata Salmon n. var. Ann. Mycolog. 3:500. Dec. 1905.
- ULMUS americana, host to Merulius ulmi Peck n. sp. N. Y. State Mus. Bull. 105 (Bot. 9):26. Aug. 1906.
- UREDINALES, better Classification of,. see *Better Classification*. . . .
- UREDINALES, A new Classification. J. C. Arthur. [Discussion.] Jour. Mycol. 12:188-191. Sept. 1906.
- UREDINALES, New Genera of. J. C. Arthur. Jour. Mycol. 12:28-32. Jan. 1907.
- UREDINEAE, Cultures of in 1906. [Abstract.] J. C. Arthur. Science N. S. 25:289. 22 Feb. 1907.
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- UREDINEAE, New Species of, V. Joseph Charles Arthur. Bull. Torr. Bot. Club, 33:513-522. Oct. 1906.
- UREDO biocellata Arth. n. sp., on Pluchea purpurascens (L.) DC. Bull. Torr. Bot. Club, 33:517. Oct. 1906.
- UREDO cabreriana Kern & Kellerm. n. sp., on Buettneria lateralis Presl. (?) [Guatemala.] Jour. Mycol. 13:25. Jan. 1907.
- UREDO chaetochloae Arth. n. sp., on Chaetochloa macrosperma Scribn. & Mer. Bull. Torr. Bot. Club, 33:519. Oct. 1906.
- UREDO dolochi Arth. n. n. [Puccinia dolochi Arth.] Bull. Torr. Bot. Club, 33:513. Oct. 1906.
- UREDO ficina Juel, on Ficus aurea. [Florida and Guatemala. Kern.] Jour. Mycol. 13:25. Jan. 1907.
- UREDO loeseneriana P. Henn., syn. of *Spirechina loeseneriana* q. v.
- UREDO holwayi Arth. n. sp., on leaves of Tsuga mertensiana (Boug.) Carr. Bull. Torr. Bot. Club, 33:518. Oct. 1906.
- UREDO trixitis Kern & Kellerm. n. sp., on Trixis frutescens P. Br. [Guatemala.] Jour. Mycol. 13:26. Jan. 1907.
- UROMYCES eleocharidis Arth. n. sp. on Eleocharis palustris (L.) R. & S. Bull. Torr. Bot. Club, 33:514. Oct. 1906.
- UROMYCES insularis Arth. n. sp., on Clitoria cajanifolia (Presl.) Barth. [Porto Rico.] Bull. Torr. Bot. Club, 33:515. Oct. 1906.
- UROMYCES, A Rare [on Sisyrinchium graminoides Bick.]. John L. Sheldon. Torrey, 6:249-250. Dec. 1906.

- VAGNERA stellata, host to Phyllostica pallidior Peck n. sp. N. Y. State. Mus. Bull. 105 (Bot. 9):26. Aug. 1906.
- VARIATION shown by the conidial stage of Phyllactinia corylea (Pers.) Karst.—I. Ernest S. Salmon. Ann Mycolog. 3:494-505. Pl. XIII-XV. Dec. 1905.
- WAITE, M. B. New Native Host for Pearblight. [Abstract.] Science N. S. 25:286. 22 Feb. 1907.
- WAITE, M. B. A New Peach Blight from California, Coryneum beyerinckii Oud. [Abstract.] Science N. S. 25:305. 22 Feb. 1907.
- WHETSTONIA Lloyd n. g. Gastromycetes. Lloyd's Myc. Notes, 22:270. July 1906.
- WHETSTONIA strobiliformis Lloyd n. sp., Lloyd's Myc. Notes, 22:270. July 1906.
- WILD Red Cherry, see *Prunus pennsylvanica*.
- WOOD-staining Fungi, some, from various localities in the United States [condensed descriptions and notes]. Geo. G. Hedgcock. Jour. Mycol. 12:204-210. Sept. 1906.
- ZYGOSPORES and sexual Strains in the common Bread Mould, Rhizopus nigricans. A. F. Blakeslee. Science N. S. 24:118-122. 27 July 1906.

NOTES FROM MYCOLOGICAL LITERATURE. XXIV.

W. A. KELLERMAN.

Long, William H.

An article by this author entitled "The Phalloideae of Texas" was published in the Journal of Mycology, May 1907. The species discussed were Phallus rubicundus, Ph. impudicus var. imperialis, Mutinus caninus, Simblum sphaerocephalum, and S. texense (Dictybole texense), all illustrated by half-tones. Constant characters for any given species were color of stipe, pileus and eggs; surface markings of cap; structure of stipe as to number, shape and openings of the chambers. Variable characters were shape of both stipe and pileus within narrow limits; presence or absence of a veil; size of stipe and cap; and shape and size of eggs. Study of many specimens of the species of Phallus "seems to indicate that Dictyophora is not a good genus. Many of the plants especially of Phallus impudicus showed veils of varying degrees of permanency."

Bulletin de la Société Mycologique de France, Tome XXIII, 1er Fasc. 30 April, 1907.

This No. contains: Philibert Riel, Description l'une Amanite nouvelle de France (*Amanita emilii*) du groupe de l'*A. muscaria*; G. Bannier, Mycothèque de l'École de Pharmacie, IX-XI; A. Sartory, *Cryptococcus salmoneus* n. sp., levûre chromogène des suc gastriques hyperacides; et Étude bibliographique et biologique de l'*Oidium lactis*; N. Patouillard, Le *Ratia* nouveau genre de la série des *Cauloglossum*; M. Mangin et H. Hariot, Sur la maladie du Rouge du Sapin pectiné dans la forêt de la Savine (Jura).

Clinton, George Perkins.

Part I of Volume VII of North American Flora (pp. 1-82) was issued October 4, 1906, and is devoted to the Ustilaginales (*Ustilaginaceae* and *Tilletiaceae*). The paper is based on Dr. Clinton's monograph of North American Ustilaginales published in the proceedings of the Boston Society of Natural History, October, 1904. But the following additional species and varieties are here described: *Entyloma holwayi* Syd.; *Sphacelotheca diplospora* glabra Clinton & Ricker var. nov.; *Sph. diplospora verruculosa* Clinton var. nov.; *Tilletia eragrostidis* Clinton & Ricker; *T. muhlenbergiae* Clinton sp. nov.; *T. redfieldiae* Clinton sp. nov.; *T. redfieldiae* Clinton sp. nov.; *Tolyposporium globuligerum* (B. & Br.) Ricker; *Urocystis lithophragmae* Garrett sp. nov.; *Ustilago kellermanii* Clinton sp. nov.; *U. punctata* Clinton sp. nov.; *U. rickerii* Clinton sp. nov.; *U. sieglingiae* Ricker. *Ustilago panici-leucophaei* Bref. has been placed in the genus *Sphacelotheca*. Keys, citations, hosts, etc., conform to the style adopted for the North American Flora.

Wilson, Guy West.

Guy West Wilson, New York Botanical Garden, Bronx Park, New York City, is engaged upon a monograph of the order Peronosporales, which includes the genera *Albugo* (*Cystopus*), *Basidiophora*, *Bremia*, *Kawakamia*, *Peronospora*, *Phytophthora*, *Plasmopara*, *Pseudoplasmodium*, and *Sclerospora*. He would be glad to receive material, both North American and foreign, of any species of the group. Correspondence is invited.

Journal of Mycology. Vol. 13, March, 1907.

The table of Contents of the Journal of Mycology for March is as follows: Arthur — McAlpine's Studies of Australian Rusts; Bessey — Spore Forms of *Spegazzinia Ornata* Sacc.; Saccardo — New Fungi from New York; Wilson and Seaver — Ascomycetes and Lower Fungi; Morgan — North American Species of *Agaricaceae*; Ricker — Third Supplement to New Genera of

Fungi; Stevens—List of New York Fungi; Kellerman—Notes from Mycological Literature, XXII; Index to North American Mycology; Editor's Notes.

Fungi Utahenses. Fascicle Five. 19 Jan., 1907.

This set contains specimens Nos. 101-125. Fourteen are species of *Puccinia*, one *Phragmidium* [*Ph. horteliae* Garrett n. sp. on *Hortelia gordonii* Hort.], one *Pucciniastrum* and nine *Uromyces*.

Selby, A. D.

Under the caption "On the Occurrence of *Phytophthora infestans* Mont., and *Plasmopora cubenses* (B. & C.) Humphrey, in Ohio," it is stated (in the *Ohio Naturalist* of February, 1907), that of the first, specimens were collected in Ohio in the early eighties; and of the latter, in 1895. Their histories are further outlined and environments discussed.

Wilson, Guy West.

An interesting species—"Melanospora parasitica"—collected in a park in New York City, is reported in *Torreyia* for March, 1907. It occurred on *Isaria farinosa* (Dicks) Fries, the conidial stage of *Cordyceps militaris* (L.) Sacc. According to Saccardo's *Sylloge* two ascomycetous fungi occur on this host—but Mr. Wilson finds that they are one and the same species. It was first described as *Sphaeronema parasitica* by Tulane, but shortly afterward transferred to the genus *Melanospora*. The species from America was described by Ellis and Everhart as *Ceratostoma biparasiticum*. This and the *Sphaeronema* first mentioned are synonyms of *Melanospora parasitica* L. Tul. & C. Tul.

Sumstine, David R.

Lentinus pulcherrimus n. sp. is described by Supt. Sumstine as "A new *Lentinus* from Pennsylvania"—see the March number of *Torreyia*, 1907. The plants resemble *Coltricia cinnamonea* (Jacq.) Murr. and closely allied to *L. villosus*, *sepiarius*, *sparsibarbis* and *pyramidatus*; to separate it from which a key is given.

Arthur, J. C.

The morphological characters, life cycle, and family of the host are taken into account in establishing "New Genera of Uredinales," as reported in the January number of the *JOURNAL OF MYCOLOGY*, 1907. Dr. Arthur remarks that the Rusts are minute plants and the diagnostic characters must be sought for with corresponding minutiae. The new genera proposed are (1) *Pelioma*, in which the cycle of development includes pycnia and

telia, both subepidermal—the type species being *Puccinia nivea* Holw.; (2) *Spirecchina*, the cycle imperfectly known, only uredinia and telia recognized, both subepidermal—based on *Uredo loeseneriana* P. Henn.; (3) *Prospodium*, cycle includes pycnia, uredinia and telia, all subcuticular—the type *Puccinia appendiculata* Wint.; (4) *Nephylictis*, cycle includes pycnia and telia, both subcuticular—type species *Puccinia elegans* Schroet.

Howe, Jr., Reginald Heber.

A list is given of "Some Lichens of Mt. Watatic, Massachusetts," the *Bryologist* for May, 1906, 38 species, which were collected in the ascent to its summit (1875 feet) Dec. 28, 1905.

Saccardo, P. A.

Six "New Fungi from New York" are described in the March number of the *JOURNAL OF MYCOLOGY*: *Pleosphaeria fairmaniana*, *Sphaeropsis Americana*, *Sphaeropsis rumicicola*, *Diplodia hortensis*, *Hymenopsis hydrophila*, and *Zygodesmus avelaneus*. All are illustrated by text figures.

Wilson, Guy West, and Seaver, Fred Jay.

It is the intention of the writers, as stated in the *JOURNAL OF MYCOLOGY* for March, 1907, to issue, as material accumulates, exsiccata of fungi under the title "Ascomycetes and Lower Fungi," the scope of the work being limited to Ascomycetes, Deuteromycetes and Phycomycetes. An annotated list of the contents of the first fascicle, 25 species, is given. Synonymy is included and three new combinations are made: *Gloniopsis smilacis* (Schw.), *Nectria purpurea* (L.), and *Rhytisma andromedae-ligustrinae* (Schw.).

Morgan, A. P.

A monographic enumeration with synoptic keys has been begun by this author, in the *JOURNAL OF MYCOLOGY* for March, 1907, of the North American Species of Agaricaceae. A synopsis of the genera of *Melanosporae*, also the 20 species of *Panaeolus*, form the first installment.

Arthur, J. C.

In a review of "McAlpine's Studies of Australian Rusts," *JOURNAL OF MYCOLOGY*, March, 1907, Dr. Arthur says the thoroughness with which the author has accomplished his task, the culmination of many years of observation and study, has insured a valuable work of reference for both local and other botanists.

Bessey, Ernst A.

The genus *Spegazzinia* seems to stand rather apart from any of the genera in the group Tubercularieae Dematieae, says the author, on account of the peculiar structure of the spores. The article, "Spore Forms of *Spegazzinia ornata* Sacc," in the *JOURNAL OF MYCOLOGY*, March, 1907, shows that the statement in *Sylloge Fungorum* is erroneous, and that the conidiospores bear two kinds of spores—long-stalked spiny conidia and short-stalked, smooth conidia; the two kinds of spores borne independently of each other directly from the sporodochial hyphae. A plate of good illustrative figures accompanies the article.

Stevens, F. L.

Fungi collected in Onandago County, N. Y., and deposited in the collection of the Onandago County Botanical Club (Syracuse), form the "List of New York Fungi" published in the *JOURNAL OF MYCOLOGY*, March, 1907.

Massee, G., and Crossland, C.

A complete account of the known fungi of the county: "The Fungus Flora of Yorkshire," is given by these authors, based mainly on fourteen successive annual fungus forays. It forms Vol. 4 of the Botanical transactions of the Yorkshire Naturalists' Union, a book of 396 pages. Habitat and localities are given for the 2,626 species.

Transactions British Mycological Society, Season 1905.

This part consists of pp. 100-131 with plates 10-13 and contains the following articles: Report of the Haslemere Foray and complete list of Fungi and Mycetozoa gathered; Combating the Fungoid Diseases of Plants, R. F. Biffen; Note on *Sphaeropsis pinastri* Sacc., Miss A. Lorrain Smith; Mycology as a Branch of Nature Study, J. F. Rayner; Fungi New to Britain, Miss A. Lorrain Smith and Carleton Rea.

Smith, Erwin F., and Townsend, C O.

A special article in *Science*, April 26, 1907, gives an account of "A Plant-tumor of Bacterial Origin." For two years the authors have been studying a tumor or gall which occurs naturally on the cultivated marguerite, or Paris Daisy. The organism has been isolated and galls have been reproduced abundantly—the inoculation having been made with needle picks—on the natural herb, on stems of tobacco, tomato, potato, sugar beets, peach trees, the galls in the latter case closely resembling young stages of crown gall. "It is too early, perhaps, to say positively that the cause of the wide-spread and destructive crown-gall of

the peach has been determined by these inoculations, but it looks that way. . . . That the crown-gall of the peach is due to a myxomycete [*Dendrophagus globus*] the writers have never been willing to admit." The organism has been named *Bacterium tumefaciens* n. sp.

Kabát et Bubák.

Fasc. IX, "Fungi Imperfecti exsiccati" was issued [from Fumau et Tabor (Bohemia)] 15 April, 1907. The numbers are 401-450.

Holway, E. W. D.

Part II of Vol. I, of North American Uredineae (pp. 33-56, pl. 11-23) was issued May 15, 1906. The work is admirable in every way — the fine photomicrographs being unique.

Kellerman, W. A.

An analysis and review is given in the May (1907) No. of the JOURNAL OF MYCOLOGY of "Arthur's Uredinales of the North American Flora."

Winslow, C. E. A., and Rogers, Anne F.

The "Generic Characters in the Coccaceae" is the title of an article in Science, May 24, 1906. They say "The best basis for a natural classification is the statistical study of a large series of individuals, which will disclose the points about which the largest number of races are grouped, which are presumably the type centers around which the organisms vary." Six generic groups are established: *Streptococcus*, *Aurococcus* n. g., *Diplococcus*, *Albococcus* n. g. — these forming the family Paracoccaceae (parasitic forms); and *Micrococcus*, *Sarcina*, *Rhodococcus* n. g. — forming the Metacoccaceae (saprophytic forms).

Kellerman, Karl F., and Fawcett, Edna H.

An abstract of "Movements of Certain Bacteria in Soils," published in Science, May 24, 1907, indicates that in sterilized favorable soils saturated with water, *Bacillus ohraceus*, *Pseudomonas radiculicola*, and the paracolon organism grow with equal speed, progressing about one inch in 48 hours. In soils barely moist *Pseudomonas radiculicola* progresses at the rate of one inch in 72 hours, while the two other forms are reduced to a rate of about one inch in 8 days.

Lloyd, C. G.

Mr. Lloyd issued "Letter No. 10" from Paris, July, 1906, (8 pages) commenting on Polyporii received from American correspondents, preceded by some general remarks on work by poly-

porists, and followed by a statement touching the Mycological Situation in America. Among other things he says: "The most and best systematic work on Polyporus was done by Fries. His system and names have been in general use for two generations, and are familiar to all. We therefore feel that no attempt should be made to change them except in very exceptional cases."

Society of American Bacteriologists, Eighth Annual Meeting.

The report of the meeting held convocation week, 1906-7, is given in *Science*, May 24, 1907. The articles that seem more or less to concern general botany or taxonomy are the following: Movements of Certain Bacteria in the Soil (Karl F. Kellerman and Edna H. Fawcett); General Characters in Coccaceae (C. E. A. Winslow and Anna F. Rogers); On the Cultivation of *Spirillum obermeieri* (T. G. Nevy and R. R. Knapp); Bacteria of the Dairy Wells near Washington, D. C. (Karl F. Kellerman and T. D. Beckwith).

Massee, George.

In the *Philippine Journal of Science*, April, 1907, the author gives a list of 18 species of "Philippine Myxogastres," remarking that "it is not surprising, but on the contrary, somewhat gratifying, to announce that no new species have been discovered."

Ricker, P. L.

The "Third Supplement to the New Genera of Fungi published since the year 1900, with citations and the original descriptions" compiled by P. L. Ricker, is printed in the March, May and July Numbers of the *JOURNAL OF MYCOLOGY*.

Holway, E. W. D.

Professor Holway has distributed Part III, (Vol. I) of his North American Uredineae. Hosts of about fifteen families are included, and the serial number of the Rusts has now reached 120. New species here published are: *Puccinia sidalceae* Holway n. sp. on *Sidalcea oregana* (Nutt.) Gray; *Puccinia ornatula* Holway n. sp. on *Viola* (*canadensis*?), Alpine meadow glacier, B. C.; and *Puccinia glabella* Holway n. sp. on *Boisduvalia glabella* (Nutt.) Walp. The critical work shown in this valuable publication has been emphasized previously, so also has the admirable plates been mentioned. In this part some of the photographs, even when amplification is 500 diameters, are remarkably and surprisingly excellent.

Harris, Carolyn W.

"A List of Foliaceous and Fruticous Lichens collected at Chilsom Lake, Essex County, New York, altitude 12,000 feet" — 150 species, is given in the May Bryologist, 1906.

Guttenberg, Hermann Ritter von.

The anatomy of galls caused by fungi has not generally been fully investigated in connection with the gall-producing agent, or as the author says, "Stehen eingehendere Untersuchungen ueber die von Pilzen on hoeheren Pflanzen hervorgerufenen Missmildungen, ueber die Pilzgallen oder Mycocecidien, derzeit noch aus." In this brochure of 70 pages and four double-page lithographic plates entitled "Beitraege zur Physiologischen Anatomie der Pilzgallen," he has given an exhaustive account of *Albugo candida* on *Capsella bursa-pastoris*, *Exoascus amentorum* on *Alnus incana*, *Ustilago maydis* on *Zea Mays*, *Puccinia adoxae* on *Adoxa moschatellina*, and *Exobasidium rhododendri* on *Rhododendron ferrugineum* and *Rh. hirsutum*.

Harshberger, John W.

It is not usual to regard *Physarum cinereum* as "A Grass-Killing Slime Mould," but under this caption the author reports in the Proceedings of the American Philosophical Society, held at Philadelphia, Vol. XLV, No. 184, that the grass had been destroyed in spots by this organism, "the blades of grass were killed by the plasmodium of this myxomycete spreading across the lawn." "It left is saprophytic habit, assuming a grass-killing one."

Kauffman, C. H.

A revision, with many additions, of the Key printed in the June (1905) Torrey Bulletin is given in the January Number of the JOURNAL OF MYCOLOGY, 1907, with 8 pages of plates, under the title of "The Genus *Cortinarius* with key to the species." Mr. Kauffman offers pertinent suggestions in regard to studying these plants, stating *inter alia* that young unexpanded plants must be examined as well as mature ones. Next, a careful description must be made with special reference to the difference in the color of the gills in the young and old plants, etc. Amateurs and beginners have here just such suggestions as they need in undertaking the study of the many species of the genus. The admirable key deals with about seven dozen species.

Fungi Columbiani, Century XXIV.

This was issued March 15, 1907, Elam Bartholomew, Stockton, Kansas. Nearly two dozen *Puccinia* packets are included, about one dozen *Uromyces*, many *Cercosporas*, a few *Aecidia*, and one or two species each of many other genera.

Bergen, Joseph Y., and Davis, Bradley M.

In a Laboratory and Field Manual of Botany, 1907, the authors give directions for "Type Studies" of the Schizomycetes, (pp. 102-5), Saccharomycetes (pp. 105-6), Phycomycetes (pp. 107-9), Ascomycetes (pp. 110-113), Basidiomycetes (pp. 114-117).

Rabenhorst's Kryptogamen-flora, Pilze, 104 Lief., 16 Mai, 1907.

In this part Dr. G. Lindau continues with the Hyphomycetes, taking up the II. Abteilung Phaeodidymae with the three Unterabteilungen: Bisporeae, Cladosporieae and Cordaneae.

Annales Mycologici, Vol. V. No. 1. Feb., 1907.

The articles are: Potentilla A., Mycologische Studien; Rick, Fungi Austro-American Fasc. V. u VI; Tranzschel, W., Kulturversuche mit Uredineen im Jahre 1906; Vuillemin, P., sur le *Dicranophora fulva* Schroet.; Bubák, Fr. und Kabát, J. E., Sechster Beitrag zur Pilzflora von Tirol; Schorstein, Josef, Ueber *Polyporus vaporarius* (Pers.); Guillermond, A., A propos de l'origine des levûres; Dietel, P., Uredineen aus Japan; Rehm, Ascomycetes exs. Fasc. 38; Neue Literatur; Referate und kritische Besprechungen.

Harrison, L. C., and Barlow, B.

"Some Bacterial Diseases of Plants Prevalent in Ontario," a general account, forms Bulletin 136, Ontario Agricultural College, August, 1904. The subjects are Fire Blight or Twig Blight, Bacteriosis of Beans, Soft Rot of Cauliflowers, Fall Turnip, Swedes or Yellow Turnip and A Rot of Celery.

Chester, Frederick D.

Bulletin No. 66, Delaware Agricultural Experiment Station, a dozen pages is devoted to "Soil Bacteria and the Nitrogen Assimilation." Issued November, 1904.

Pammel, L. H.

A general illustrated account of the "Cedar Apple Fungi and Apple Rust in Iowa" forms Bulletin 84. Experiment Station, Ames, Iowa.

Reed, Howard, S.

Both a general and technical account is given of "Three Fungous Diseases of the Cultivated Ginseng"—*Vermicularia dematium* (Pers.) Fr., *Pestalozzia funera* Desm., and *Neocosmopora vasinfecta* var. *nivea* (Atk.) Smith. See Bulletin No. 69, Missouri Agricultural Experiment Station, October, 1905.

Stevens, F. L., and Hall, J. G.

A black rot of apples closely imitating in appearance that caused by Sphaeropsis, is made the subject of a paper in the JOURNAL OF MYCOLOGY for May, 1907. The authors find the cause in a new species of fungus, which they call *Volutella fructi*. A page of outline drawings accompanies the description.

Fungi Selecti Guatemalenses, Decade II.

For this Decade the labels are published in the May number of the JOURNAL OF MYCOLOGY, 1907. The list is as follows: 11. *Aecidium byrsonimae* Kern & Kellerman on *Byrsonima crassifolia* (L.) H. B. K. 12. *Balansia trinitensis* Cooke & Massee on *Panicum* sp. indet. 13. *Coleosporium plumierae* Patouillard on *Plumiera rubra* L. 14. *Puccinia conoclinii* Seymour on *Eupatorium rafaense* Coulter. 15. *Puccinia heliotropii* Kern & Kellerman on *Heliotropium indicum* L. 16. *Puccinia purpurea* Cooke on *Sorghum vulgare* Pers. 17. *Puccinia tetramerii* Seymour on *Blechum brownei* Juss. 18. *Puccinia tithoniae* Dietel & Holway on *Tithonia tubaeformis* Cass. 19. *Uredo biocellata* Arthur on *Pluchea odorata* Cass. 20. *Uredo trixitis* Kern & Kellerman on *Trixis frutescens* P. Br.

Herre, Albert W. C. T.

In the April No. of the Botanical Gazette, 1907, this subject is discussed, namely, "Lichen Distribution in the Santa Cruz peninsula, California." Incidentally the description is given of *Lecanactis zahlbruckneri* Herre n. sp., and *Dirina franciscana* A. Zahlbruckner n. sp.

Mycological Notes, No. 24. Dec., 1906, C. G. Lloyd.

This No. gives work "Concerning the Phalloids," "The Common Bird's-nest Fungi," and on "An Unknown South American Lycoperdon" [*L. septimus* — "We have named this plant 'seventh' in reminder of the fact that it belongs to the seventh section of a recent paper on the Genus *Lycoperdon*, and is the only species we have seen that does belong here"]. Good figures are shown of several species — *Clathrus cibarius*, *Clathrus cancellatus*, *Clathrus gracilis*, *Laternea columnata*, and *Mutinus elegans*.

Shear, C. L., and Wood, Anna K.

These authors report some interesting studies. Botanical Gazette, April, 1907, under the head "Ascogenous Forms of *Gloeosporium* and *Colletotrichum*." They have grown both the conidial and ascogenous stages from eight different hosts, namely, "*Gloeosporium rufomaculans* (Berk.) v. Thümen, from the cultivated grape, *Vitis* sp.; *G. fructigenum* Berk., from the apple;

an apparently unnamed *Gloeosporium* from the cranberry, *Vaccinium macrocarpum*; *G. elasticae* Cooke & Masee, from the leaves of the rubber plant, *Ficus elastica*; a form from the locust, *Gleditschia triacanthus*, which does not appear to have been reported before; one from *Ginkgo biloba*, also not heretofore reported; *Colletotrichum gossypii* Southw., from cotton; and *C. Lindemuthianum* (Sacc. & Magnus) Bri. & Cav., from the cultivated bean." The one from the apple only has its ascogenous form reported heretofore. The authors used in the cultures sterilized corn meal, 75° to 50° F. Referring to the fact that forms occurring on different hosts have been generally regarded as different species, they say their study "leads to the conclusion that they cannot be successfully segregated as species on morphological grounds." They use the name *Glomerella rufomaculans* (Berk.) Spauld. & v. Schrenk.

Hasselbring, Heinrich.

In the Botanical Gazette for April, 1907, this author discusses "Gravity as a Form-Stimulus in Fungi." He experimented with *Polystictus cinnabarinus*, *Schizophyllum commune*, and some species of *Coprinus*. He says in conclusion, "it follows from the foregoing observations on three widely separated forms of the Basidiomycetes, that although gravity has no effect on the organization of the hymenophore, it has a marked influence on determining the configuration of the fruit-body of some forms. This effect is most marked in the more primitive forms, which are thereby shown to be the more plastic. In the more highly differentiated forms [*Coprinus*] this effect of gravity disappears."

Stevens, F. L.

A Rust found in North Carolina on *Melothria pendula*, "*Puccinia* on *Melothria*," Botanical Gazette, April, 1907, is named *P. Melothriae* Stevens n. sp., accompanied with outline figures of the spores. It belongs to the *Leptopuccinia* type.

Smith, R. Greig.

Dr. Smith reports a "Gelatin-hardening Bacterium," which was isolated during the bacteriological examination of the tissues of *Schinus molles*, the specimen of which was exuding small quantities of a torquoise-colored gum resin. To the new species the name of *Bacillus indurans* has been given. This report is found in the proceedings of the Linnean Society of New South Wales, 1905, Part 2, August 30th.

Hedgcock, George Grant.

Experiments touching "Zonation in Artificial Cultures of Cephalothecium and Other Fungi," are reported in the 17th Annual Report of the Missouri Botanical Garden. The fungi used were Cephalothecium, Penicillium, Mucor and Hormodendron; they were grown on agar plates under five conditions of light. It was found that the cultures grown under red and orange light and in darkness exhibited uniform dense spore formation over the whole surface of the mycelium. Those under blue light and in ordinary light exhibited distinct daily rings of growth of alternating denser spore formation.

Hedgcock, George Grant.

A very important paper giving the result of "Studies upon some Chromogenic Fungi which discolor Wood," is published in the 17th Annual Report of the Missouri Botanical Garden. Dr. Hedgcock made a thorough study of the fungus-flora of the lumber pile. He reports exhaustively on about two dozen species. The arrangement is after this fashion: (I) wood-bleuing fungi (*Ceratostomella*); (II) wood-blackening and wood-browning fungi (*Graphium*, *Hormodendrum*, *Hormiscium*, &c.); (III) wood-reddening fungi (*Penicillium*, *Fusarium*). Each fungus was grown upon a number of kinds of wood, as well as upon potato, rice, bean, sweet potato, and other similar media in tubes, in addition to cultures on agar media made from wood and other vegetable decoctions. In many instances new conidial stages of fungi were discovered; the new species are fully described.

Nicholas, Susie Percival.

Investigations were carried on touching "The Nature and Origin of the binucleated cells in some Basidiomycetes," and reported in the transactions of the Wisconsin Academy of Sciences, Arts, and Letters. Vol. XV, 1904, published in 1905. Studied were *Hypholoma perplexum* Pk., species of *Coprinus*, *Rhizomorpha*—*Poria*, *Pholiota praecox* Pers., *Lepiota naucina*, *Dictyophora duplicata* Ed. Fisch., and *Lycoperdon pyriforme* Schaeff. The binucleated cells were not found to originate through the formation of any special reproductive apparatus. Their formation is not necessarily followed immediately by the formation of a carpophore but no complete resumé can here be attempted.

Fink, Bruce.

Cladonia pyxidata and *Cladonia pityrea* are discussed in "Further Notes on Cladonias. XI." in the July No. of the *Bryologist*, 1907: half tone illustrations, enlarged, are given.

Harris, Carolyn W.

A list of 60 "Lichens of the Adirondac League Club Tract" is given in *Bryologist*, 10:64-6, July, 1907. They were collected in June in the vicinity of Little Moose Lake, Herkimer County, New York, at an altitude varying from 1788 to 2460 feet.

Journal of Mycology, Vol. 13, May, 1907.

The following items are given in the table of contents: Kellerman—Arthur's Uredinales of the North American Flora; Stevens & Hall—An Apple Rot due to *Volutella*; Kellerman—*Fungi Selecti Guatemalenses, Exsiccati Decade II*; Long—*Phalloideae of Texas*; Kellerman—Notes from *Mycological Literature XXIII*; Ricker—Third Supplement to *New Genera*; Kellerman—Index to North American Mycology; Editor's Notes.

Kusano, S.

The Author adds "A new species of *Taphrina* on *Acer*" to the four hitherto reported on this host, namely, *T. nikkoensis*; published in the *Botanical Magazine*, April, 1907. The fungus forms grayish scurfs on the leaves of *Acer purpurascens* at Nikko, Japan. In that region it is said some hosts are furiously attacked.

Annales Mycologici, Vol. V. No. 2. April, 1907.

This No. contains: Cavara F., e Mollica, N., *Ricerche intorno al ciclo evolutivo di una interessante forma di Pleospora herbarum* (Pers.) Rab.; Hori, S., *On Ustilago esculenta* P. Henn.; Lakon, Georg. B., *Die Bedingungen der Fruchtkoerperbildung bei Caprinus*; Saccardo, P. A., *Notae Mycologicae; Neue Literatur; Referate und kritische Besprechungen*.

Fungi Selecti Exsiccati. Serie VIII.

This set, issued by Otto Japp, Hamburg, includes Nos. 176-200, with a supplement to six numbers issued previously. The date of issue of Serie VIII is November, 1906. A wide range of groups is represented.

Butler, E. J. and Hayman, J. M.

Messrs. Butler and Hayman give an extended account of "Indian Wheat Rusts,"—the report being Vol. 1. No. 2. Botanical Series of the *Memoirs of the Department of Agriculture in India*, July, 1906. There are 58 pages and five plates, three of the latter being colored, and represent *Puccinia graminis*, *Puccinia glumarum* and *Puccinia triticea*.

Baxter, E. J.

The "Fungus Diseases of Sugar-cane in Bengal" forms Vol. 1. No. 3. of the Memoirs of the Department of Agriculture in India, Botanical Series, July, 1906. The principal diseases discussed and illustrated by figures are: Red Rot (or Red Smut), *Colletotrichum falcatum*; Smut, *Ustilago sacchari* Rab.; *Diplodia cacaicola* P. Henn; *Cytospora sacchari* Butl. sp. nov.; "Pine-apple disease, *Thielaviopsis ethacetica* Went; Black Rot *Sphaeronaema adiposum* Butler n. sp.; Brown leaf-spot, *Cercospora longipes* Butler n. sp.; Ring-spot, *Leptosphaeria sacchari* Br. & H.; and sooty mould, *Capnodium* sp.

Butler, E. J.

The "Annual Report of the Cryptogamic Botanist for 1905" is published in the first Annual Report of the Imperial Department of Agriculture in India, pp. 71-88, 1906. This is a general account of the work done, a large number of plant diseases having been encountered. Some work had been done previously by the mycologists, Doctors Cunningham and Barclay. Widely distributed and serious fungus pests are mentioned, as *Phytophthora infestans*, The common Rusts of wheat, smuts of wheat, oats and sorghum, *Exoascus deformans*, *Thielaviopsis ethacetica*, etc.

Butler, E. J.

An important "Account of the Genus *Pythium* and some Chytridiaceae" is given by Mr. Butler, as Vol. 1., No. 5, Botanical Series, Memoirs of the Department of Agriculture in India, February, 1907. In Part I the genus *Pythium* is fully discussed and monographed, new species being *P. indigoferae*, *P. diacarpum*, *P. palmivorum*, and *P. rostratum*. In Part II, Observations on some Chytridiaceae the following new species are described: *Pleolpidium irregulare*, *Pl. cuculus*, *Pl. inflatum*. *Pseudolpidium pithyii*, *Ps. gracile*, and *Nowakowskiella ramosa*. Ten full page plates illustrate the species.

Burlingham, Gertrude Simmons.

Pertinent "Suggestions for the study of the Lactariae" are given by the author in the June No. of *Torryea*, 1907. After stating the case she summarizes the points in a blank form for guidance of the amateur or observer in recording the notes. It is suggested that the most complete and satisfactory color chart is the *Répertoire de Couleurs*, published by the French society of "Chrysanthémistes."

Lyman, George Richard.

The very important work by this author on "Culture Studies on Polymorphism of Hymenomycetes" is reported, as one of the contributions from the Cryptogamic Laboratory of Harvard University, in the proceedings of the Boston Society of Natural History, Vol. 33, No. 4, p. 125-209, pl. 18-26. Secondary spores are common, produced in immense numbers and varied fashion, in the Phycomycetes and Ascomycetes. But among the Autobasidiomycetes they are less commonly known, less varied, the basidiospores being the main or only agent of reproduction. The paper reviews the present knowledge and then includes an account of cultures of 28 species, — over 100 having been studied. Of the 28 species, five possess oidia, and chlamydospores were produced in abundance for about half dozen species. The perfect form of *Aegerita candida* was detected, namely, *Peniophora candida* (Pers.) Lyman n. sp. The author concludes that conidia and other highly specialized secondary methods of reproduction are rare, occurring more frequently in the Thelephoraceae.

Blakeslee, A. F.

"Heterothallism in Bread Mould, *Rhizopus nigricans*, Botanical Gazette, June, 1907. Comments are made on two papers recently published by Hamaker and by Namyslawski; then follows an account of cultures from zygosporic material used by the latter author; and this is the judgment: The evidence at hand leads one to the conclusion that the large majority of the Mucorineae are heterothallic.

Chester, Frederick D.

In the 15th Annual Report of the Delaware College Agricultural Experiment Station, 1903, we find a valuable article entitled: "Observations on an Important Group of Soil Bacteria; Organisms related to *Bacillus subtilis*." He says by the *Bacillus subtilis* group is understood those members of the genus *Bacillus*, as defined by Migula, which produce spores, liquefy gelatine and grow under aerobic conditions. A synopsis is given, also descriptions of the ten species.

Hori, S.

It is noted that *Ustilago esculenta* P. Henn. causes the affected plants *Zizania latifolia*, at Tokio, Japan, to retain their green color for a long time in autumn, and thus they are at once distinguished from the normal plants which turn yellow early in autumn. The smutted part, extremity of the shoot, remains entirely concealed for a long time between the leaves and the leaf sheaths.

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W. A. KELLERMAN, PH. D., COLUMBUS, OHIO.

EDITOR'S NOTES.

In the April No. of the Bulletin of the Torrey Botanical Club is published a new caste of the American Code of Botanical Nomenclature, being the 1904 Philadelphia canons with a few amendments. These changes are made in part to meet the requirements of the 1905 Vienna Code; but some of the rules and recommendations of the Vienna Congress are not acceptable to the members and alternates of the Nomenclature Commission of the Botanical Club of the A. A. A. S.

In Mycology as in other branches of Botany, uniform and concerted action among taxonomists is greatly to be desired; and all efforts leading to stability and uniformity are to be commended. Our Commission is insistent on the principle of types which the Vienna Congress failed to recognize. Another contention of the Americans — consistent and commendable — is that nothing should be arbitrary or exceptional in application. Objectionable therefore, is the action of the Vienna Congress in excluding a large number of generic names from the operation of all nomenclatorial rules, and in requiring diagnosis of new species to be in the Latin language after January 1st, 1908.

We have several comments to make on the new code, though space requires that one or two only be given here. Canon 1, should, we think, be omitted. There is a general agreement approximately if not essentially uniform as to the meaning of *species* in Nature — and even the conception of genus is not so divergent but that the work of specialists generally secures approval. We see no advantage in an attempted definition of species — surely the rules and practices in nomenclature are not dependent on the theoretical statement. Again, a genus may exist even if there is but one species and not a group, and any one of the entire series mentioned in Canons 3 and 4 may be similarly restricted — then wherefore “group” the representative? We think it adequate to substitute for the four Canons mentioned, the mere statement that the groups in ascending series recognized in botany are species, genera, tribes, families, orders, classes and divisions; and names of a lower group or of intermediate groups, when necessary, may be formed from the preceding by using the prefix *sub*.



Elias J. Durand

Journal of Mycology Portraits with Facsimile Autographs.

Journal of Mycology

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PROTOCOLONOSPORA, A NEW GENUS OF FUNGI.

(Preliminary Note.)

GEO. F. ATKINSON AND C. W. EDGERTON.

The senior author discovered a fungous disease of the cultivated vetch during July which does not seem to have been described before, and was first observed on the stems and pods from a small patch of vetch on the Horticultural grounds of Cornell University and later collected on vetch in the fields on the University farm where it seems to be abundant and a serious pest, often being associated with an Ascochyta. On the pods it often occurs quite pure, and here it is easily seen with the unaided eye to be distinct from the disease caused by the Ascochyta. It is, however, frequently mixed, even on the pods, with this fungus, but the very characteristic spots alone serve to distinguish it.

The spots are elongated, either narrow or elliptical, sometimes with a dull purple border. On the pods they are oblique. The spores ooze out in mass and have a pale pink or flesh color, but when spread in a thin layer, form a whitish film.

The fungus is subepidermal. The epidermis is ruptured in the form of a slit through which the spores escape. The mycelium becomes brown and then black, and the epidermis is later blackened; in age the spots are black oblique lines as seen on the pods, and many of them are sterile probably through failure of the fungus to fruit.

The structure of the fungus causing this new disease of vetch is very interesting. It resembles that of species of *Corticium*. The basidia form a definite hymenium which is seated on the pseudo-parenchymatous subhymenium, which is two or three cell-layers in thickness. The nourishing mycelium extends out into the surrounding tissue of the host. The spores are sessile; and are borne on a basidium in a whorl or crown at the end. The spores are oblong to subelliptical, straight or curved, continuous, hyaline, granular, and measure $12-20 \times 3-3.5 \mu$. As the spores fall away from the basidia others are produced as shown by cultures. Conidia similar to the basidiospores are produced on slender conidiophores which are intermingled with the basidia. This character recalls that of the genus *Exobasidium*. The spores also bud in yeast-like fashion from one or both ends, rarely from the side, and the sporidia thus produced are similar to the spores.

The fungus appears to be the type of a new genus for which the name *Protocoronospora* is proposed, and a provisional diagnosis is given as follows:

Protocoronospora Atkinson and Edgerton new genus. Stroma pseudoparenchymatous, two or three cell layers in thickness, formed by the compact branching of the mycelium, the ultimate exterior branches producing the basidia which form a hymenium. Spores sessile, hyaline, colorless, continuous, smooth, several (usually four-eight) on a basidium. Spores budding and forming sporidia similar in form. Conidia also similar in form on slender short conidiophores intermingled with the basidia.

P. nigricans Atkinson and Edgerton n. sp.—Forming narrow elongated spots on the pods, stems, leaves and bracts, spots oblique on the pods and from 2-5 mm. to 1-2 mm. Spots at first white or with purple border, later black. Stroma subepidermal, of pseudoparenchymatous cells $6-9 \mu$ in diameter, two to three cell layers in thickness. Basidia clavate to subcylindrical, $20-30 \times 6-8 \mu$, 4-8 spored. Spores sessile, and basidia continuing to form new spores, at least in artificial culture. Spores pale pink in mass, oblong to subelliptical, hyaline, continuous, smooth, granular, straight or curved, $12-20 \times 3-3.5 \mu$, usually becoming once septate on germination. Mycelium from the stroma penetrating the adjacent tissues. Parasitic on pods, stems, leaves and bracts of *Vicia sativa*.

Botanical Department, Cornell University.
September 2, 1907.

A CASE OF POISONING BY AMANITA PHALLOIDES.

OTTO E. JENNINGS.

The writer's attention was recently called by Judge J. D. Shafer, of Pittsburg, to a newspaper account of a fatal case of mushroom poisoning at the little village of Deep Valley in the extreme southwestern point of Pennsylvania, and, acting upon Judge Shafer's urgent suggestion, the case was immediately investigated.

It was found that the village physician, Dr. Philip Dinsmore, together with three other members of the family and Mr. Frank Roberts, the man-of-all-work, had eaten with the evening meal, between six and seven o'clock, Sunday, August 4, a mess of mushrooms gathered that afternoon by Mr. Roberts. There had been about a quart of the mushrooms and they had been prepared by frying in flour and butter. All ate of the mushrooms excepting one little girl.

Between one and two o'clock the next morning all who had eaten of the mushrooms were taken violently sick, vomiting excessively and having an extreme diarrhoea. These symptoms continuing during Monday, Dr. H. C. Rice, of Freeport, Pa., was summoned and a treatment begun consisting of the sub-cutaneous injection of *atropine* and as far as possible the administration of narcotics and oleaginous purgatives.

The vomiting and diarrhoea continued for about three days, other symptoms being subnormal temperature, more or less delirium, and in the case of Dr. Dinsmore, severe muscular cramps of the limbs and extremities, and, evidently, of the muscular walls of the abdomen also, the patient dying early Thursday morning.

At the time of the writer's visit (Saturday, August 10) Mr. Roberts had so far recovered as to be about, but the other three patients were still confined to their beds. The vomiting and diarrhoea had ceased, but there was considerable enlargement of the liver with distension of the gall-bladder and the patients were becoming jaundiced.

Saturday morning Mr. Roberts escorted the writer to a little patch of about two acres of woods, lying at the base of the hillside along the creek, where the mushrooms had been gathered for the fatal meal. Two species were abundant, *Cantharellus** and the white form of *Amanita phalloides* Fr., and the latter species was indicated as the one composing the greater part of the mess taken. Other species indicated as having been also

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*The writer is indebted to Prof. D. R. Sumstine for verification of the identifications.

selected were *Amanitopsis vaginata* (Bull.) Roz., and *Russula emetica* Fr. — a very few. The only test applied in selecting the fungi had apparently been the pleasing appearance and the tenderness of the mushroom. Roberts' identification of *Amanita* as composing the greater part of those eaten was independently verified by one of the patients, Dr. Dinsmore's sister, who had prepared the fungi for eating.

From the evidence obtained it is quite clear that the poisoning was due to the deadly *Amanita*, and it will be noticed that the symptoms exhibited were in close agreement with those ascribed to *phallin* poisoning by chestnut,** although Dr. Rice characterized the intestinal discharges as "serous" and not assuming the "rice-water" condition, and neither extreme salivation nor decided suppression of the urine was noticed.

In connection with the supposed action of *phallin* in decomposing the blood corpuscles and in bringing about the escape of the blood serum from the system by way of the alimentary canal it may be mentioned as a partial confirmation that the undertaker experienced considerable trouble in preparing the corpse for burial,—less than half the usual amount of blood could be extracted; thus indicating a depletion of blood supply before death occurred.

CARNEGIE MUSEUM, August 14, 1907.

(Published by permission of Dr. W. J. Holland, Director.)

** Chestnut, V. K. Circular No. 13, Div. Botany, U. S. Dept. Agriculture.

A NEW SPECIES OF PROTOMYCES.

J. J. DAVIS.

For the purpose of securing a name under which to distribute specimens in *Fungi Columbiani* I submit the following:

Protomyces gravidus n. sp.—Causing hypertrophic swellings on stems, branches, petioles and midribs. Spores, either sub-epidermal or in the vascular bundles but not usually in both, numerous, surface more or less irregularly uneven, generally globose but some times elliptical, ovate or polygonal, 30-55 x 27-40 μ , plurinucleate; epispore thin (1-3 μ), brown; endospore in maturity thick (3-5 μ), hyaline. On *Bidens cernua* L. and *Bidens connata* Muhl., Dousman; on the same hosts and sparingly on *Bidens frondosa* L., Racine; on *Bidens cernua* L., Berryville, all in Wisconsin. July to November.

What I have called the endospore should rather perhaps be considered a peripheral layer of cytoplasm in a resting condition the true endospore being a hyaline membrane 1 μ or less thick.

In the 35th Rep. of the New York State Botanist, p. 138, is reported the occurrence of *Protomyces marcosporus* Ung. on leaves and stems of *Ambrosia trifida* L., at Albany, with a brief description that corresponds with the fungus on *Bidens*. Prof. Peck informs me that it was abundant at one station during one season. Through the kindness of Dr. Farlow I have had an opportunity to examine sections of a gall on *Ambrosia artemisiaefolia* L. which was sent him from Nantucket, Mass. in August 1905, containing spores similar to those in the *Bidens* galls.

Sydow described in *Annales Mycologici*, 1:237, *Entyloma leucanthemi* which was distributed by Vestergren (*Microm.* No. 808.) under the name *Protomyopsis leucanthemi* (Syd.) Magn. but I have been unable to learn of a publication of the characters of the genus. Again through the kindness of Dr. Farlow I have been able to examine sections containing this fungus. The spores are similar to those in *Bidens* but they appear to occur in the leaf blade without gall formation and no mention is made of such swellings by Sydow. I therefore hesitate to distribute my material under the name given by Magnus.

I have found the fungus here considered on no hosts other than *Bidens* — not even on *Corcopsis* growing with affected *Bidens* — and for my present purpose the question as to the relation between the *Ambrosia* and *Bidens* inhabiting forms may be left open.

I have made many attempts to observe the germination of the spores, at all seasons of the year, using material kept continuously out of doors but without result.

Racine, Wisconsin, August 6, 1907.

CULTURES OF UREDINEAE IN 1906.¹

BY J. C. ARTHUR.

The present article forms the seventh of a series of reports² by the author upon the culture of plant rusts, covering the years from 1899 to the close of 1906. As in previous years the grass and sedge rusts have constituted a large part of the list of species under trial. This is partly due to the economic and scientific interest connected with them, but even more, possibly, to the greater ease with which wintered-over and viable spores may be secured for cultural study. Among the species whose life-

¹ Read before the Botanical Society of America at the New York meeting, December 31, 1906.

² See Bot. Gaz. 29:268-276, 35:10-23; Jour. Myc. 8:51-56, 10:8-21, 11:50-67 and 12:11-27.

cycle has now been worked out for the first time, the one having the greatest economic import does not belong to the grass or sedge forms, but inhabits flax. The discovery of the full developmental history of this serious menace to successful flax growing, brought about by the cooperation of Professor Henry L. Bolley of North Dakota, widely known for his interest and scientific studies in promoting the flax industry, has been a matter of much satisfaction. It greatly clarifies the problem of controlling the flax rust in the interest of the cultivator.

The work of testing the viability of spores, making the sowings, and recorded data, required, as in previous years, the undivided attention of a person to whom the whole work could be intrusted. The expense of such an assistant was this year met by a grant from the Botanical Society of America. It was the second time the Society has given material aid to this series of investigations.

Through the kindness of Professor R. A. Harper, I was so fortunate as to enlist the interest of Dr. E. W. Olive, lecturer at the University of Wisconsin, who consented to supervise the season's work. The forethought and constant watchfulness, the enthusiastic application, and especially the maturity of judgment and breadth of knowledge brought to bear on the work by Dr. Olive materially increased the completeness of the results.

As in former years correspondents have provided much of the material used in the trials, partly upon their own initiative, and partly in response to suggestion, for all of which I am under heavy obligation. Teliosporic material was sent by Messrs. A. D. Selby, Wooster, Ohio; H. H. Whetzel, Ithaca, N. Y.; Chas. E. Fairman, Lyndonville, N. Y.; W. A. Kellerman, Columbus, Ohio; H. L. Shantz, Columbia, Mo.; J. J. Davis, Racine, Wis.; John L. Sheldon, Morgantown, W. Va.; H. L. Bolley, Agricultural College, N. D.; E. Bartholomew, Stockton, Kans.; Geo. E. Morris, Waltham, Mass.; Guy W. Wilson, Lafayette, Ind.; E. Bethel, Denver, Colo.; and especially by Rev. J. M. Bates, Red Cloud, Neb. Aeciosporic material was sent by Messrs. Herman von Schrenk, St. Louis, Mo.; H. H. Whetzel, Ithaca, N. Y.; C. L. Shear, Tacoma Park, D. C.; D. Reddick, Ithaca, N. Y.; and P. H. Rolfs, Lake City, Fla., all the collections being either *Caeoma* or *Peridermium* on species of *Pinus*. Host plants are often required for the work, which do not grow in this vicinity, and can not be purchased from dealers, and for a number of such plants in good growing condition I am indebted to Messrs. William Trelease of the Missouri Botanical Garden, St. Louis, Mo.; John L. Sheldon, Morgantown, W. Va.; P. B. Kennedy, Reno, Nev.; and J. J. Davis, Racine, Wis.

During the present season 94 collections of material with resting spores and 15 collections with active spores were employed, from which 293 drop cultures and 6 Petri dish cultures

were made to test the germinating condition of the spores. Out of the 94 collections with resting spores 46 could not be made to germinate, although no reason could be assigned why they should not. This gave 48 collections of available material belonging to 30 species of rusts, exclusive of the aecial pine rusts, and from these 223 sowings were made. Beside these 53 sowings were made with *Caeoma* and *Peridermium* spores from pine, all without infection, 27 sowings with teliospores of *Gymnosporangium*, and 23 sowings with various aeciospores. Altogether 326 sowings were made, and for this purpose 134 species of hosts were required, which were grown temporarily in the greenhouse, where practically all the work was done. The results of this work are given in the following paragraphs, and are divided into negative results, positive results with species whose life histories have already been previously determined, and positive results with species whose life histories have not before been fully known.

Of the trials giving negative results the following may be recorded to serve for reference in further studies.

1. PUCCINIA on *Carex Pennsylvanica* Lam., collected near Lafayette, Ind., was sown on *Trillium recurvatum*, *Napaea dioica*, *Anemonella thalictroides*, *Isopyrum biternatum*, *Anemone virginiana*, *Actaea alba*, *Viola cucullata*, *Dirca palustris*, *Polemonium reptans*, *Ambrosia trifida*, *Rudbeckia laciniata*, and *Lactuca canadensis*, with no infection. Similar material in former seasons has been tried on eighteen other species of hosts with negative results.³

2. PUCCINIA on *Carex graviora* Bailey, sent by Rev. J. M. Bates from Red Cloud, Neb., was sown on *Actaea rubra*, *Thalictrum dioicum*, *Isopyrum biternatum*, *Apios Apios*, *Falcata comosa*, *Psoralea Onobrychis*, *Cassia Chamaecrista*, *Polygala Senega*, *Aesculus glabra*, *Ceanothus americanus*, *Smilax herbacea*, *Viola cucullata*, *Napaea dioica*, *Callirrhoe involucreta*, *Althaea rosea*, *Hibiscus Moscheutos*, *Macrocalyx Nyctelea*, *Polemonium reptans*, *Myosotis palustris*, *Phlox divaricata*, *Phlox subulata*, *Triosteum perfoliatum*, *Boltonia asteroides*, *Laciniaria pycnostachya*, *Rudbeckia laciniata*, *Senecio obovatus*, and *Cacalia reniformis*, with no infection. Similar material from the same source has been sown in previous years upon eleven other species of hosts with negative results.⁴

3. PUCCINIA on *Polygonum scandens* L., obtained in the vicinity of Lafayette, Ind., was sown five times on *Geranium maculatum*, twice on *G. Robertianum*, twice on *G. pusillum*, and

³ See Jour. Myc. 10:10. 1904; 11:51. 1905; and 12:12. 1906.

⁴ See Jour. Myc. 10:10. 1904; and 11:52. 1905.

twice on *Thalictrum dioicum*. These sowings were made under seemingly favorable conditions and yet no infection resulted. In 1903 Dr. W. Tranzschel of St. Petersburg established the connection between *Puccinia Polygoni-amphibii* Pers. on *Polygonum amphibium* and the aecia on *Geranium palustre* and *G. pratense*, and a year later the writer corroborated the discovery with corresponding American species of hosts. In 1904 Dr. Tranzschel showed that the rust on climbing species of *Polygonum*, often included with the preceding, is distinct, either as a true species or a biological species, for it produces its aecia on *Geranium pusillum*. To see if this also could be substantiated with American material the above sowings were made with seemingly excellent teliosporic material, but the negative results leave the matter an open question. The only other native *Geranium* on which this form might be expected to grow readily is *G. carolinianum*, which was unfortunately not at hand for the test.

4. PUCCINIA on *Muhlenbergia diffusa* Schreb., sent by Rev. J. M. Bates from Red Cloud, Neb., was sown on *Trillium recurvatum*, *Actaea alba*, *Anemonella thalictroides*, *Isopyrum biter-natum*, *Caulophyllum thalictroides*, *Apios Apios*, *Viola pubescens*, *Dirca palustris*, *Althaea rosea*, *Callirrhoe involucrata*, *Napaea dioica*, *Hibiscus Moscheutos*, *Marcocalyx Nyctelea*, *Polemonium reptans*, *Ambrosia trifida*, and *Lactuca canadensis*, with no infection. This taken with previous trials shows that the rusts on different species of *Muhlenbergia* are in all probability biologically complex.

5. PUCCINIA SCHEDONNARDI K. & S., sent by Rev. J. M. Bates from Red Cloud, Neb., was sown on *Callirrhoe involucrata*, *Althaea rosea*, and *Ceanothus americanus*, with no infection. Like material from the same source was sown in 1902 on eight other species of hosts with negative results.⁵ The small sori and fine leaves of the grass make the manipulation of material of this species somewhat uncertain.

6. PUCCINIA EMACULATA Schw. on *Panicum capillare*, obtained in the vicinity of Lafayette, Ind., where it is very common, was sown on *Polygala Senega* and *Napaea dioica*. This rust was sown in previous seasons on eighteen other species of hosts.⁶

7. UROMYCES on *Juncus effusus* L., sent by Dr. Charles E. Fairman from Ridgeway, N. Y., was sown on *Polemonium reptans*, *Houstonia purpurea*, *Ambrosia trifida*, *Rudbeckia laciniata*, *Polymnia canadensis*, *Parthenium integrifolium*, *Silphium integrifolium*, *S. perfoliatum*, *S. terbinthinaceum*, and *Senecio obovatus*,

⁵ See Bot. Gaz. 35:11. 1903.

⁶ See Bot. Gaz. 35:12. 1903; Jour. Myc. 8:52. 1902; 10:10. 1904; and 12:12. 1906.

with no infection. What was doubtless the same rust, and also from western New York, was sown in 1905 on two other species of hosts with negative results.⁷

This rust has heretofore been considered to belong to *Uromyces Junci* (Desm.) Tul., but recent study has shown that it is morphologically quite distinct from that species, especially as it has urediniospores that are echinulate and four-pored, instead of verrucose and two-pored, as in the European species, which by the way apparently does not occur in the United States east of Nebraska and Kansas. It was described by Schweinitz (Trans. Am. Phil. Soc. 4:295. 1832.) as a new species under the name *Puccinia Junci*. As that specific name is not now available, I suggest that the species be called *Uromyces effusus*, in allusion to the copious distribution of the sori over the surface of the host, and would characterize it as follows:

Uromyces effusus sp. nov.

O and I. Pycnia and aecia unknown.

II. Uredinia amphigenous, scattered, oblong or linear, 0.1-0.3 mm. wide by 0.3-1.5 mm. long, tardily naked, dark cinnamon-brown, ruptured epidermis very conspicuous; urediniospores broadly ellipsoid or oval, 14-19 by 18-26 μ , wall light yellow about 1.5 μ thick, rather sparingly and bluntly echinulate, pores 4, equatorial.

III. Telia amphigenous, numerous, scattered, oblong or linear, 0.2-0.5 mm. wide by 0.3-2 mm. or more long, rarely confluent, finally naked, ruptured epidermis very conspicuous; teliospores obovate or broadly oval, 13-19 by 24-33 μ , obtuse or rarely acute at apex, usually narrowed below; wall chestnut-brown, 1.5-2 μ thick, much thicker above, 6-10 μ , smooth; pedicel tinted, about as long as the spore.

On *Juncus effusus* L. Type collected by L. von Schweinitz at Bethlehem, Pa. Collections in the writer's herbarium from Ohio, New York, West Virginia, and Maryland, and in the herbarium of the New York Botanical Garden from New Jersey, Massachusetts and South Carolina. It is also found in the following exsiccati: Ellis, N. Am. Fungi. 238; Ellis & Ev., Fungi Columb. 339; Ravenel, Fungi Am. 51; Shear, N. Y. Fungi 76; Kellerm., Ohio Fungi 38.

8. *UROMYCES ELEOCHARIDIS* Arth. on *Eleocharis palustris* (L.) R. & S., sent by Mr. E. Bartholomew from Stockton, Kan., was sown on *Callirrhoe involucrata*, *Napaea dioica*, *Cassia Chamaecrista*, *Myosotis palustris*, and *Silphium perfoliatum*, with no infection.

9. *UROMYCES ACUMINATUS* Arth. on *Spartina cynosuroides* Willd., obtained at Fair Oaks, Ind. by Mr. F. D. Kern, was sown four times on *Steironema ciliatum*, twice on *S. lanceolatum*, twice on *Lysimachia quadrifolia* L., and once each on *L. terrestris*, *Polygala Senega*, *Napaea dioica* and *Houstonia purpurea*, with no infection. As teliosporic material of this rust, obtained from Nebraska, was sown on *Steironema ciliatum* with success in 1905,⁸

⁷ See Jour. Myc. 12:13. 1906.

⁸ See Jour. Myc. 12:24. 1906.

it would seem that what now passes under one name is either a segregate, or a series of biological species, and that the *Uromyces* on *Spartina* in Indiana differs in some way from that in Nebraska.

The following species of rusts were successfully grown, and the data supplement that obtained from previous cultures of this series, or that recorded by other American or European investigators.

1. *MELAMPSORA BIGELOWII* Thuem. — Teliosporic material obtained near Lafayette, Ind., on *Salix* sp., was sown April 25 on *Larix decidua*, pycnia appearing in abundance May 2, and fully grown aecia about May 12.⁹

2. *CRONARTIUM QUERCUS* (Brond.) Schroet. — Work with this species was suggested by Dr. C. L. Shear, who also provided freshly gathered aecia on *Pinus virginiana* Mill., sending these a number of times in varying quantity. Dr. Shear made a number of cultures in the open in the spring of 1905, and presented a paper embodying his observations and conclusions¹⁰ at the New Orleans meeting of the American Mycological Society, but which did not appear in print until June, 1906, after all data to be presented here were secured.

Aeciospores from material provided by Dr. Shear was sown May 12 in the greenhouse on three plants of *Quercus alba* and two plants of *Q. velutina*. On May 19 another sowing was made on two other plants of *Q. velutina*. This work coming late in the season did not receive daily examination, but on June 1 all the plants of *Q. velutina* showed uredinia, and one of them also had developed telia. By June 25 the remaining four plants had produced telia. The plants of *Q. alba* remained free from infection.

The aecia used for these cultures were the typical form of *Peridermium Cerebrum* Peck. There seems no reason to doubt the identity of the American, European and Japanese fungus, which has passed under a number of names, but a discussion of the literature and facts will not be taken up in this place.

3. *PUCCINIA OPIZII* Bubák. — Aecia on various wild species of *Lactuca*, and even on the garden *L. sativa*, are common in the extended region of the upper Mississippi valley. They were described by Burrill (Bull. Ill. Lab. Nat. Hist. 2: 232. 1885), but the name *Aecidium compositarum Lactucae* Burr. was first published three years later (Saccardo, Syll. fung. 7: 799. 1888). This form has often appeared in considerable abundance within

⁹ For previous cultures see Jour. Myc. 11:60. 1905.

¹⁰ Jour. Myc. 12:89-92. 1906.

a hundred feet of my laboratory door, and much attention has been bestowed upon it. The first clue to its connection was found on the last day of April of this year, when in company with Mr. F. D. Kern, the writer detected at Fair Oaks, Ind., a hundred miles north of this place, in two well separated spots, some plants of *Lactuca canadensis* thickly covered with aecia, and intermixed with the affected leaves some leaves of a small, narrow leaved *Carex*, bearing teliospores of the previous year's growth. No evidence of fruiting could be found on the *Carex*, and roots brought back and grown in pots have shown no signs of fruit, so that the *Carex* has not been specifically determined. Teliosporic material was obtained from both localities, and May 2 one was sown on *Lactuca canadensis* and *Onagra biennis*, the other on *L. virosa* and two plants of *L. canadensis*. *Onagra* showed no infection, but all plants of *Lactuca* gave rise to pycnia May 9, and aecia May 15, in great abundance. Another sowing was made May 14 on *L. sativa*, which gave pycnia May 14, and aecia May 28, with ample development.

This rust is taken to be the same as the one which Dr. Fr. Bubák studied in Bohemia by means of cultures, and which he has very fully described.¹¹ No Bohemian collections, however, are at hand with which to make comparison, but two European collections of aecia (Sydow, Uredineen 334 and 1100) show essential morphological agreement with American aecia on *Lactuca*. Dr. Bubák (l. c.) has stated that to him the American and European collections appear distinct, but without saying wherein the difference may lie. To me the differences appear to be habitual. On thin leaved hosts both pycnia and aecia are in more open and indefinite groups. On hosts from the western prairies, which have firm and strongly developed leaves the groups of aecia are usually compact and circumscribed, and surround the often amphigenous pycnia. The European aecia belonging to the species are known under the name *Accidium lactucinum* Lagerh. & Lindr.

4. PUCCINIA SAMBUCI (Schw.) Arth. — Teliosporic material on *Carex Frankii* Kunth, brought from Frankfort, Ind., by Mr. F. D. Kern, was sown May 10 on *Sambucus canadensis*, giving numerous pycnia May 16, and abundance of aecia May 26. This adds another host to this common species, those already known being *Carex trichocarpa*, *C. lurida*, and *C. lupulina*.¹²

5. PUCCINIA PECKII (DeT.) Kellerm. — Teliosporic material on *Carex trichocarpa* Muhl., brought from Fair Oaks, Ind., was sown on *Onagra biennis* May 4, and gave rise to pycnia May 14, and to aecia May 17, both in abundance. Another collection on *C. lanuginosa* Michx., sent by Rev. J. M. Bates

¹¹ Centr. Bakt. 9:924. 1902.

¹² See Bot. Gaz. 35:14. 1903; Jour. Myc. 8:55. 1902; 12:14. 1906.

from Wymore, Neb., was sown on *Onagra biennis* May 19, giving rise to pycnia May 26, and aecia June 2, both in abundance.¹³

6. *PUCCINIA ALBIPERIDIA* Arth. — This rust on three species of hosts was obtained in different localities near Lafayette, Ind., and sown with the following results:

From *Carex squarrosa* L., sown in greenhouse April 16 on *Ribes rotundifolium*; April 21, pycnia; April 30, aecia.

From *C. squarrosa* L., sown in garden April 21 on *R. gracile*; April 25, pycnia; May 13, aecia.

From *C. squarrosa* L., sown in greenhouse April 16 on *R. rubrum*; no infection.

From *C. tetanica* Schk., sown in greenhouse April 20 on *R. Cynosbati*; April 27, pycnia; May 9, aecia.

From *C. crinita* Lam., sown on *R. Cynosbati* in greenhouse April 26, then plant transferred to garden; May 4, pycnia; May 17, aecia.

These results add one more telial host to those previously used for cultures.¹⁴ They also have given an opportunity for a study of the differences between the pale aecia obtained by cultures and the highly colored aecia usually observed in the field. The aecia grown wholly in the greenhouse were pale, as in previous years; those on the plant which had the pot plunged into the garden soil after the fungus became established, were much more colored; and those raised from sowings made in the garden were highly colored and presented essentially the same appearance as others that came upon some nearby bushes of *Ribes* from natural infection. The result of observations during the last six years, coupled with the cultures of this year, make the conclusion almost inevitable that shade, moist air, and slow growth, tend to make the aecia smaller, with less coloring matter in the peridial cells and surrounding mycelium, and also tend to produce less hypertrophy of the tissues of the host, and that this accounts for the differences observed between aecia grown in cultures and those very common on *Ribes Cynosbati*, *R. rotundifolium*, *R. gracile*, and similar species of gooseberries throughout the eastern United States. All collections of this sort, therefore, may be called *Puccinia albiperidia*, but whether this is a distinct species from the very similar rust of Europe, *Puccinia Grossulariae* (Schum.) Lagerh., or one of the several biological species established by Klebahn, still remains an open question.

7. *PUCCINIA ANGUSTATA* Peck. — Teliosporic material on *Scirpus atrovirens* Muhl., from the vicinity of Lafayette, Ind., was sown April 28, on *Dirca palustris*, with no infection. On

¹³ For previous cultures see Bot. Gaz. 35:13. 1903; Jour. Myc. 8:55. 1902; 11:58. 1905; and 12:15. 1906.

¹⁴ For previous cultures see Jour. Myc. 8:53. 1902; 10:11. 1904; 11:58. 1905; and 12:14. 1906.

May 4 it was sown on *Lycopus Americanus*, giving rise May 14 to numerous pycnia, and May 18 to aecia in abundance.¹⁵

8. PUCCINIA ELEOCHARIDIS Arth. — Teliosporic material on *Eleocharis palustris* (L.) R. & S., sent by Mr. E. Bartholomew from Stockton, Kans., was sown May 7 on *Eupatorium perfoliatum*, giving rise to pycnia May 14, and to aecia May 22. Similar material on same species of host from near Lafayette, Ind., was sown June 1 on *E. perfoliatum*, giving rise to pycnia June 8, and to aecia June 20. It was also sown on *Napaea dioica*, with no infection.¹⁶

9. PUCCINIA ANDROPOGONIS Schw. — Teliosporic material on *Andropogon scoparius* Michx., sent by Rev. J. M. Bates from Sargent, Neb., was sown April 24 on *Pentstemon hirsutus*, giving rise to pycnia April 30, and to aecia May 10, both in abundance.¹⁷

10. PUCCINIA TOMIPARA Trel. — Teliosporic material on *Bromus purgans* L., from Lafayette, Ind., was sown May 19 on *Clematis virginiana*, giving rise to pycnia May 26, and to aecia June 8, both in abundance.¹⁸

11. PUCCINIA SUBNITENS Diet. — Teliosporic material on *Distichlis spicata* (L.) Greene, sent by Rev. J. M. Bates from Red Cloud, Neb., was sown April 5 on *Chenopodium album*, *Bursa Bursa-pastoris*, and *Sarcobatus vermiculatus*, giving a weak infection only on the *Chenopodium*. As the *Sarcobatus* plant soon died, another sowing was made May 5 on two other plants of *Sarcobatus*, but with no infection. It was sown again May 10, and May 19, on *Sarcobatus*, still with no infection. Still a fifth sowing was made May 29 on two plants of *Sarcobatus*, and one of *Chenopodium album*, with a weak infection of the latter, and with apparently a few pycnia showing on one leaf of *Sarcobatus*. The plants of *Sarcobatus* were sent by Dr. P. B. Kennedy from Reno, Nev., and had not become established when the sowings were made. They were obtained where *Distichlis spicata* grew intermixed, well covered with *Puccinia subnitens*, and the *Sarcobatus* was well besprinkled with aecia, not distinguishable from those now known to belong to this grass rust.¹⁹ The particular object in view was to determine experimentally if *Puccinia subnitens* will grow on *Sarcobatus*. The single seeming infection is doubtful, as it may have come from spores transported with the plants. The question remains an open one,

¹⁵ For previous cultures see Bot. Gaz. 29:273. 1900; and Jour. Myc. 8:53. 1902.

¹⁶ For previous cultures see Jour. Myc. 12:23. 1906.

¹⁷ For previous cultures see Bot. Gaz. 29:272. 1900; Jour. Myc. 9:10. 1903; and 10:11. 1904.

¹⁸ For previous cultures see Jour. Myc. 11:62. 1905.

¹⁹ For previous cultures see Bot. Gaz. 35: 19. 1903; Jour. Myc. 11:54. 1905; 12:16. 1906.

although I venture the opinion that if the teliosporic material had come from Nevada, instead of Nebraska, the sowings would have been successful.

12. *PUCCINIA POCULIFORMIS* (Jacq.) Wettst. — Teliosporic material on *Agrostis alba* L., brought from Fair Oaks, Ind., was sown May 2 on two plants of *Berberis vulgaris*, both showing abundant pycnia May 9, and aecia May 18.

Aeciospores from these cultures were sown May 31 on *Avena sativa*, *Hordeum vulgare* (Great Beardless), and *Triticum vulgare* (Jones' Silver Sheaf), without infection in the first case, and with sparing infection in the other two cases, the former showing uredinia June 12, and the latter somewhat later.

Teliosporic material on *Elymus canadensis* L., sent from Racine, Wis., by Dr. J. J. Davis, was sown May 2 on *Berberis vulgaris*, showing pycnia May 9, and aecia May 18. Aecia from this culture were sown May 31 on *Triticum vulgare* (Jones' Silver Sheaf), and *Secale cereale* (Mammoth Winter Rye), with no infection.²⁰

13. *PUCCINIA TRANSFORMANS* Ellis & Ev. — Teliosporic material from a greenhouse plant of *Stenolobium Stans*, which had been infected a year previously, was sown May 7 on two healthy plants of the same species, and gave rise to pycnia May 22, and to telia May 30. A sowing on two other plants was made May 10, showing pycnia May 26, and telia May 31.²¹

14. *PUCCINIA XANTHII* Schw. — Teliosporic material on *Xanthium* sp., obtained in the vicinity of Lafayette, Ind., about the middle of April, was sown on *Xanthium* seedlings April 20, and gave rise to translucent papillae simulating pycnia April 26, and open telia May 3. Another sowing May 1 gave pale papillae about May 18, and open telia about May 26.²²

15. *PUCCINIA SILPHII* Schw. — Teliosporic material on *Silphium integrifolium* Michx., obtained the last of March near Lafayette, Ind., was sown April 26 on *Silphium perfoliatum*, giving rise to pale papillae May 1, and open telia May 4. Another sowing was made on *S. terebinthinaceum* May 1, giving rise to pale papillae May 8, and open telia May 14. Similar material from another locality was sown May 3 on *S. integrifolium*, *S. perfoliatum* and *S. terebinthinaceum*, giving infection in usual way in each instance but exact data not taken.²³ It was observed that the infection on *S. integrifolium* was more rapid in its growth and more abundant than on the other hosts. In the report of last

²⁰ For previous cultures see Jour. Myc. 8:53. 1902; 11:57. 1905; 12:17. 1906.

²¹ For previous cultures see Jour. Myc. 12:22. 1906.

²² For previous cultures see Jour. Myc. 12:20. 1906.

²³ For previous cultures see Jour. Myc. 12:21. 1906.

year's cultures the opinion was expressed that this rust may be composed of biological races, but the present work shows that adaptation to the hosts is not so close but that under specially favorable conditions the rust may be transferred from one host to another.

16. PUCCINIA PRUNI-SPINOSAE Pers.—Aecia on *Hepatica acutiloba* DC., from near Lafayette, Ind., were sown April 28 on *Prunus serotina* and *Amygdalus Persica*, giving rise May 21 to uredinia on the former host, but with no infection on the latter host. Like material was sown May 2 on *Prunus serotina* and *P. pumila*, giving rise to the uredinia in both instances May 21. These results abundantly confirm, and somewhat extend, the work of last year.²⁴

17. UROMYCES SCIRPI (Cast.) Burr.—Teliosporic material on *Scirpus fluviatilis* (Torr.) A. Gray, sent by Rev. J. M. Bates from Walbach, Neb., was sown May 22 on *Cicuta maculata*, giving abundance of pycnia May 31, and of aecia June 8. A sowing made June 1 on *Pastinaca sativa*, the plants being especially thrifty, gave no infection. On June 5 another sowing was made on *Oxypolis rigidus* and *Cicuta maculata*, with no infection on the former, but with fine showing of pycnia on the latter June 12, and of aecia June 22.

There is apparently no morphological difference between the American rust and the corresponding European one, and the hosts are also much alike. Sixteen years ago Dr. P. Dietel showed by cultures²⁵ that in central Germany aecia are produced on *Sium latifolium*, which in habit and structure is much like *Cicuta maculata*. He also found that, most curiously, aecia could be grown from the same material on *Hippurus vulgaris*, which belongs to another family of plants, showing that, in all probability, the species is not closely circumscribed.

Cultures made by Dr. Fr. Bubák in 1901 from Bohemian material brought to light a biological form which only infected *Berula angustifolia*.²⁶

In 1902 Dr. H. Klebahn attempted to repeat Dietel's cultures, and found that teliosporic material from the same immediate region, the exact locality having been changed and the rust destroyed, gave abundant aecia on *Pastinaca sativa*, but only slightly infected *Hippurus vulgaris*, and infected *Sium latifolium* and *Glaux maritima* not at all.²⁷ The year following he carried out more extensive cultures. Teliosporic material raised from aeciospores on *Pastinaca sativa*, infected both *Pastinaca* and *Berula angustifolia*. Teliosporic material from central Germany

²⁴ See Jour. Myc. 12:19. 1906.

²⁵ Hedwigia 29:149. 1890.

²⁶ Centr. Bakt. 9²:926. 1902.

²⁷ Jahrb. Hamb. Wiss. Anst. 20:33. 1903.

infected both these hosts. Similar material from northern Germany infected only *Berula*. In 1904 aecia were raised in a similar way on *Oenanthe aquatica*.²⁸

One of the earliest cultures with this pleophagic species was made by Mr. C. B. Plowright with English material, raising aecia on *Glaux maritima*, which belongs to the *Primulaceae*.²⁹

A careful microscopic study of all these forms shows close agreement in morphological characters, and altogether there appears to be no reason to treat these cultural forms other than biological races of a single species. *Scirpus fluviatilis* is the American representative of the European *S. maritimus*, and by many authors is given the latter name. The writer has examined American collections that appear to belong to this species, as follows: on *S. fluviatilis* from Iowa, Illinois, Kansas, Nebraska, South Dakota, Ohio, and Wisconsin; on *Cicuta maculata* from Illinois, Iowa, and Colorado; on *Oenanthe californica* from central California, *Sium cicutaefolium* from Wisconsin, and on *Glaux maritima* from Montana and Wyoming.

18. GYMNOSPORANGIUM JUNIPERI-VIRGINIANAE Schw.—Galls from a tree of *Juniperus virginiana* near the laboratory, brought in by Mr. F. D. Kern, were used for sowing May 1 on *Malus coronaria*, *Sorbus americana*, and *Crataegus Pringlei*. Only the first gave infection, which showed abundant pycnia on May 14, but failed to develop aecia on account of injuries.²⁵

19. GYMNOSPORANGIUM GLOBOSUM Farl.—Galls from a tree of *Juniperus virginiana*, found in the vicinity of Lafayette, Ind., were brought in by Mr. Guy W. Wilson, and used for making three sowings on *Crataegus Pringlei*, and one each on *Malus coronaria* and *Amelanchier* sp. All sowings on *Crataegus* gave abundance of pycnia, and one plant finally produced well formed aecia, the other plants not growing well. No infection was obtained on the other two hosts.

Similar material was also received from Dr. John A. Sheldon, of Morgantown, W. Va., and sown May 19 on *Crataegus Pringlei*, *Malus coronaria*, and *Sorbus americana*, all giving rise to an abundance of pycnia. As none of the plants grew well, only the sowing on *Sorbus* formed aecia, these finally reaching maturity and showing the characteristic structure of the species.

These results are parallel with, and confirm the work by Dr. Roland Thaxter, done some years ago.²⁶

²⁸ Ztschr. Pfl.-Kr. 15:74. 1905.

²⁹ Gard. Chron. III. 7:682. 1890.

²⁶ For previous cultures see Jour. Myc. 12:13. 1906.

²⁶ Proc. Amer. Acad. Sci. 22:263. 1887; Bot. Gaz. 14:167. 1889.

The following three species have never before been tested by means of cultures, so far as the writer knows. Although few in number, they make an important addition to our knowledge of life histories:

I. *MELAMPSORA LINI* (Link) Desmaz.—For a number of years attempts have been made to obtain cultures of this cosmopolitan rust, and learn its full cycle of development. Many collections from different parts of the country, gathered at different times from November to April, have been tested, but with uniform failure to secure germination of the teliospores. The most numerous and promising collections were sent by Professor H. L. Bolley, of North Dakota, but equally in vain until one made the last day of April on cultivated flax, dug from under a snow bank, was received. This showed strong germination of the teliospores, and on May 4 was sown on *Linum Lewisii*, *Larix laricina*, and the day following on *Tsuga canadensis*, and *Arisaema triphyllum*. No clues were available, but judging from the willow, poplar, and some other species of the same genus, it was assumed that it might be heteroecious. Nevertheless, on May 16 pycnia began to appear on the flax, and on May 21 aecia. The next sowing was made May 18 on *Linum usitatissimum*, plants of which had not before been available, giving rise to pycnia May 26, and aecia May 30. Another equally successful sowing on the same host was made May 29, but exact record for the appearance of the sori was not kept.

The pycnia are small, pale, and inconspicuous, although numerous. They are globoid, subepidermal, and without ostiolar filaments. The aecia are of the caeoma form, that is, are without peridia. They are also rather pale, and not as prominent as the uredinia, for which, however, they might easily be mistaken. So far as I can learn they have never been collected, although probably common throughout the world. This may be due to their being inconspicuous, and quite as much to the earliness of their appearance.

The economic bearing of the discovery is to some extent obvious. Knowing the autoecious nature of the rust makes the destruction of old flax straw in flax growing regions a matter of moment, in order to lessen and retard the appearance of the rust in growing fields of flax. Upon reporting the first success to Professor Bolley he replied under date of May 23, 1906: "I am very much pleased to receive your letter, for with the information I am able to determine the source of a rust epidemic that we had in our flax breeding plots last year. I now find everywhere in the flax stubble plenty of volunteer flax with almost every plant more or less infected with spermogonia and aecidia." It will now be possible to intelligently devise methods for the practical control of flax rust.

2. *UROMYCES* ON *JUNCUS TENUIS*.—This rust, which has generally passed under the name of *Uromyces Junci*, is very common in the United States east of the Rocky Mountains from Canada to the Gulf of Mexico. It is often highly parasitized, so that the sori contain few or no well grown teliospores. A number of attempts to bring the rust under culture have failed because the teliospores could not be made to germinate. In 1902 a sowing was made on *Iris versicolor* without success.

Unparasitized material on *Juncus tenuis* Willd. was found near Lafayette, Ind., April 3, that proved to be viable, and was sown April 20 on *Lactuca canadensis*, *L. virosa*, *Senecio obovatus*, *Rudbeckia laciniata*, *Ambrosia trifida*, *A. artemisiaefolia*, and *Silphium perfoliatum*. Much to our delight pycnia were observed on the last host April 30, and were followed by a great abundance of aecia May 7. Another sowing was made May 4 on *S. perfoliatum* and *S. terebinthinaceum*, and the next day on *Parthenium integrifolium*. Only the first was infected, showing pycnia May 17, and May 31. The plant of *S. terebinthinaceum* was weak and did not grow well. Later sowings May 9 on *Polymnia canadensis*, and June 5 on *Parthenium integrifolium* and *Silphium terebinthinaceum*, gave no infection.

Another collection of teliospores on *Juncus tenuis* was sent by Dr. John L. Sheldon from Morgantown, W. Va., which was found close to *Houstonia caerulea* bearing aecia. This material was sown May 19 on *Houstonia caerulea*, *H. purpurea* and *Silphium perfoliatum*. No infection occurred on the *Houstonias*, but pycnia appeared on the *Silphium* May 29, and aecia June 4, both abundant and well formed.

Since obtaining the unequivocal cultural results, a morphological study has been made of the rust, which clearly demonstrates that it is specifically distinct from *Uromyces Junci* (Desm.) Tul. As it appears never to have been recognized as an autonomous species, the following name and description are submitted:

***Uromyces Silphii* (Syd.) nom. nov.** (*Accidium compositarium Silphii* Burr. Saccardo, Syll. Fung. 7:798. 1888; *Accidium Silphii* Sydow, Uredineen 1546.)

O. Pycnia chiefly epiphyllous, in small groups, golden brown, subglobose or ellipsoid, subepidermal, 80-100 μ broad by 80-110 μ high; ostiolar filaments up to 65 μ long.

I. Aecia amphigenous, in groups 4-10 mm. across, crowded about the pycnia on discolored spots, deep-seated, short, 0.2-0.4 mm. in diameter; peridium colorless, margin recurved, lacerate, peridial cells rhombic, 20-28 μ across, outer wall thick, 6-8 μ , transversely striate, inner wall thinner, 4-6 μ , moderately verrucose; aeciospores angularly globoid, small, 13-18 μ in diameter, wall colorless, thin, about 1 μ , minutely verrucose.

On *Silphium integrifolium* Michx., Illinois (type, McLean County, May 3, 1881 or 1882, *A. B. Seymour* 4852, recorded in Burrill's Parasitic Fungi of Illinois, page 231), Wisconsin; *S. terebinthinaceum* Jacq., Illi-

nois, Wisconsin, Missouri; *S. perfoliatum* L., Indiana, Iowa, Wisconsin; *S. laciniatum* L., Illinois, Iowa, Kansas.

II. Uredinia amphigenous, scattered, roundish or somewhat elongated, small, 0.2-0.3 mm. wide, by 0.3-0.5 mm. long, tardily naked, dark cinnamon-brown, ruptured epidermis not conspicuous; urediniospores broadly ellipsoid or sometimes obovate, 13-19 by 15-23 μ , wall golden yellow, about 1.5 μ thick, sparsely and bluntly echinulate, pores 5 or 6, scattered.

III. Telia amphigenous, scattered, roundish or somewhat elongated, small, 0.2-0.3 mm. wide by 0.2-0.6 mm. long, tardily naked, firm, somewhat pulvinate, blackish brown, ruptured epidermis noticeable; teliospores angularly obovate, rounded, truncate or occasionally pointed above, usually narrowed below, 12-19 by 26-35 μ , wall chestnut-brown, 1.5-2 μ thick, much thicker above, 7-10 μ , smooth; pedicel light chestnut-brown, one to one and a half times length of spore.

On *Juncus tenuis* Willd., Indiana, Iowa, Wisconsin, Michigan, Minnesota, South Dakota, Missouri, New York, Maine, Massachusetts, West Virginia, Louisiana, Texas; *J. dichotomus* Ell., Florida.

It has been issued in the following exsiccati: aecial stage—Ellis & Ev. Fungi Columb. 1478; Sydow, Ured. 1546; telial stage—Seym. & Earle, Econ. Fungi 52, 528; Griffiths, W. Am. Fungi 244 (host *J. tenuis* not *J. longistylis*); Ellis & Ev. Fungi. Columb. 2394.

The following key will serve to separate the three common species of *Uromyces* on *Juncus*, when the urediniospores are present. In the absence of uredinia the urediniospores can usually be found to some extent in telial sori, even those that have withstood the winter, and are collected in the spring following their maturity, and especially so if they are parasitized.

Urediniospores verrucose, pores 2, equatorial. *U. Junci* (Desm.) Tul.
Urediniospores echinulate, pores 4, equatorial. *U. effusus* Arth.
Urediniospores echinulate, pores 5-6, scattered. *U. Silphii* (Syd.) Arth.

3. GYMNOSPORANGIUM NELSONI Arth. — At the time this species was published it was stated that Prof. Aven Nelson, the collector of the type material, considered it highly probable that the aecia found on *Amelanchier* in the vicinity belonged to the species. Teliosporic material on *Juniperus scopulorum* Sarg., sent by Mr. E. Bethel from Colorado this spring, gave the first opportunity to test the suggestion. Sowings were made May 29 on the leaves of *Amelanchier canadensis*, *Sorbus americana*, *Crataegus Pringlei*, *Pyrus japonica*, and *Aronia nigra*. On June 12 a few pycnia were observed on the *Amelanchier* and *Sorbus*, but owing doubtless to indifferent growth of the hosts no aecia were formed. The other hosts remained without infection. This helps in a small way to confirm Professor Nelson's suggestion, but is not conclusive.

SUMMARY.

The following is a complete list of successful cultures made during the season of 1906. It is divided into two series: species previously reported by the writer or other investigators, and species now reported for the first time.

A. Species previously reported.

1. MELAMPSORA BIGELOWII Thuem. — Teliospores on *Salix* sp. sown on *Larix decidua* Mill.
2. CRONARTIUM QUERCUS (Brond.) Schroet. — Aeciospores on *Pinus virginiana* Mill. sown on *Quercus velutina* Lam.
3. PUCCINIA OPIZII Bubák. — Teliospores on *Carex* sp. sown on *Lactuca canadensis* L., *L. virosa* L. and *L. sativa* L.
4. PUCCINIA SAMBUCI (Schw.) Arth. — Teliospores on *Carex Frankii* Kunth sown on *Sambucus canadensis* L.
5. PUCCINIA PECKII (DeT.) Kellerm. — Teliospores on *Carex trichocarpa* Muhl., and also on *C. lanuginosa* Michx., sown on *Onagra biennis* (L.) Scop.
6. PUCCINIA ALBIPERIDIA Arth. — Teliospores on *Carex squarrosa* L., *C. tetanica* Schk., and *C. crinita* Lam. sown on *Ribes rotundifolium* Michx., *R. gracile* Michx. and *R. Cynosbati* L.
7. PUCCINIA ANGUSTATA Peck. — Teliospores on *Scirpus atrovirens* Muhl. sown on *Lycopus americanus* Muhl.
8. PUCCINIA ELEOCHARIDIS Arth. — Teliospores on *Eleocharis palustris* (L.) R. & S. sown on *Eupatorium perfoliatum* L.
9. PUCCINIA ANDROPOGONIS Schw. — Teliospores on *Andropogon scoparius* Michx. sown on *Pentstemon hirsutus* (L.) Willd.
10. PUCCINIA TOMIPARA Trel. — Teliospores on *Bromus purgans* L. sown on *Clematis virginiana* L.
11. PUCCINIA SUBNITENS Diet. — Teliospores on *Distichlis spicata* (L.) Greene sown on *Chenopodium album* L.
12. PUCCINIA POCULIFORMIS (Jacq.) Wettst. — Teliospores on *Agrostis alba* L. and on *Elymus canadensis* L. sown on *Berberis vulgaris* L., and aeciospores from *B. vulgaris* L. sown on *Hordeum vulgare* L. and *Triticum vulgare* Vill.
13. PUCCINIA TRANSFORMANS Ellis & Ev. — Teliospores on *Stenolobium Stans* (L.) Don sown on same host.
14. PUCCINIA XANTHII Schw. — Teliospores on *Xanthium* sp. sown on same host.
15. PUCCINIA SILPHII Schw. — Teliospores on *Silphium integrifolium* Michx. sown on *S. integrifolium* Michx., *S. perfoliatum* L., and *S. terebinthinaceum* Jacq.
16. PUCCINIA PRUNI-SPINOSAE Pers. — Aeciospores on *Hepatica acutiloba* DC. sown on *Prunus serotina* Ehrh. and *P. pu-mila* L.
17. UROMYCES SCIRPI (Cast.) Burr. — Teliospores on *Scirpus fluviatilis* (Torr.) A. Gray sown on *Cicuta maculata* L.

18. GYMNOSPORANGIUM JUNIPERI-VIRGINIANAE Schw. — Teliospores on *Juniperus virginiana* L. sown on *Malus coronaria* (L.) Mill.

19. GYMNOSPORANGIUM GLOBOSUM Farl. — Teliospores on *Juniperus virginiana* L. sown on *Crataegus Pringlei* Sarg., *Sorbus americana* Marsh., and *Malus coronaria* (L.) Mill.

B. Species reported now for the first time.

1. MELAMPSORA LINI (Link) Desmaz. — Teliospores on *Linum usitatissimum* L. sown on *L. Lewisii* Pursh and *L. usitatissimum* L.

2. UROMYCES SILPHII (Syd.) Arth. — Teliospores on *Juncus tenuis* Willd. sown on *Silphium perfoliatum* L.

3. GYMNOSPORANGIUM NELSONI Arth. — Teliospores on *Juniperus scopulorum* Sarg. sown on *Amelanchier canadensis* (L.) Medic. and *Sorbus americana* Marsh.

AN HISTORICAL REVIEW OF THE PROPOSED GENERA OF PHYCOMYCETES.

I. PERONOSPORALES.

GUY WEST WILSON.

In the present consideration of the generic types of the *Phycomycetes* the genera will be arranged chronologically under each order, with the type species, the synonyms, the homonyms, and such other information under each genus as may seem desirable. This is followed by an alphabetical list of the genera with their type species, in which the tenable names are printed in black type while those which are untenable are in common type.

The subject of the generic types of the *Phycomycetes* was first taken up at the suggestion of Dr. J. C. Arthur, while a student in his laboratory, and the results embodied in a thesis which was presented to the Faculty of Purdue University, to the authorities of which institution I am indebted for permission to publish the material contained in the thesis. I wish to also express my hearty appreciation of the courtesies shown me by Dr. Arthur and by Dr. J. H. Barnhart in the way of critical and bibliographical assistance and the loan of otherwise inaccessible books and by those in charge of the various libraries consulted both in Lafayette and New York.

1. ALBUGO Roussel, Fl. Calvados, ed. 2. 47. 1806.

The name *Albugo* was first used for a subgenus by Persoon* who included under it the white spored species of *Uredo*, of which he recognized two, *U. candida* and *U. Cheiranthi*, the first of which is the type species. Roussel elevated the subgenus to generic rank with Persoon's first species as the monotype of the genus. In this species he followed Persoon in including the white rust of the *Cruciferae* and of *Tragopogon*, and by way of good measure added some fungus on *Urtica* which in all probability belongs to the *Uredinales*. The genus is usually credited to S. F. Gray† who used the name in the same sense fifteen years later.

Synonym: *Cystopus* Lév., not Blume.

2. PERONOSPORA Corda, Icon. Fung. 1: 20. 1837.

This genus was published for a single species, *P. rumicis*, which is figured on *pl. 5. f. 273*.

3. BREMIA Regel, Bot. Zeit. 1:666. 1843.

The only species which has so far been referred to the genus is *B. Lactucae* Regel, a fairly good figure of which (*pl. 3B*) accompanies the description.

Synonym: *Actinobotrys* Hoffm.

4. CYSTOPUS Léville, Ann. Sc. Nat. III. 8: 371. 1847.

The genus is characterized and five species of *Uredo*, of which the first is *U. candida*, are cited as members of the genus. Except the last species named these are all congeneric. While it is customary to credit to Léville the names of all these species under the genus *Cystopus*, he refrained, not only in this but in subsequent papers, from forming the combinations with which he is so generously credited by his contemporaries. The name is untenable as the genus is a typonym of *Albugo*. It has also been applied to an *Orchidaceus*‡ genus.

5. ACTINOBOTRYS Hoffman, Bot. Zeit. 14: 154. 1856.

But one species, *A. Tulasnei*, was described, the figure of a portion of the conidiophore of which (*pl. 5. f. 22*) is unmistakably that of *Bremia Lactucae* Regel, 1843.

6. BASIDIOPHORA Roze & Cornu, Ann. Sci. Nat. V. 11: 84. 1869.

This genus is founded on a single species, *B. entospora*, which is described at great length and carefully figured (*pl. 4*).

Synonym: *Gilletia* Sacc. & Penz.

* Syn. Meth. Fung. 223. 1801.

† Nat. Arr. Brit. Pl. 1:540. 1821.

‡ *Cystopus* Blume, Orch. Archip. Ind. 82. 1858.

7. PHYTOPHTHORA de Bary, Jour. Roy. Agr. Soc. II. 12: 240. 1876.

The present genus was founded for a single species, *Peronospora infestans*, which is renamed *Phytophthora infestans* de Bary. The species and its life history are discussed in detail and illustrations are given (f. 3, 4). A duly accredited reprint of this article§ is usually cited instead of the original place of publication.

8. SCLEROSPORA Schröter, de Bary, Bot. Zeit 39: 621. 1881.

The present name was used by Schröter* as a subgenus of *Peronospora*, under which there was placed a single species previously described by Saccardo as *Protomyces graminicola*. The first use of the name in a generic sense is in a paper by de Bary in which he enumerates the valid genera of *Peronosporaceae* among which is *Sclerospora* Schröter. The first binominal combined with the generic name is in Cohn's *Kryptogamen Flora von Schlesien*|| where the type of the subgenus of 1879 becomes *S. graminicola* (Sacc.) Schröt. Up to this time no other species had been associated with the name *Sclerospora* whether regarded as a genus or as a subgenus.

9. GILLETIA Saccardo & Penzig; Sacc. Michelia 2: 587. 1882.

The only species which is referred to this genus is *G. spinuligera* Sacc. & Therry, of which the authors say "Oogonia ignota, sed totus fungi habitus peronosperioideus." The fungus is co-specific with *Basidiophora entospora* Roze & Cornu. The type specimens of both these species were collected in France on *Leptilon canadensis* (L.) Britton. The same generic name has since been used in *Commelinaceae*.¶

10. PLASMOPARA Schröter, in Cohn, Krypfl. Fl. Schles. 3: 236. 1886.

Eight species were referred to this genus by its author who founded it as "Gatt. **Plasmopara**. (*Peronospora* Sect. I. *Zoosporiparae* und Sect. II. *Plasmatoparae* de Bary)." The generic name is merely a modification of de Bary's second sectional name, which implies that the conidia germinate by a plasma. This is true only of de Bary's second section, the species of the first germinating by zoospores. Two species, *Peronospora pygmaea* Unger and *P. densa* Rabenh., are included by de Bary in his section *Plasmatoparac* of which *P. pygmaea* is the type. As

§ Jour. Bot. 14:105-126, 148-154. 1876.

* Hedwigia, 18:86. 1879.

|| 3^a:236. 1886.

¶ Rendle, Jour. Bot. 84:55. 1896.

this species is the first one from this section which is cited by Schröter it is the type of the genus. Of his other species two were known to de Bary, while the others, including the type of *Basidiophora*, are of later date.

11. CHLOROSPORA Spegazzini, Rev. Argent. Hist. Nat. 1: 29. 1891.

The single species of this genus, *C. vastatrix*, is described as having monopodially branched conidiophores and colored conidia which germinate by a plasma. The genus is, therefore, very close to *Plasmopara*.

12. DREPANOCONIS Schröt. & P. Henn.; Henning's, Hedwigia 35: 211. 1896.

This genus, which is placed by its authors in *Albuginaceae*, contains a single species *D. brasiliensis*, the true position of which is probably among the *Hyphomycetes*.

13. PSEUDOPERONOSPORA Rostewzew, Ann. Inst. Agron. Moscow 9:47. 1903; Flora 92:422. 1903.

The present genus was founded upon *Peronospora cubensis* B. & C. and a Russian variety of that species. The characters of these fungi and their relatives are discussed in detail and the article, which is in Russian, is profusely illustrated. There is no room to question the identity of the genus and its type. A translation of the article appeared in Flora about eight or ten months later.

Synonym: *Peronoplasmopora* (Berlese) Clinton.

14. KAWAKAMIA Miyabe, Mag. Bot. Tokyo 17:(306). 1903.

This genus is founded on a single species, *Peronospora cyperiperi* Miyabe & Ideta. Although published in the Japanese section of the Magazine the descriptions of both genus and species are in English.

15. PERONOPLASMOPARA Clinton, Ann. Rep. Conn. State Agr. Exp. St. 29:234. 1905.

Berlese* proposed this name for a subgenus of *Plasmopara* in which he included two species, *Plasmopara Celtidis* (Waite) Berlese and *P. cubensis* (B. & C.) Humphrey. He described both species and figured the latter, which is therefore the subgeneric type. When Clinton elevated the subgenus to generic rank he designated "Types: *Peronoplasmopara cubensis* (B. & C.) Clinton, *Peronoplasmopara celtidis* (Waite) Clinton." As it is manifestly impossible for a genus to have more than one type, and as his discussion is based almost entirely upon the first species which he mentions we must consider both subgenus and genus as founded upon *Peronospora cubensis* B. & C.

* Riv. Pat. Veg. 9:123. 1900.

16. PHLEOPHYTHORA Klebahn, Cent. Bakt II. 15:336. 1905.

The genus is founded upon an imperfectly known species, *P. syringae*, which may belong either to the *Peronosporales* or to the *Anclystidales*.

17. MYCELOPHAGUS Mangin, Compt. Rend. Acad. Sci. Paris 136:472. 1906.

The genus is founded on a poorly described and imperfectly known species, *M. castaneae*, which probably belongs to *Anclystidaceae*.

Alphabetical List of Genera.

(The tenable names in black type.)

Actinobotrys Hoffm. 1856.—*A. Tulasnei* Hoffm. = *Bremia lactucae* Regel. 1843.

Albugo (Pers.) Rouss. 1806.—*A. candida* (Pers.) Rouss.

Basidiophora Roze & Cornu, 1869.—*B. entospora* Roze & Cornu.

Bremia Regel, 1843.—*B. lactucae* Regel.

Chlorospora Speg. 1891.—*C. vastatrix* Speg.

Cystopus Lév. 1847.—*C. candidus* (Pers.) Lév. 1848. = *Albugo candida* Rouss. 1806.

Drepanoconis Schröt. & P. Henn. 1896.—*D. brasiliensis* Schröt. & P. Henn. Hyphomycete?

Gilletia Sacc. & Penz. 1882.—*G. spinuligera* Sacc. & Therry. = *Basidiophora entospora* Roze & Cornu. 1869.

Kawakamia Miyabe, 1903.—*K. cyperi* (Miyabe & Ideta) Miyabe.

Mycelophagus Mangin, 1906.—*M. castaneae* Mangin. Tenable as a genus but probably belonging to another order of Oömycetes.

Peronoplasmopara (Berlese) Clinton, 1905.—*P. cubensis* (B. & C.) Clinton. = *Pseudoperonospora cubensis* (B. & C.) Rostew. 1903.

Peronospora Corda, 1837.—*P. rumicis*. Corda.

Phleophythora Klebahn, 1905.—*P. syringae* Klebahn.

Phytophthora de Bary, 1876.—*P. infestans* (Mont.) de Bary.

Plasmopara Schröt. 1886.—*P. pygmaca* (Unger) Schröt.

Pseudoperonospora Rostew. 1903.—*P. cubensis* (B. & C.) Rostew.

Sclerospora (Schröt.) de Bary, 1881.—*S. graminicola* (Sacc.) Schröt. 1886.

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- CALODON niger Quélet, syn. of *Phellodon niger* q. v.
- CALODON suaveolens, Karst., syn. of *Hydnellum suaveolens* q. v.
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- HYDNUM abietinum Schrad., *syn. of Hericium laciniatum* q. v.
- HYDNUM adustum Schw., *syn. of Steccherinum adustum* q. v.
- HYDNUM agaricoides Swartz, *syn. of Steccherinum agaricoides* q. v.
- HYDNUM albonigrum Peck, *syn. of Phellodon alboniger* q. v.
- HYDNUM atroviride Morgan, *syn. of Sarcodon atroviride* q. v.
- HYDNUM aurantiacum A. & S., *syn. of Hydnellum floriforme* q. v.
- HYDNUM aurantium Raf., *syn. of Hydnellum floriforme* q. v.
- HYDNUM auriscalpium L., *syn. of Auriscalpium auriscalpium* q. v.
- HYDNUM blackfordae Peck, *syn. of Sarcodon blackfordae* q. v.
- HYDNUM boreale Banker, *syn. of Hydnellum suaveolens* q. v.
- HYDNUM brunneo-leucum B. & C., *syn. of Grandinioides flavum* q. v.
- HYDNUM caput-ursi Fries, *syn. of Hericium caput-ursi* q. v.
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- HYDNUM cervinum Pers., *syn. of Sarcodon imbricatus* q. v.
- HYDNUM compactum Pers., *syn. of Hydnellum floriforme* q. v.
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- MEDUSINA coralloides Chev., syn. of *Hericium coralloides* q. v.
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- NECTRIA cinnabarina (Tode) Fries, *syn. of Nectria purpurea* q. v.
- NECTRIA purpurea (Linn.) Wilson & Seaver n. n. [Tremella purpurea Linn.; Tubercularia vulgaris Tode; Sphaeria cinnabarina Tode; Nectria cinnabarina (Tode) Fries]. Jour. Mycol. 13:51. Mar. 1907.
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PANICUM caespitosum Swartz, host to Sorosporium ovarium Griffiths n. sp. [Mexico.] Bull. Torr. Bot. Club, 34:209. April 1907.

PANICUM paspaloides, host to Ustilago rickerii Clinton n. sp. [Cuba.] N. A. Flora, 7:11. 4 Oct. 1906.

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PANICUM sp., host to Sphacelotheca diplospora verruculosa Clinton n. var. [Mexico.] N. A. Flora, 7:27. 4 Oct. 1906.

PENIOPHORA candida (Persoon) Lyman n. sp. [Aegerita candida Pers.], on pieces of pine boards, and fallen branches of Alnus, Populus, Acer, etc., in wet places; hymenium always accompanied by the conidial form. Proc. Boston Soc. Nat. Hist., 33:168. February 1907.

PEZIZA flava Swartz, *syn. of Grandinioides flavum q. v.*

PHAEODON atroviride Earle, *syn. of Sarcodon atroviride q. v.*

PHAEODON aurantiacus Schroet., *syn. of Hydnellum floriforme q. v.*

PHAEODON fennicus Hennings, *syn. of Sarcodon fennicus q. v.*

PHAEODON ferrugineus Schroet., *syn. of Hydnellum sanguinarium q. v.*

PHAEODON imbricatus Schroet., *syn. of Sarcodon imbricatus q. v.*

PHAEODON zonatus Schroet. *syn. of Hydnellum zonatum q. v.*

PHALLOIDS, concerning. Mycological Notes. C. G. Lloyd. No. 24, Dec. 1906. pp. 293-308. pl. 91-93.

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PHELLODON delicatus (Schw.) Banker n. n. [Hydnum delicatum Schw. non Klotsch.] Mem. Torr. Bot. Club, 12:173. 13 June 1906.

PHELLODON ellisianus Banker n. sp. on the ground in wood road. Mem. Torr. Bot. Club, 12:174. 13 June 1906.

- PHELLODON fasciatus* (Peck) Banker n. n. [*Hydnum fasciatum* Peck.] Mem. Torr. Bot. Club, 12:171. 13 June 1906.
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- PHELLODON putidus* (Atkin.) Banker n. n. [*Hydnum putidum* Atkinson.] Mem. Torr. Bot. Club, 12:170. 13 June 1906.
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- PUCGINIA arabicola E. & E. Jour. Mycol. 6:119, 191, [is Puccinia plumbaria Peck on Phlox not Arabis. Holway]. Holway's N. A. Uredin. 1:47. 15 May 1906.
- PUCGINIA euphorbiae intumescens Syd., syn. of *Puccinia intumescens* q. v.
- PUCGINIA eurotiae Griffiths n. sp. on Eurotia lanata Moq. Bull. Torr. Bot. Club, 34:210. April 1907.
- PUCGINIA glabella Holway n. sp. on Boisduvalia glabella (Nutt). Walp. Holway's N. A. Uredin. 1:76. 10 May 1907.
- PUCGINIA intumescens Holway, new comb. [Puccinia euphorbiae intumescens Syd.] Holway's N. A. Uredin. 1:60. 10 May 1907.
- PUCGINIA lithophragmae Holway n. sp. on Lithophragma parviflora (Hook.) Nutt. Holway's N. A. Ured. 1:51. 15 May 1906.
- PUCGINIA ludwigiae (E. & E.) Holway n. comb. [Aecidium ludwigiae E. & E.; Puccinia nesaeae E. & E.; Dicaeoma nesaeae Kuntze; Allodus nesaeae Arth.] Holway's N. A. Uredin. 1:72. 10 May 1907.
- PUCGINIA melothriae Stevens n. sp. on Melothria pendula L. Bot. Gaz. 43:283. April 1907.
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- PUCGINIA obliqua B. C. Jour. Linn. Soc. 10:356, 1869, [appears to be P. lateritia B. & C. on some of the Rubiaceae. Holway]. Holway's N. A. Uredin. 1:43. 15 May 1906.

(To be continued.)

NOTES FROM MYCOLOGICAL LITERATURE. XXV.

W. A. KELLERMAN.

Moore, C. L.

In Bulletin Vol. 1, No. 1, Pictou Academy, N. S., there is given a general account of the Myxomycetes and a list of 33 "Myxomycetes of Pictou County."

Magnus, P.

An interesting article appeared in the Berichte der Deutschen Botanischen Gesellschaft, Jahrgang 1904, Band XXII, Heft 7, entitled "Puccinia Ruebsaumeni P. Magn. n. sp., eine einen einjaehrigen Hexenbesen bildende Art." The species has heretofore been confused with or included in Puccinia caulicicola Schneid. (P. Schneideri Schroet.) from which it differs in its larger spores; it is restricted to Origanon vulgare. A plate of figures shows the hexenbesen, mycelium with haustoria *in situ* and the teleutospores.

Fawcett, H. S.

In Report in Botany and Horticulture (Florida Agricultural Station, An. Rep. 1906) Mr. Fawcett gives an account of the important diseases for the year — Colletotrichum lindemuthianum (Sacc. & Magn.) Bri. & Cav.; Alternaria brassicae var. nigrescens Pegl.; Cercospora apii Hals; Cladosporium citri Penz.; Colletotrichum gloeosporioides Penz.; Pseudoperonospora cubensis (B. & C.) Rost.; Gloeosporium mangiferae, &c.

Saccardo, P. A.

In "Notae Mycologicae," Series IX, Annales Mycologici for April, 1907, the author describes 7 new species, one of which is North American, namely, Tuberculina davisiana Sacc. et Trav. sp. n.; hab. in foliis adhuc vivis Salicis cordatae.

Griffiths, David.

Dr. Griffiths reports "Concerning some West American Fungi" in the Bulletin of the Torrey Botanical Club, April, 1907. They are species of his personal collecting for the past four or five years, new or worthy of record. The new species are: Sclerospora farlowii; Ustilago microchloae, Sorosporium ovarium, Urocystis sophiae, Aecidium cannonii, Puccinia eurotiae.

Campbell, Douglas Houghton.

Chapter VI in A University text-book of Botany, 2nd Edition, 1907, is devoted to the Fungi. The general character of the Subkingdom Fungi is given briefly; similarly the Structure and Affinities are discussed. The bulk of the chapter is concerned

with the classification — the author recognizing the usual three classes — the Phycomycetes including the subclasses Omycetes and Zygomycetes; the two classes constituting the Eu-mycetes; Ascomycetes composed of Hemiascineae, and Euasceae; and Basidiomycetes composed of the three sub-classes; Hemibasidae, Protobasidiomycetes, and Autobasidiomycetes. Five pages are devoted to the Lichens and one page to Bibliography. Numerous text figures are used.

Rolfs, F. M.

Experiments in reciprocal inoculation with pure cultures shows that *Cytospora rubescens* Nitschke is the pycnidial stage of *Valsa leucostoma* — a fungus well known in Europe, Australia and the United States. "Professor F. C. Stewart of the New York Agricultural Experiment Station, was the first American to call attention to the parasitic nature of the fungus." At the Missouri State Fruit Experiment Station it is an active parasite attacking the twigs, limbs and trunk of the peach, plum, apricot and cherrytrees. This is reported under the head of "Dieback of the Peach Trees" in Science of July 19, 1907.

Lauterborn, Robert.

In Heft 5, Band XXV, 26 June 1907, an account is given of "Eine neue Gattung der Schwefelbakterien (*Thioploca schmidlei* nov. gen. nov. spec.)" — belonging to the family Beggiotoaceae, occurring in Untersees des Bodensees in der Gegend von Ermatingen, in 15-20 m. Tiefe das Innere des kalkreichen Grundschlücks durchziehend.

Zeitschrift fuer Pflanzenkrankheiten, XIV. Band, 1904.

The principal mycological articles of this volume are as follows: Ueber die Botrytis-Krankheit der Tulpen, H. Klebahn; Ueber *Trichothecium roseum* Link, als Ursache der Bitterfaeule von Fruechten, K. S. Iwanoff; Der Rost des Getreides in Schlesien im Sommer 1903, W. Remer; Beitrage zur Kenntniss des Pilzes in den Wurzelanschwellungen von *Alnus incana*, C. G. Bjoerkenheim; Die *Peronospora-recte* *Pseudoperonospora* Krankheit der Melonen und Gurken in Ungarn, Prof. Linhart; Eine wichtige *Gloeosporium*-Krankheit der Linden, R. Lambert; Ueber den klimatisch-biologischen Zusammenhang einer Reihe Getreidekrankheiten waehrend der letzten Jahre, J. R. Jungner.

Zeitschrift fuer Pflanzenkrankheiten, XV. Band, 1905.

We have to record the following titles: Pilzkrankheiten in Indien im Jahre 1903, E. J. Butler; Die schaedlichsten Insecten und Pflanzenkrankheiten welche an den Kultzpflanzen in Bulgarien waehrend des Jahres 1903 geschädigt haben; Kulturversuche mit Rostpilzen, XII Bericht, 1903 und 1904, H. Klebahn;

Helminthosporium gramineum Rabenh. und *Pleospora trichostoma* Wint. Fritz Noack; Die Schlerotienkrankheit bei den Forstsythien, A. Osterwalder.

Burlingham, Gertrude Simmons.

In the February Bulletin of the Torrey Botanical Club (1907) Miss Burlingham gives an account of "Some *Lactarii* from Windham County, Vermont," based on collections made mostly near Newfane, elevation about 500 meters, from the middle of July to the middle of September. She describes the following: *Lactarius aspileoides* Burlingham n. sp.; *L. bensleyae* Burlingham n. sp.; *L. isabellinus* Burlingham n. sp.; *L. minusculus* Burlingham n. sp.; *L. nitidis* Burlingham n. sp.; and raises *Pecki* var. *oculatus* (of *L. subdulcis*) to specific rank; besides listing three dozen or more other species. The article concludes with an excellent key to the species of Vermont.

Peck, Charles Horton.

Dr. Peck describes 20 new species in the Bulletin of the Torrey Botanical Club for February 1907. Over half of them are Agarics, the others of various groups. Of the specially interesting forms may be noted *Hydnum sulcatipes* with stem like some species of *Helvella*, and *Peckiella hymenioides* on *Lactarius uvidus*, externally similar to *P. hymenii*. *Lentinus ventricosus* Peck. Bull. Torr. Bot. Club, 23:414, 1896, is transferred to the genus *Armillaria*.

Wilson, Guy West.

A monograph of the genus *Albugo* is published in the February No. of the Bulletin of the Torrey Botanical Club, under the title "Studies in North American Peronosporales — The genus *Albugo*." A brief general account of *Albugo* [*Albugo* (Pers.) S. F. Gray, Nat. Arr. Brit. Pl. 1:540. 1821 *Uredo* § *Albugo* Pers. Syn. Meth. Fung. 223. 1881; *Cystopus* Lév. Ann. Sci. Nat. III, 8:371. 1847] as represented in North America is given, followed by a key to the species. Synonymy in full, with citations, is printed; also a complete list of the hosts arranged alphabetically under families. One new species is described — *A. occidentalis*; and species excludendae are *Cystopus euphorbiae* Cke. & Mass. and *C. salsolae* and *C. schlechteri* P. Sydow. Oospores of nine of the thirteen species are illustrated by figures.

Shear, Cornelius Lott.

For some time Mr. Shear has been studying the diseases of the Cranberry during which time he has encountered many new fungi and his interesting paper recently published in the Bulletin of the Torrey Botanical Club (June), entitled "New Species of Fungi", deals mainly with the vacciniicolous species. He

describes 20 to 30 new species and proposes three new genera, two of the latter belonging to Sphaeropsidales (*Plagiorhabdus*, and *Bothrodiscus*), and one to the Ascomycetae (*Acanthorhynchus*). The generic names are significant: the first from *plagios*, oblique, and *rhabdos*, rod in allusion to the oblique appendage of the spores; the second from *bothros*, pit, and *discos*, disk; and the third from *acanthos*, thorn, and *rhynchus*, beak, suggested by the spiny beak.

Journal of Mycology, Vol. 13, July, 1907.

The table of contents of this No. is as follows: Sumstine, *Polyporus Pennsylvanicus* Sp. Nov; Sheldon, A Study of the Leaf-Tip Blight of *Dracaena Fragrans*; Durand, The Mycological Writings of Theodor Holmskjöld and their relations to Persoon's *Commentatio*; Morgan, North American Species of Agaricaceae; Ricker, Third Supplement to New Genera of Fungi; Kellerman, Index to North American Mycology; Kellerman, Notes from Mycological Literature XXIV; Editor's Notes.

Unintentionally the Index to the New Genera of the Third Supplement was omitted when the last installment was printed. It is therefore inserted below.

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EDITOR'S NOTES.

We have referred to the American Code of Botanical Nomenclature as recently published in the Bulletin of the Torrey Botanical Club, April, 1907, and made a suggestion in connection with the subject dealt with in Section I. As to Section II (formation of names), we have nothing to say except approbation, unless it be to note that Canon 8 does not require that the names for Subclasses and higher groups have the feminine form. All other group names, if we except the Genus, are required by preceding Canons to have the termination *-ac*. Moreover, such usage has found almost universal acceptance; we believe the 8th Canon could properly require this.

Professor Saccardo has taken the lead in many phases of classificatory and nomenclatural reform in Mycology. We desire to call attention to his "Disposizione e Nomenclatura" of mycological groups recently published in the *Bulletino della Societa Botanica Italiana*, which we will reproduce in full in the next Number of the JOURNAL. In this he is consistent as regards the matter of terminations referred to above; and he has made his groups conform to advanced nomenclatorial views. For example, the termination *-aceae* is used for family names, and *-ales* for the orders; all other terminations are in *-ae*. A brief excerpt in advance of the full list exhibits these points:

REGNUM VEGETABILE: PLANTÆ.

Series CRYPTOGRAMAE (Lin. 1737) em.

Subseries: MYCETAE seu FUNGI (Juss. 1728) em.

Divisio: EUMYCETAE Eichler 1883 (Hyphomycetae Bref. 1887 non Mart.)

Subdiv. TELEOMYCETAE Sacc. 1902.

Classis I. BASIDIOMYCETAE (DeBy. 1862) em. (Basidiosporeae Lév. 1837).

Subcl. I. EUBASIDIAE (Schroet. 1889) em.

Ordo I. HYMENIALES (Fr. 1821) em. nom., seu Hymenomycetae Fr.

Fam. I. AGARICACEAE Fr. 1825, &c.



PROFESSOR A. P. MORGAN AT HIS HOME PORCH

From Picture Taken a Short Time Before His Death; Mrs. Morgan is on the Right.

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Plates not included in the above.

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OBITUARY: PROFESSOR A. P. MORGAN.

W. A. KELLERMAN.

The death of Professor Morgan has removed from us a genuine naturalist, an eminent mycologist, and splendid man. On this Journal particularly will fall a heavy loss — valued contributor as he was, beginning with the first volume and at numerous times assisting even to the end of the thirteenth; in fact, the MS. he had nearly or quite completed will be used also in the beginning of the fourteenth volume.

It is a pleasure to state that the deep interest in nature, particularly the vegetable world, which his daily life, study, and publications evinced, had nothing of sordid motive — this was not an agency or means of accumulating wealth or even a method of earning a livelihood. His later years on the farm were quite favorable to sympathetic enjoyment of nature and most fully embraced. My own visit at his home a summer or two ago, with a short ramble through his fields and woods, put me in touch with a type of naturalist too rare these later days; revealed to me a soul alive to the beauties of nature and responsive to her sweetest influences.

Professor Morgan began studying the higher fungi when little assistance in this country was available. There was Frost of Vermont, with whom he at once came in contact, as also our Nestor of Agaricology, Peck of Albany. We suspect their friendly communications aided and encouraged him greatly. But an independent and critical mind was exhibited at once. The work

that he has done from first to last is his own — his papers being a presentation of his own good judgment. His name is indissolubly linked with American Mycology — great as the strides, and changes in altitude in the future may be. His name has been associated by Peck, Saccardo, Masee, and Ellis, with several interesting species, for example, *Boletus Morgani*, *Polyporus Morgani*, *Lepiota Morgani*, *Russula Morgani*, *Cantharellus Morgani*, *Hypoxylon Morgani*, *Peziza Morgani*.

He did not attend scientific meetings, and therefore personally he was unknown to most of the botanists — not so of course his work extensive and valuable, which is not dependent on personal contact.

No portrait has been published, though we were insistent on having a good photograph, — which then after some reluctance he promised at an early opportune time. But it proved too late, and consequently I will use one of the pictures I made for my own pleasure as I kodaked him at his own home, standing on the porch with the members of his family, Mrs. Morgan being on the right. From this charming point he had a view for miles over the rich and beautiful Miami Valley. I have asked Mrs. Morgan for a brief outline of her husband's life and the following points she has kindly furnished me:

Andrew Price Morgan, born at Centerville, Ohio, 27th October, 1836, son of Harrison S. Morgan and Lydia Ann Newman; died of pneumonia at his home, Preston, Ohio, October 19, 1907. Incineration by the Cincinnati Cremation Co., October 21, 1907.

He began the study of Botany while a teacher in the schools of Dayton, Ohio. Was first assistant then principal in the ward schools, afterward Professor of Mathematics in the Dayton High School. From this position he went into the army, first in the 84th Ohio Infantry — carrying a stoutly bound copy of Gray's Manual in his knapsack — and again as First Lieutenant in the Fourth Independent Battalion O. V. C. Being a member of the Dayton Light Guards he was a well drilled soldier and did a great deal of work drilling volunteers. At the close of his army service he was very ill with typhoid fever and to avoid confinement in the school room traveled in the states of Wisconsin and Minnesota representing the school book firm of Wilson Hinkle & Co. for seven years. A partial paralysis closed his career. He could neither read nor write for two years. In 1870 he married Laura M. Vail of Pomfret, Vermont, and when he quit traveling for the school book firm he went to his wife's old home midway between the White and Green mountain ranges. Here he began his first study of fungi. He procured a copy of *Hymenomycetes Europaei* by Elias Fries. I find this written on the blank leaf of the well worn volume, "Cost \$8.25. Imported by Scribner Welford & Armstrong. New York City, June 2, 1876." He identified the Lichens with the aid of Tuckerman of Amherst, Mass. and

Mosses with the aid of Frost of Brattleboro, making the personal acquaintance of both these men. His early gatherings of Agarics were determined by Chas. H. Peck of Albany, N. Y., with whom he has kept up communication ever since. After more than three years of this delightful recuperating of health he returned to Dayton, Ohio, and was Principal of the Second District School for several years.

He has lived on the little farm in Preston for twenty-three years — "the happiest of his life!" he says, studying, reading, working in his own way. He was reading *An Introduction to Logic*, by H. W. B. Joseph Oxford, a few days before his death and had just finished reading with great pleasure Ernest Mach's *Space and Geometry*.

We append a list of Professor Morgan's publications — which we have been able to complete with Dr. Farlow's assistance.

- The Study of Fungi, *Bot. Gaz.* 2:104-5, May 1877.
Flora of the Miami Valley, Ohio, 12°, pp. 68, 1878.
Agaricus Morgani Peck, *Bot. Gaz.* 4:208-9, Sept. 1879.
A New Polyporus, *Bot. Gaz.* 7:135-6, Nov. 1882.
Mycologic Flora of the Miami Valley, Ohio, *Jour. Cin. Soc. Nat. Hist.* VI-XI; Apr. 1883-Oct. 1888.
Kentucky Fungi, *Bot. Gaz.* 8:156-7, Jan. 1883.
The North American Geasters, *Am. Nat.* 18:863-970, Oct. 1884.
North American Geasters, *Jour. Mycol.* 1:7, Jan. 1885.
On the Study of the Agaricini, *Jour. Mycol.* 1:41-2, March 1885.
North American Agarics, The subgenus *Amanita*, *Jour. Mycol.* 3:25-33, March 1887.
The Genus Geaster, *Am. Nat.* 21:1026-1029, Nov. 1887.
Mycological Observations, I, *Bot. Gaz.* 15:84-86, Apr. 1890.
North American Fungi, The Gastromycetes, *Jour. Cin. Soc. Nat. Hist.* XI-XIV, Jan. 1889-July 1891-March 1902.
North American Helicosporae, *Jour. Cin. Soc. Nat. Hist.* 15:39-52, April 1892.
Myrostoma coliforme Dicks. in Florida, *Am. Nat.* 26:341-3, Apr. 1892.
Two New Genera of Hyphomycetes, *Bot. Gaz.* 17:190-2, June 1892.
New North American Fungi, *Jour. Cin. Soc. Nat. Hist.* 18:36-45, pl. 1-3, 1895 (1896).
Myxomycetes of the Miami Valley, Ohio, *Jour. Cin. Soc. Nat. Hist.*, XV-XIX, Oct. 1892-Aug. 1896.
Description of a New Phalloid, *Jour. Cin. Soc. Nat. Hist.* 15:171-2, Jan. 1893.
Synonymy of *Mucilago spongosa* (Leys.), *Bot. Gaz.* 24:56-7, 31 July 1897.
Notes on some Florida Myriostomas and Geasters, *Jour. Mycol.* 8:3-4, May 1902.
A New Genus of Fungi, *Jour. Mycol.* 8:4-5, May 1902.
Morchella — The Morels, *Jour. Mycol.* 8:49-50, June 1902.
Note on North American Fungi, *Jour. Mycol.* 8:105-6, Oct. 1902.
A New Genus of Fungi, *Sporocystis*, *Jour. Mycol.* 8:169, Dec. 1902.
The Discomycetes of the Miami Valley, Ohio, *Jour. Mycol.* 8:179-92, Dec. 1902.
Lepidoderma geaster (Link), *Jour. Mycol.* 9:3-4, Feb. 1903.
A New Species of *Sirothecium*, *Jour. Mycol.* 9:82-3, May 1903.
Dictyostelica or *Acrasieae*, *Jour. Mycol.* 9:84-86, May 1903.
Some Western Specimens, *Jour. Mycol.* 9:161, Oct. 1903.
Note on *Corticium leucothrix* B. & C., *Jour. Mycol.* 9:162, Oct. 1903.

- A New Species of *Berlesiella*, Jour. Mycol. 9:217, Dec. 1903.
 A New *Sirothecium*, Jour. Mycol. 10:1, Jan. 1904.
 A New *Melogramma*, Jour. Mycol. 10:49, March 1904.
Tubercularia fasciculata Tode, Jour. Mycol. 10:97-8, May 1904.
 A New Species of *Pyrenomyces*, Jour. Mycol. 10:161-2, July 1904.
Pyrenomyces scarcely known in North America, Jour. Mycol. 10:226-8, Sept. 1904.
Sphaeria Calva Tode, Jour. Mycol. 11:1, Jan. 1905.
 The Genus *Gibellula* Cava, Jour. Mycol. 11:49-50, March 1905.
 A New *Chaetosphaeria*, Jour. Mycol. 11:105, May 1905.
 A New Species of *Kalmusia*, Jour. Mycol. 11:153, July 1905.
Peziza Pubida B. & C., Jour. Mycol. 11:154, July 1905.
 North American Species of *Marasmius*, Jour. Mycol. 11:201-12, 233-47, 12:1-9, Sept. 1905-Jan. 1906.
 North American Species of *Helomyces*, Jour. Mycol. 12:92-5, May 1906.
 North American Species of *Lepiota*, Jour. Mycol. 12:154-9, 195-203, 242-48, 13:1-18, July 1906-Jan. 1907.
 North American Species of *Agaricaceae*, Jour. Mycol. 13:53-62, 143-153.

TWO NEW HYPOGAEIOUS SECOTIACEAE.

BY WILLIAM ALBERT SETCHELL.

In the immediate vicinity of Berkeley, and in fact upon the campus of the University of California itself, as well as elsewhere, Dr. N. L. Gardner and myself have not infrequently found specimens of two members of the *Secotium*-family which appear to be new and which are strange in their habitat. They grow in exactly the same fashion that many of the so-called hypogaei do, — i. e., not really buried in the ground, but partially buried under earth and absolutely covered over with a compact layer (or layers) of fallen leaves and other debris. It is in just such places and covered in exactly the same way, that we have found many of the true hypogaei, such as specimens of *Hymenogaster*, *Hydnangium*, *Tuber*, etc., in this same region. The method of searching for these *Secotiaceae* is just the same as that employed for the *Hymenogastraceae*, *Tuberaceae*, etc., viz., of raking off the covering of dead leaves and exposing the ground underneath, when they may be seen either superficial on the earth, or else very slightly buried in it. It seems proper to call attention to this matter of habitat, since, so far as the literature is known to me, there is almost no mention of such habitat favored by other members of the same group (cf. however, Bucholtz, *Hedwigia*, vol. 40, p. 314, 1901) and also because of the supposed absence of hypogaeous species in this family, the statement has been made that the members of this group are all epigaeous. (cf. Fischer, in Engler and Prantl, *die nat. Pflanzenfam.* I. 1 * * p. 299, 1898).

Another striking thing about the plants with which this article is concerned is, that they both appear at first sight to be

young individuals of some Hymenomycetous species. On first being uncovered one looks very much like some species of *Coprinus* or similar genus, while the other has a very striking resemblance to a young *Russula* with a red pileus. Both have well developed stipes, what appear at first sight to be gills, and one has a transverse veil, although the last is slight. On careful examination, however, it is seen that they are members of the Secotiaceae and, although new, are related to species long described.

Both of these plants belong to the genus *Secotium* as extended by Fischer in his account of this family in the Engler and Prantl. A careful study of all the forms included under *Secotium* in this extended sense, however, will probably result in a splitting into several different genera, each reasonably distinct from the other. I am not sufficiently acquainted with the species described otherwise than from description and shall consequently not undertake any segregation which has not already been proposed. I realize the difficulties in proposing any satisfactory ultimate segregation except as the result of extensive and comprehensive study of types and of fresh or well prepared alcoholic materials representing various conditions and stages of development. In general appearance, all the species are agaricoid rather than like the members of the Hymenogastraceae, while in structure of the mature gleba, they in common with the other Secotiaceae, range from those closely resembling the Hymenogastraceae to those which have gill-like structures which anastomose only slightly. In color of spores, the members of this genus in its extended sense range from colorless through yellow and brown to black, while in shape of spores, they vary from globular through ovoid to fusiform. These extreme variations make the proper reference as to genus very uncertain in the case of new species.

The type of the genus *Secotium* is *S. Guienzii* Kunze from the neighborhood of the Cape of Good Hope. It was briefly described by Kunze in 1840 (*Flora*, p. 322) and it has been well illustrated from the original specimens, by Corda (*Icones Fungorum*, vol. 5, pl. 6, f. 10-18, 1842), so that we may judge fairly of all necessary details of its structure. With its distinct volva, the coarse veins of the gleba, its lack of anything resembling lamellae, its fairly regular chambers, and obovoid, colorless spores, it differs very decidedly from either of the two plants which are the subject of this article, as well as from all other species which have thus far been referred to the same genus with it. In the same work, Corda also figures Berkeley's *S. melanosporum* (loc. cit., pl. 6, f. 19-24) which most nearly of all yet described species resembles *S. Guienzii*, but it has no persistent and conspicuous volva, what appears to be a sort of arachnoid transverse veil, and very dark, brownish-black, ovoid spores. It has, however, similar veins running out through the gleba.

Finally Corda illustrates and describes a second species of Berkeley's, viz. — *S. coarctatum*, from Swan River in Southwestern Australia, the same locality whence the original specimens of the preceding species also came. *S. coarctatum* seems to be close to the plant described below under the name of *S. tenuipes* and its characters will be discussed in that connection. It is certainly some considerably different from both the species mentioned above. There is one other type which especially concerns us in the present consideration and that is the *S. Mattirolanus* which is the type of the genus *Elasmomyces* of Cavaia (cf. Malpighia, 1898). This genus is subsumed under *Secotium* by Fischer (loc. cit.) but with the statement that it is doubtless to be considered independent, only the difficulty at present is to determine just which of the described species of *Secotium* are to be associated with it as well as perhaps the exact lines of demarcation between the two genera. The species, to be described below under the name of *Elasmomyces russuloides*, is very close to Cavaia's plant and a farther discussion will be found in connection with the description of it. Of the other species referred to this genus few are known to me from actual specimens. The widely distributed *S. acuminatum* (or *S. agaricoides* Hollos) has not occurred to me nor does it occur in Californian collections, unless indeed, as hardly seems probable from the descriptions, it is identical with *S. nubigenum*, Harkness, as Hollos supposes (cf. Hollos, Die Gastromyceten Ungarns, p. 37, 1904, under *S. agaricoides*, also Lloyd, Mycological Notes, p. 139). Hollos has also referred under the same species the *S. erythrocephalum* Tulasne, a species collected by myself in New Zealand, which seems certainly amply distinct from the Hungarian plant, at least. A careful search for the type specimen of *S. nubigenum*, Harkness, in his collection in the Herbarium of the California Academy of San Francisco, even before the bulk of that collection was destroyed by the fire following the earthquake of April 18, 1906, failed to disclose it and there seems to be no doubt that Harkness failed to retain, or at least, to carefully preserve it. The *Secotium Texense* B. & C., as well as the *S. decipiens* Peck, seem properly to be referred to the genus *Gyrophragmium* as has been done (cf. Lloyd, loc. cit. pp. 154 and 197).

In all there seems to be only six species of those credited to this genus which have been referred to as having been found in the United States, viz.:

S. texense B. & C., now referred to *Gyrophragmium*.

S. decipiens Peck, now referred to *Gyrophragmium*.

S. nubigenum Harkness, which has been referred, but probably erroneously to *S. acuminatum* Mont.

S. Warnei Peck, which seems by unanimous consent to be referred to *S. acuminatum* Mont.

S. coarctatum B. & C., to which species a specimen from Texas has been referred by Lloyd (cf. under *S. tenuipes* below) and *S. macrosporum* Lloyd, from Texas (Lloyd, Myc. Notes, p. 139, pl. 13, f. 12-16, 1898).

It will be seen from this list that there are only four species, in all probability, of *Secotium* in our flora and neither of two described below are likely to belong to any one of these. They have been compared as carefully as possible with all the descriptions and figures so far as known to me and seem reasonably, if not amply, distinct.

***Secotium tenuipes* sp. nov.** — Gregarium; peridio subgloboso aut late ovoideo, subumbonato, basi plus minusve truncato et velo horizontali exiguo evanescente arachnoideoque instructo, 1-2 cm. lato et 1-1.5 cm. alto, luteo-fusco ad fusco, glabro, carnoso; gleba a stipite fere libera sed ad apicem extremam lamelliformiter decurrente, lacunis sinuosis aut regulariter aut indefinite, labyrinthico marginibus lamelliformibus, luteo-fusca, sine venis propriis; stipite longo aut brevi (ad 2 cm.), gracile, evolvato, striato, per glebam libere percurrente sed ad apicem in glebam expanso; basidiis 2-4-sporiferis, sterigmatibus distinctis subintumescentibusque; sporis ellipticis aut ovoideis, 12-16 μ longis, 8-12 μ latis, luteofuscis, levibus. In terram argillaceam sub foliis Eucalyptus et Quercus prope Berkeley et San Francisco, Californiam. Plate 107, f. 4-8.

This species is not uncommon under the leaves of Eucalyptus Globulus and of some other trees, particularly oaks, in the vicinity of the Eucalyptus, both in the neighborhood of Berkeley and of San Francisco. When first uncovered it looks very much like a *Bolbitius*, or a *Coprinus*, especially when the lamelliform gleba is exposed more than usual at the base. This aspect is very well shown in the figure on plate 107. It is usually four to five centimeters in height, with a longer or shorter stipe, an evanescent and somewhat arachnoid veil, and the whole plant is a yellow-brown to a dark-brown color. They generally appear more or less bent, flattened under the weight of the layer of leaves which entirely conceals them from view until exposed by the use of the rake. They occur scattered over a considerable area, as a rule, in twos or threes together and seem to prefer slight slopes which are well drained and yet retain moisture longer than the neighboring levels. There is little trace of any structure which might be supposed to represent a volva, but the transverse veil while scanty and arachnoid, is still distinct in the early stages of adult development. In structure of the gleba, the specimens seem to vary considerably. In some, the chambers are very regular in shape and position and this is particularly to be seen in a transverse section of what we may call the pileus. Even on the margins which abut on the stipe and the lower ex-

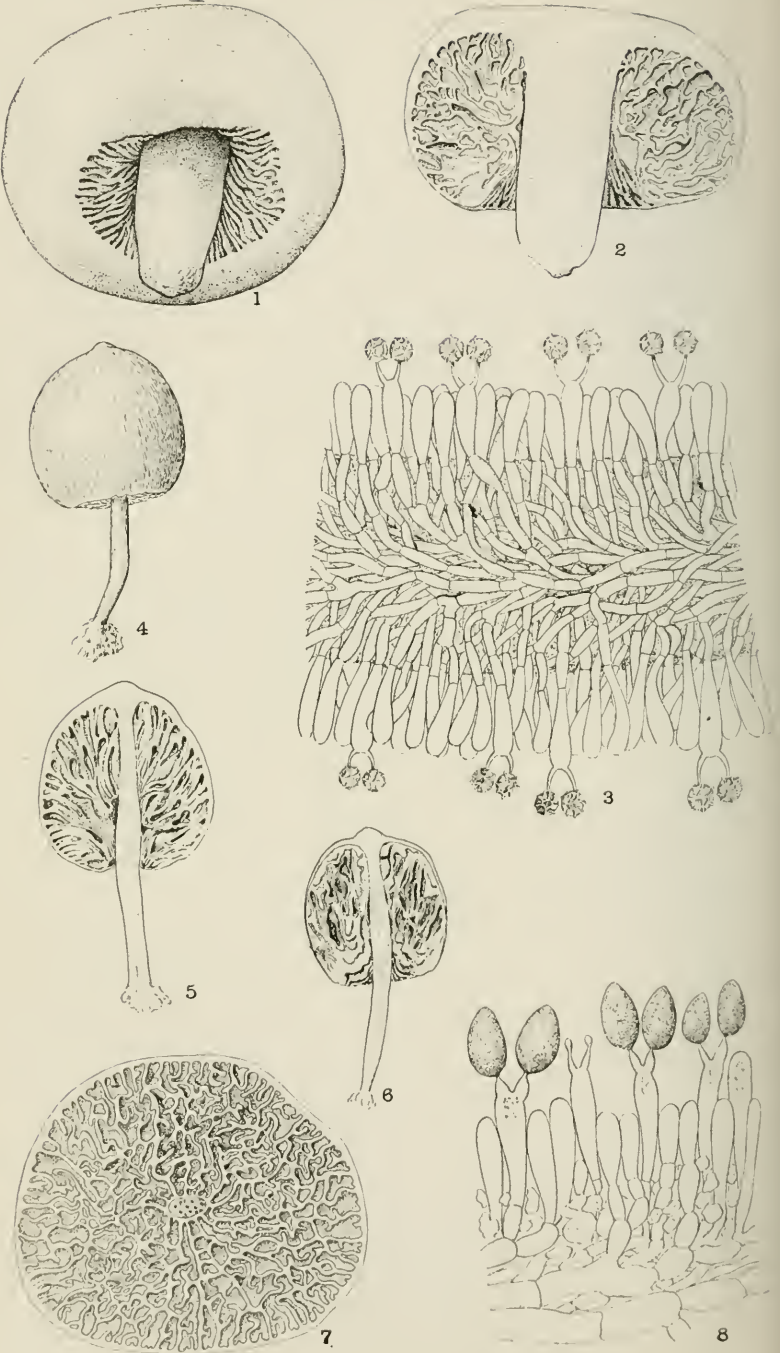
posed portions, the gill-like structure is not very pronounced, but in other specimens the gill-like structure of the gleba is very plainly to be seen. It is always more or less apparent in longitudinal sections as may be seen on comparing figures 5 and 6 on Plate 107. In some cases the anastomosing plates seem much like those of a *Favolus*, although it is difficult to make certain of any regularity such as occurs usually in species of that genus. The polyporoid and agaricoid resemblances are, however, more striking than hymenogastroid. The chambering, nevertheless, is sufficiently complete to range this species in the Hymenogastrineae rather than in any other group of equal rank.

In appearance and structure, this species varies so much from *S. Guenzii*, the type of the genus that it may well be doubted whether it will ultimately be considered cogenetic with it, but, at present, it seems best to refer to *Secotium* rather than attempt to split up that genus. Its nearest relatives are *S. coarctatum* Berkeley and *S. Gunnii* Berkeley. It resembles very closely the figures of Berkeley (Hooker's Journal of Botany, 1845) and of Corda (Icones Fungorum, pt. I, pl. 6. f. 25-30), but differs from them in the shape of the pileus (or peridium) and in the shape and size of the spores. From *S. Gunnii* Berkeley as described by Masee (Grevillea, vol. 19, p. 96, 1891), it differs in the slender sterigmata and in the shape and size of the spores. Lloyd (The Lycoperdaceae of Australia, New Zealand and Neighboring Islands, p. 7, pl. 26, f. 7 and 8) figures a plant from Texas, under the name of *S. coarctatum*, which may belong to this species. It agrees reasonably well in habit, but the spores appear to be more globular than in our plants. I am indebted to Dr. Ed. Fischer of Bern, for examining material and giving me the benefit of his opinion concerning the position of this plant.

***Elasmomyces russuloides* sp. nov.** Solitarius aut subgregarius; peridio depresso-globoso, inferne umbilicato et pseudolamellas ostendente, 1-1.5 cm. diam., 1-1.25 cm. alto, albo plus minusve rubescente, glabro; gleba alba, estipite fere ad apicem libera, intus regulariter cellulosa cellulis polygonato-sinuosis, extus plane lamellosis; stipite brevi ad brevissimo, moderate robusto, tereti, nunc recto nunc curvato, per glebam ad apicem percurrente et distincto; basidiis 2-4 sporiferis, sterigmatibus gracilibus curvatisque, cystidiis nunc frequentis nunc sparsis, plus minusve clavatis gracilibusque; sporis globosis, albidis, lineis elevatis in rete irregulariter contextis, 6-8 μ diam. Plate 107, f. 1-3.

Infrequens sub foliis *Hetermeles arbutifoliae* et *Quercus agrifoliae*, in Berkeley, California. Coll. N. L. Gardner et W. A. Setchell.

This species, unlike the preceding, is not at all plentiful in the region about Berkeley, where it has been found thus far, only, and occurs in small numbers usually more or less buried in the soil and covered by a thick layer of leaves. When the leaves are



SECOTIUM TENUIPES SETCHELL n. sp., AND ELASMO MYCES RUS-
SULOIDES SETCHELL n. sp.

raked off it is seen partially (up to about half) buried and looking very much like a young *Russula* of one or other of the common red-topped species. The illusion is not dispelled when it is removed from its place and examined, for the pseudo-lamellae showing at the base of the peridium give still a very decided agaricoid appearance. When the gleba is cut across, however, all doubt is removed, since, except for the percurrent stipe, the structure is thoroughly hymenogastroid. The lacunae are regular and open and there is no such inner indefinite and confusing lamelliform structure as has been mentioned as occurring in the preceding species. A comparison of figures 2, 5, and 6 will show what is meant better than words may describe. The basidia are most commonly 2-spored in the specimens I have examined and the spores while simply appearing rough under a moderate power still show something of the irregular reticulation of raised lines which appear distinctly when subjected to examination with an oil immersion objective. In some specimens cystidia appear very numerous while in others few are to be seen. The affinities of this species are very closely with *E. Mattirolanus* Cav., from which it is to be distinguished by the color of the peridium, the more rounded and thicker margins, and the smaller sculptured spores. Dr. Ed. Fischer has kindly compared our specimens with an original plant from Cavara and points out these distinctions. From *Secotium* (*Elasmomyces*) *Krjukowense* Bucholtz and *S. (Elasmomyces) Michailowskianum* Bucholtz, so far as I may judge from the descriptions, this species differs in color as well as size and markings of the spores. These three species seem to be the only *Secotiums* thus far described with which it is necessary to compare our plan.

University of California, Berkeley.

October 21, 1907.

EXPLANATION OF PLATE 107.

Elasmomyces russuloides sp. nov.

1. General habit of a typical plant seen obliquely from below. $\times 2$ diam.
2. Half of a similar plant, divided longitudinally in the median plane. $\times 2$ diam.
3. Portion of a section across a trama-plate, showing the basidia and spores. $\times 1000$ diam.

Secotium tenuipes sp. nov.

4. General habit of a typical plant, seen from the side. 1 diam.
5. Half of a similar plant, divided longitudinally in the median plane. $\times 1$ diam.
6. Similar view of another typical plant. $\times 1$ diam.
7. Surface view of medium transverse cut of the pileus, showing peridium, gleba, and stipe. $\times 2$ diam.
8. Small portion of the hymenium, showing basidia, spores, and cystidia. $\times 1000$ diam.

Drawings prepared by H. N. Bagley under direction of the writer.

SACCARDO'S RECENT ARRANGEMENT AND NOMENCLATURE OF THE FUNGI.

A REVIEW BY W. A. KELLERMAN.

In the *Bullettino della Societa Botanica Italiana*, issued March 30, 1907, we find the following title: P. A. Saccardo e G. B. Traverso: — Sulla Disposizione e nomenclatura dei gruppi micologici da seguirsi nella Flora Italica Cryptogama. The authors seize the opportunity while their Flora is being printed, to outline a more consistent terminology and arrangement of the groups of the fungi, which we desire to commend, and therefore reproduce the same below. Saccardo has heretofore called attention to the propriety of using the Latin form *-mycetæ*, instead of the Greek *-mycetes*, since these words are in apposition to the Latin word *plantæ*. He himself has been using it and other botanists also are taking it up.

In the scheme it will be seen that the termination *-ales* is used for the Orders and *-uccæ* for the Families. The authors for the names of the several groups are given, also the date when each was published. An attempt has been made to reproduce this important part of the article verbatim et literatim, as follows:

REGNUM VEGETABLE: *PLANTÆ*.

Series: *CRYPTOGAMÆ* (Linn. 1737) em.

Subseries: *MYCETÆ* seu *FUNGI* (Juss. 1728) em.

Divisio I. **EUMYCETÆ** Eichler 1883 (= *Hyphomycetæ* Bref. 1877, non Mart.).

Subdiv. I. **Teleomycetæ** Sacc. 1902 (in *Rendic. Congr. Bot. Palermo*, 1902).

Classis I. **Basidiomycetæ** De By., in Streinz *Nomencl. Fungor.*, 1862) em. (= *Basidiosporæ* Lév. 1837.)

Subcl. I. **Eubasidiæ** (Schröt. 1889) em.

Ordo I. **Hmeniales** (Fr. 1821) em. nom., seu *Hymenomycetæ* Fr.

Fam. I. **Agaricaceæ** Fr. 1825

“ II. **Polyporaceæ** Fr. 1825

“ III. **Hydnaceæ** Pers. 1801

“ IV. **Clavariaceæ** Cda. 1842.

“ V. **Thelephoraceæ** Pers. 1822.

Ordo II. **Gasterales** (Willd. 1802) em., seu *Gasteromycetae* Willd.

Fam. I. **Lycoperdaceae** Ehrenb. 1818

" II. **Sclerodermataceae** Fr. 1825

" III. **Nidulariaceae** Fr. 1780.

" IV. **Hymenogastraceae** Vitt. 1831.

Ordo III. **Phalloidales** (Fr. 1825) em. nom.

Fam. I. **Phallaceae** Fr. 1849

" II. **Clathraceae** Fr. 1849.

Subcl. II. **Protobasidiae** (Bref. 1888) em.

Ordo I. **Tremelloidales** (Agardh 1827) em.

Fam. I. **Pilacreaceae** Bref. 1888

" II. **Dacryomycetaceae** Bref. 1888

" III. **Tremellaceae** (Agardh 1821) em.

" IV. **Auriculariaceae** Bref. 1888.

Ordo II. **Uredinales** (Brongn. 1824) Dietel 1897.

Fam. I. **Pucciniaceae** Schröt. 1887

" II. **Cronartiaceae** Diet. 1899

" III. **Coleosporiaceae** Diet. 1899

" IV. **Melampsoraceae** Schröt. 1887.

Subcl. III. **Hemibasidiae** Schröt. 1889.

Ordo I. **Ustilaginales** (Tul. 1847) em. nom.

Fam. I. **Tilletiaceae** Tul. 1847

" II. **Ustilaginaceae** Tul. 1847.

Classis II. **Ascomycetae** (Fr. 1825) em.

Subcl. I. **Euascae** (Schröt. 1889) em.

Ordo I. **Laboulbeniales** (Peyr. 1875) em. nom.

Fam. I. **Laboulbeniaceae** Peyr. 1875.

Ordo II. **Pyreniales** (Fr. 1823, em. De Not. 1844) em. nom., seu *Pyrenomycetae* Fr.

Fam. I. **Xylariaceae** Tul. 1863

" II. **Valsaceae** Tul. 1863

" III. **Ceratostomataceae** Wint. 1887

" IV. **Sphaeriaceae** (Fr. 1849) em. Sacc. (1899)

" V. **Perisporiaceae** Fr. 1821

" VI. **Erysiphaceae** Lév. 1849

" VII. **Dothideaceae** Nitschke in Fuck. 1869

" VIII. **Hypocreaceae** De Not. 1844

" IX. **Coryneliaceae** Sacc. 1891

" X. **Microthyriaceae** Sacc. 1883

" XI. **Lophiostomataceae** Sacc. 1883.

Ordo III. **Hysteriales** (Cda. 1842) em. nom.

- Fam. I. **Hysteriaceae** Cda. 1842
" II. **Hemihysteriaceae** Speg. 1883.

Ordo IV. **Tuberales** (Vitt. 1831) em. nom.

- Fam. I. **Tuberaceae** (Vitt. 1831) em.
" II. **Elaphomycetaceae** Tul. 1851
" III. **Onygenaceae** Fr. 1849
" IV. **Trichocomaceae** Ed. Fisch. 1896
" V. **Cenococcaceae** Tul. 1851
" VI. **Myriangiaceae** Nyl. 1854.

Ordo V. **Discales** (Fr. 1836) em. nom., seu *Discomycetae* Fr.

- Fam. I. **Cyttariaceae** Lév. 1846.
" II. **Helvellaceae** Pers. 1801
" III. **Pezizaceae** Fr. 1823
" IV. **Ascobolaceae** Boud. 1869
" V. **Dermataceae** Fr. 1823
" VI. **Bulgariaceae** Fr. 1849
" VII. **Stictidaceae** Fr. 1825
" VIII. **Phacidiaceae** Fr. 1821
" IX. **Patellariaceae** Fr. 1825
" X. **Cordieritaceae** Sacc. 1884
" XI. **Caliciaceae** Fr. 1831
" XII. **Arthoniaceae** Rehm 1891.

Ordo VI. **Gymnoascales** (Baran. 1872) em.

- Fam. I. **Ascocorticiaceae** Schröt. 1893
" II. **Gymnoascaceae** Baran. 1872.
" III. **Endomycetaceae** Schröt. 1893
" IV. **Exoascaceae** Sadeb. 1883.

Subcl. II. **Protoascae** (Schröt. 1889) em.Ordo I. **Saccharomycetales** (Rees 1870) em. nom., seu *Saccharomycetae* Rees.

- Fam. I. **Saccharomycetaceae** Rees 1870
" II. **Schizosaccharomycetaceae** n. fam., ad int.

Subcl. III. **Hemiascae** Schröt. 1889.Ordo I. **Protomycetales** (De By. 1862) em.

- Fam. I. **Protomycetaceae** De By. 1862 em.
" II. **Ascoidaceae** Schröt. 1889
" III. **Monascaceae** Schröt. 1894

Classis III. **Phycomycetae** De By. 1866.

Ordo I. **Zygomycales** (Cohn 1872) em. (= *Zygosporae* Cohn in Hedw. 1872, em.; = *Zygomycetae* Sachs 1874, em.).

Fam. I. **Mucoraceae** (Nees 1817) em.

" II. **Entomophthoraceae** Schröt. 1886.

Ordo II. **Oomycales** (Cohn 1872) em. (= *Oosporae* Cohn in Hedw. 1872, em.; = *Oomycetes* Sachs 1874, em.).

Fam. I. **Peronosporaceae** De By. 1862

" II. **Cystopodaceae** Schröt. 1889

" III. **Saprolegniaceae** (Pringsh. 1857) em.

" IV. **Monoblepharidaceae** Schröt. 1893

" V. **Ancylistaceae** Pfitz. 1872

" IV. **Chytridiaceae** De By. et Wor. 1863.

Subdiv. II. **Deuteromycetae** Sacc. 1899 (in Syll. Fung., volumine XIV).

Ordo I. **Sphaeropsidales** (Lév. 1845, em. Sacc. 1884) Lindau 1899.

Fam. I. **Sphaerioidaceae** Sacc. 1884

" II. **Nectrioidaceae** Sacc. 1884

" III. **Leptostromataceae** Sacc. 1884

" IV. **Excipulaceae** Sacc. 1884.

Ordo II. **Melanconiales** (Cda. 1842) em.

Fam. I. **Melanconiacecy** (Cda. 1842) em.

Ordo III. **Hphlaesa** (Mart. 1817) em. nom., seu *Hypomycetae* Mart.

Fam. I. **Tuberculariaceae** Ehrb. 1818

" II. **Stilbaceae** Fr. 1825

" III. **Dematiaceae** Fr. 1832

" IV. **Mucedinaceae** Lk. 1809.

Divisio II **MYXOMYCETAE** (Wallr. 1833) em.

Ordo I. **Myxomycales** (Wallr. 1833) em. nom.

Fam. I. **Myxomycetaceae** Wallr. 1833

" II. **Ceratiomyxaceae** Schröt. 1889

" III. **Acasiaceae** Van Tiegh. 1880

" IV. **Phytomyxaceae** Schröt. 1886

" V. ? **Monadinaceae** Cienk. 1865.

Divisio III. **SCHIZOMYCETAE** Naeg. 1857.Ordo I. **Schyzomyciales** (Naeg. 1857) em. nom.Fam. I. **Myxobacteriaceae** Thaxt. 1892" II. **Beggiatoaceae** Mig. 1894" III. **Chlamydobacteriaceae** Mig. 1894" IV. **Spirillaceae** (Cohn 1872) Mig. 1894" V. **Bacteriaceae** Zopf 1883" VI. **Coccaceae** Zopf 1883.**NORTH AMERICAN SPECIES OF AGARICACEAE.**

A. P. MORGAN.

THE MELANOSPORAEE. (Continued).

(Continued from page 153).

V. **PSILOCYBE** FRIES, SYST. MYC. I, 1821.

Pileus fleshy, convex or campanulate, smooth and glabrous, the margin at first incurved. Stipe subcartilaginous, tough and flexile or rigid, fistulous and stuffed or hollow, exceptionally solid, usually smooth and glabrous. Lamellae adnexed or adnate, becoming purple or brown; spores in mass purplish-brown or purplish-black, sometimes brown.

Growing on old trunks or mostly on the ground in fields and woods. Passing easily into *Psathyra* on the one hand and not sharply distinguished from *Hypholoma* on the other.

I. **SPADICEAE.** *Pileus fleshy but thin, hygrophaneous, brownish when moist, and usually striatulate, expallent in drying; veil none. Stipe slender, rigid, glabrous or silky fibrillose.*

a. *Lamellae broad.*

I. **PSILOCYBE CORNEIPES** FRIES, MON. HYM. SUEC. II. 1863. ICONS. SEL. 136.

Pileus submembranaceous, campanulate then convex, smooth and glabrous, hygrophaneous, when wet bay, when dry ochraceous, the margin striate. Stipe slender, horny rigid, smooth and shining, fistulous, bay or blackish. Lamellae very broad, subdistant, adnate, at first whitish then clouded with brown from the spores.

Growing in dense wet woods; Pacific Coast Cat. *Pileus* 1-2.5 cm. in diameter; *stipe* 4-6 cm. long, 2-3 mm. thick. A species remarkably distinct on account of having a *stipe* like that of *Mycena cohaerens*.

2. *PSILOCYBE CLIVENSIS* B. & BR., ANN. N. H. 1860.

Pileus submembranaceous, convex, smooth, atomate, hygrophanous, the margin striate, at first pale brown, then pale ochre inclining to white. Stipe nearly equal above the slightly clavate base, fistulous, somewhat silky. Lamellae broad, emarginate, rather distant, umber, the edge white; spores umber, 10×5 mic.

Growing on the ground along the borders of woods. New York, *Peck*. Pileus 2-3 cm. in diameter; stipe 3.5-4 cm. long, 2 mm. thick.

3. *PSILOCYBE FUSCOFULVA* PECK. BULLETIN I, No. 2. 1887.

Pileus thin, convex or subcampanulate, subumbonate, glabrous, hygrophanous, dark watery-brown and striatulate when moist, subochraceous when dry. Stipe slender, flexuous, stuffed, slightly silky, reddish-brown. Lamellae rather broad, moderately close adnate, subventricose, purplish-brown; spores purplish-brown, $10-12 \times 6-8$ mic.

Growing among *Sphagna*; New York, *Peck*. Pileus 1-2.5 cm. in diameter; stipe 4-6 cm. long, 2-4 mm. thick.

4. *PSILOCYBE SQUALIDELLA* PECK, 46 N. Y. REP. 1892. A. (*HYPHOLOMA*) *SQUALIDELLUS* PECK, 29 N. Y. REP. 1876.

Pileus thin, subcampanulate or convex then expanded, smooth, hygrophanous, pale alutaceous or watery-brown when moist, ochraceous or reddish-yellow when dry, the margin striate. Stipe slender, flexuous, stuffed or hollow, reddish-brown, paler at the summit, white-villous at the base. Lamellae broad, rounded behind, adnexed, whitish then purplish-brown; spores purple-brown, elliptic, 9-10 mic. long.

Gregarious or caespitose; growing in wet places in woods; New York, *Peck*. Pileus 1-2.5 cm. in diameter; stipe 3-5 cm. long, 2 mm. thick.

5. *PSILOCYBE SPADICEA*, *AGARICUS SPADICEUS* SCHAEFFER, 1874. *AGARICUS STIPATUS* FRIES, SYST. MYC. I. 1821.

Pileus fleshy, convex then plane, obtuse, smooth, wet, hygrophanous, umber-brown, becoming pallid when dry; the flesh whitening. Stipe tough, hollow, pallid, smooth at the apex. Lamellae rather broad, close, rotundate-adnexed, at first whitish, then flesh-color, at length brown; spores brown, elliptic, $8-9 \times 4-5$ mic.

Subcaespitose; growing on the ground among old leaves, at the base of stumps, etc. Recorded from the Atlantic to the Pacific States; a world-wide species. Pileus 5-10 cm. in diameter; stipe 6-12 cm. long, 6-10 mm. thick.

6. *PSILOCYBE FOENISECII* PERSOON, IC. ET DESCR. FUNG. 1799. SYNOPSIS, 1801. PECK, N. Y. REP. 1903.

Pileus fleshy, campanulate then convex and expanded, obtuse, glabrous, hygrophanous, brown or reddish-brown when moist, paler when dry. Stipe slender, fistulous, smooth and glabrous, pallid, rufescent. Lamellae broad, adnate, ventricose, subdistant, umber-brown; spores brown, elliptic-oblong, 11-14 x 6-9 mic.

Growing in the rich soil of grassy grounds, on lawns, in meadows, along roadsides, etc. Recorded from Atlantic to Pacific States, probably common everywhere. Pileus 1-3 cm. in diameter; stipe 5-9 cm. long, 2-4 mm. thick.

7. *PSILOCYBE PHYLLOGENA*, A. (HYPHOLOMA) PHYLLOGENUS PECK, 26 N. Y. REP. 1873.

Pileus firm, convex, hygrophanous, reddish-brown when moist, alutaceous when dry. Stipe equal, stuffed or hollow, fibrillose, expanding at the base into a thin flat disk. Lamellae broad, close, brown, the edge white; spores pale brown, subglobose, 5 mic. in diameter.

Growing on fallen leaves in woods; New York, *Peck*. Pileus 4-8 m. m. in diameter; stipe 1.5-2.5 cm. long, 1 mm. thick. A very small but distinct species, remarkable for the flat disk by which it is attached to the leaves.

8. *PSILOCYBE ARENULINA* PECK, 30 N. Y. REP. 1877.

Pileus convex then explanate or centrally depressed, glabrous, hygrophanous, dark brown and striatulate when moist, livid-white when dry. Stipe tapering slightly upward, fistulous, whitish, arising from a mycelial bulb. Lamellae close, cinnamon-brown, becoming darker with age; spores subelliptic, 10 mic. long.

Growing in sandy soil; New York, *Peck*; Michigan, *Kauffman*. Pileus 1-3 cm. in diameter; stipe 4-6 cm. long, 2 mm. thick.

b. Lamellae rather narrow.

9. *PSILOCYBE UNICOLOR* PECK, 53 N. Y. REP. 1899.

Pileus thin, broadly convex then expanded, hygrophanous, when wet brown and striatulate, pale brown or whitish when dry. Stipe short, equal, glabrous, stuffed or hollow, brownish. Lamellae narrow, close, adnexed, brown, at length darker; spores elliptic, 6 x 4 mic.

Growing on prostrate mossy trunks. New York, *Peck*. Pileus 1-2 cm. in diameter; stipe 1.5-2 cm. long, 2 mm. thick. Related to *Ps. camtopoda*.

10. *PSILOCYBE CASTANELLA* PECK, BULLETIN I, No. 2, 1887.

Pileus thin, convex or subconical, then expanded or slightly depressed, glabrous, hygrophanous, chestnut or umber and striatulate when moist, pale alutaceous when dry. Stipe equal, flexuous, hollow or stuffed, silky-fibrillose, brownish or subrufescent, with a white mycelium at the base. Lamellae close, adnate, at first pale brown, then purplish-brown; spores purplish-brown, $7-8 \times 4-5$ mic.

Gregarious or subcaespitose; growing in grassy ground by roadsides; New York, *Peck*. Pileus 1-1.5 cm. in diameter; stipe 3-5 cm. long, 1-2 mm. thick.

11. *PSILOCYBE CAMPTOPODA* PECK 31 N. Y. REP. 1878.

Pileus thin, broadly convex, glabrous, hygrophanous, brown and striatulate when moist, whitish and even when dry. Stipe solid, equal, smooth, generally curved, pruinose at the summit, with a white strigose mycelium at the base. Lamellae narrow, close, whitish becoming brown; spores elliptic, 6×4 mic.

Growing on old trunks in woods; New York, *Peck*. Pileus 1-2 cm. in diameter; stipe 2-3 cm. long.

12. *PSILOCYBE RHODOPHAEA* MONTAGNE, SYLL. CRYPT. 389.

Pileus submembranaceous, convex then expanded, smooth and glabrous, hygrophanous, rose-color or lilac, rufescent when dry. Stipe tall, flexuous, fistulous, concolorous with the pileus, except at the apex where it is white striatulate, the base floccose-fibrillose. Lamellae rather narrow, distant attenuate-adnexed, at first rose-color becoming blackish-brown; spores brown, elliptic, $16 \times 7-8$ mic.

Growing on old leaves in woods; Columbus, O., *Sullivant*. Pileus 1-2 cm. in diameter; stipe 7-9 cm. long, 1-2 mm. thick.

13. *PSILOCYBE PULICOSA* MONTAGNE, SYLL. CRYPT. 388.

Pileus fleshy, thin, conic then campanulate, obtuse, striatulate, hygrophanous, dark brown when wet, expallent in drying. Stipe long; slender, fistulous, smooth, pallid. Lamellae narrow, linear, adnate, pale umber, becoming brown or blackish; spores dark brown, elliptic, large, 20 mic. long. (?)

Growing on the ground; Columbus, O., *Sullivant*. Pileus 2-3 cm. in diameter; stipe 7-9 cm. long, 3-4 mm. thick. Closely related to *Ps. spadicea*.

14. *PSILOCYBE SQUALENS* FRIES, *EPICRISIS*, 1836. *ICONES SEL.* 137.

Pileus fleshy, thin, convex then plane or depressed, smooth and glabrous, hygrophanous, when wet dull ferruginous or ochraceous, expallent when dry. Stipe nearly equal, fistulous, scantily fibrillose, striate at the apex, nearly the same color at the pileus. Lamellae narrow, close, adnate, often decurrent by a tooth, pale-brown; spores ferruginous-brown.

Solitary or caespitose; growing on old rotten trunks; Pacific Coast Cat. Pileus 3-5 cm. in diameter; stipe 3-5 cm. long, 2-4 mm. thick. On account of the color of the spores Fries thought the species might better be referred to *Naucoria*.

15. *PSILOCYBE LIMICOLA* PECK, 24 N. Y. REP. 1871.

Pileus thin, convex then expanded, smooth, hygrophanous, dark watery brown and striatulate when moist, pale ochraceous-brown when dry and rugulose. Stipe slender, equal, brittle, silky, fistulous, whitish. Lamellae close, rounded behind, adnexed, cinnamon-brown, becoming darker; spores elliptic, 10 mic. long.

Subcaespitose; growing in damp muck soil in woods. New York, *Peck*. Pileus 1-2.5 cm. in diameter; stipe 5 cm. long, scarcely 2 mm. thick.

16. *PSILOCYBE CERNUA*, *AGARICUS CERNUUS*, VAHL IN *FLORA DANICA*. *AGARICUS FASCICULATUS* SCHAEFFER, *INDEX*. 1774.

Pileus fleshy campanulate then expanded, glabrous, hygrophanous, pallescent, white and rugulose when dry. Stipe slender, fistulous, flexuous, glabrous, white, smooth and pruinose at the apex. Lamellae rather narrow, subdistant, becoming ventricose, adnate, whitish-cinereous then blackish-brown; spores elliptic, 7-9 x 5-6 mic.

Commonly caespitose; growing on the ground among old leaves and rotten wood. New York, *Peck*; Preston, O. Pileus 3-6 cm. in diameter; stipe 5-7 cm. long, 4-5 mm. thick.

II. *CALLOSAE*. *Pileus fleshy, mostly bright colored, somewhat expallent, but scarcely hygrophanous or striatulate, in wet weather the surface often slightly viscid. Stipe callous, flexile, usually colored, glabrous or silky-fibrillose.*

a. *Lamellae broad.*

17. *PSILOCYBE ERICAEA* PERSOON, *SYNOPSIS*, 1801. FRIES, *ICONES SEL.* 136. COOKE, *ILLUSTR.* 568.

Pileus fleshy, thin, conic then convex and explanate, smooth and glabrous, slightly viscid when wet, shining when dry, ferruginous or fulvous. Stipe elongated, tough, fistulous, pallid or pale yellow, white-villous at the base. Lamellae broad, subdistant, adnate, pallid then blackening; spores 8-10 x 5 mic.

Growing on the ground in humid situations in mountain regions. N. Carolina and Pennsylvania, *Schweinitz*; Pacific Coast Cat. Pileus 2-4 cm. in diameter; stipe 7-10 cm. long, 3-4 mm. thick.

18. *PSILOCYBE UDA* PERSOON, SYNOPSIS, 1801. COOKE ILLUSTR. 569.

Pileus fleshy, thin, convex then explanate, rugulose, not viscid, testaceous to fulvous, expallent but not hygrophanous. Stipe slender, elongated, fistulous, tough, glabrous or fibrillose, pale tawny or ferruginous. Lamellae rather broad, adnexed or adnate, ventricose, at first whitish becoming purple; spores oblong, 16-20 x 7-9 mic.

Growing in sphagnous marshes; New England, *Sprague*; New York, *Peck*. Pileus 1-3 cm. in diameter; stipe 6-9 cm. long, 2-3 mm. thick.

19. *PSILOCYBE SUBERICA* FRIES, ICONES SELECTAE. 1880. COOKE, ILLUSTR. 588.

Pileus fleshy, convex then explanate, smooth and glabrous, fulvous. Stipe short, fistulous glabrous, yellowish. Lamellae very broad, sinuate-adnate, pallid then blackening; spores brown, ovoid-oblong, 12-14 x 6 mic.

Growing in sterile fields; Alabama, *Underwood* and *Earle*. Pileus 3-5 cm. in diameter; stipe 4-5 cm. long, 3-4 mm. thick. Much resembling *Ps. ericaea*, but the stipe is shorter, the pileus more dilated and it occupies a very different habitat.

20. *PSILOCYBE ELONGATIPES* PECK, 29 N. Y. Rep. 1876.

Pileus thin, convex then expanded, smooth, moist, yellow. Stipe elongated, rather fragile, flexuous, stuffed or hollow, silky-fibrillose, pallid to rufous. Lamellae broad, subdistant, ventricose, yellowish becoming brown; spores brown, elliptic, 10-12 mic. long.

Growing among *Sphagnum* in marshes and wet places in woods; New York, *Peck*. Pileus 1-2 cm. in diameter; stipe 8-12 cm. high, 2 mm. thick.

21. *PSILOCYBE PLUTONIA* B. & C., FUNGI CUB. 77. 1867.

Pileus thin convex then plane, glabrous, brown. Stipe tapering downward, slightly fistulous, glabrous, brown. Lamellae broad, rounded behind, adnate, brown; spores brown, subglobose.

Growing on dead wood; Cuba, *Wright*. Pileus 1-2.5 cm. in diameter; stipe 5 cm. high, 2 mm. thick.

22. PSILOCYBE SABULOSA PECK, BULL. TORR. CLUB. 1897.

Pileus convex, subumbonate, glabrous, yellow. Stipe equal, fistulous, pallid or straw-color. Lamellae broad, subdistant, ventricose, adnate, becoming purplish-brown, whitish on the edge; spores elliptic, 12-15 x 7-8 mic.

Growing in sandy soil in pastures; Kansas, *Bartholomew*. Pileus 1.5-2.5 cm. in diameter; stipe 2.5-4 cm. long, about 2 mm. thick. This species is quite distinct from *Ps. arenulina* which is hygrophanous.

23. PSILOCYBE LIMOPHILA PECK, 30 N. Y. REP. 1877.

Pileus thin, convex then expanded, fragile, atomaceous, radiately rugulose, whitish, often splitting around the margin. Stipe short, fistulous, equal, white, striate at the summit. Lamellae rather broad, lax, whitish then purplish-brown; spores elliptic, 10-12 x 5-6 mic.

Growing in muddy alluvial soil under willows; New York, *Peck*. It is related to *Hypholoma incertum* but the veil is absent and the spores are larger.

b. Lamellae rather narrow.

24. PSILOCYBE SEMILANCEATA, AGARICUS SEMILANCEATUS FRIES, OBS. II, 1818. HYM. EUR. 1874. A. CALLOSUS, VAR. SYST. MYC. I, 1821. COOKE, ILLUSTR. 572.

Pileus submembranaceous, tough, ovoid-conic, slightly expanded and acutely unbonate; the dermis smooth, viscid when moist, striatulate, easily seceding; the surface various in color, yellow, greenish, etc. Stipe long, slender, tough, flexible, glabrous, pallid. Lamellae ascending, narrow, close, becoming purple-black; spores elliptic-oblong, 10-15 x 5-7 mic.

Growing on manure or in rich soil in fields, pastures, etc. New York, *Peck*. Pileus 1-1.5 cm. high and broad; stipe 7-10 cm. long, 2-3 mm. thick.

25. PSILOCYBE SUBVIRDIS B. & C., FUNGI CUB. 76. 1867.

Pileus depressed, umbonate, glabrous, yellow-green, the umbo brown. Stipe slender, fistulous, glabrous, at the base more or less tomentose. Lamellae narrow, close, adnate; spores purple-brown.

Growing on rotten wood; Cuba, *Wright*. Pileus 1-2 cm. in diameter; stipe 4-5 cm. long, 1 mm. thick.

26. *PSILOCYBE NITIDIPIES*, A. (*HYPHOLOMA*) *NITIDIPIES* PECK, 35 N. Y. REP. 1882.

Pileus fleshy, firm, convex, glabrous or obscurely fibrillose, whitish or yellowish. Stipe solid, nearly equal, whitish, silky-shining. Lamellae close, adnexed, whitish or subcinereous, becoming rosy-brown, the edge white; spores ovoid, rosy-brown, 5.6×4.4 mic.

Growing on damp shaded earth; New York, *Peck*. Pileus 5-7 cm. in diameter; stipe 5-10 cm. high, 6-8 mm. thick.

27. *PSILOCYBE DICHROMA* B. & C., *FUNGI CUB.* 75. 1867.

Pileus thin, conic then plane, glabrous, fulvous. Stipe fistulous, glabrous, white. Lamellae thin, distant, adnexed, fuscous; spores purple-brown.

Growing on rotten wood; Cuba, *Wright*. Pileus 1-1.5 cm. in diameter; stipe 2-3 cm. high, 2-3 mm. thick. Resembling at first sight *Naucoria copriniceps* B. & C.

28. *PSILOCYBE CAERULIPES* PECK, 38 N. Y. REP. 1884.

Pileus thin, subcampanulate then convex, subumbonate, glabrous, hygrophanous, slightly viscid, watery-brown and striatulate when moist, yellowish or subochraceous when dry. Stipe slender, equal, flexuous, tough, stuffed or hollow, pruinose at the apex, slightly fibrillose, bluish. Lamellae close, adnate, grayish-tawny, becoming rusty-brown, the edge white; spores elliptic, $8-10 \times 4-5$ mic.

Solitary or caespitose; growing on decaying wood; New York, *Peck*. Pileus 1-2 cm. in diameter; stipe 2.5-4 cm. long, scarcely 2 mm. thick.

VI. *PILOSACE* FRIES, NOV. SYMB. MYC. 1851.

Pileus various, fleshy to submembranaceous, convex or campanulate. Stipe fistulous, stuffed or hollow, mostly smooth and glabrous; annulus none. Lamellae free from the stipe, becoming brown or purplish-brown; spores brown or purplish-brown.

A genus corresponding to *Pluteus* among the *Rhodosporae*.

I. *EXIMIAE*. *Pileus submembranaceous, the surface smooth and glabrous. Stipe slender, fistulous, smooth and glabrous.*

I. PILOSACE PALMIGENA, A. (PSILOCYBE) PALMIGENA B. & C., FUNGI CUB. 78. 1867.

Pileus thin, hemispheric, white and glabrous, at length expanded brown and slightly viscid. Stipe fistulous, glabrous, white becoming fulvous, strigose at the base. Lamellae broad, free, brown, spores purple-brown.

Growing in stumps of palms in woods; *Wright*. Pileus 8 mm. in diameter; stipe 2-3 cm. long, not 1 mm. thick.

2. PILOSACE EXIMIA PECK, 24 N. Y. REP. 1871 AND N. Y. REP. 1903.

Pileus fleshy, thin, convex or broadly campanulate, at length expanded and subumbonate, smooth, dark sooty brown. Stipe slender, hollow, a little thicker at the base, dull red. Lamellae broad, close, ventricose, rounded behind and free, dull red or brownish pink, then brown; spores reddish, elliptic, 6×4 mic.

Growing on old stumps in woods, New York, *Peck*. Pileus 6-12 mm. in diameter, stipe 2-3 cm. long, 1 mm. thick.

3. PILOSACE GILLETTII, PSILOCYBE GILLETTII KARSTEN, HATTSVAMPAR I. 1879.

Pileus membranaceous, campanulate then convex, often obliquely umbonate, striatulate, glabrous, livid-gray slightly tinged with olivaceous, pale ochraceous when dry. Stipe straight, equal, fistulous, glabrous, slightly pruinose at the apex, dark brown, paler above. Lamellae broad, slightly adnate, soon free, livid-gray, becoming purple; spores elliptic, $10-13 \times 5-6$ mic.

Growing on the ground in woods; Nebraska, *Clements*. Pileus 1-3 cm. in diameter; stipe 5 cm. long, 1-2 mm. thick.

4. PILOSACE ROSEOLA, GYMNOCHILUS ROSEOLUS CLEMENTS, NEB. REP. IV. 1895

Pileus membranaceous, hemispheric or convex, glabrous, rugulose, atomate, vinous when wet, incarnate when dry. Stipe tall, fragile, fistulous, glabrous, shining, mealy at apex. Lamellae rather remote, purplish-cinnamon; spores dark purple, elliptic, $12-13 \times 7-8$ mic.

Growing on the ground; Nebraska, *Clements*. Pileus 1-2.5 cm. in diameter; stipe 4-8 cm. long, 2 mm. thick.

II. LEPIDOTAE. *Pileus fleshy, the surface pilose-scaly or furfuraceous. Stipe rather thick, solid or stuffed, naked or furfuraceous.*

5. PILOSACE TRICHOLEPIS FRIES, NOV. SYMB. MYC. 1851.

Pileus fleshy, convex then expanded, obtuse; the flesh firm but not compact; the surface with a dense covering of brown hairy scales. Stipe firm, equal, fissile, naked, refescent, dilated at the apex. Lamellae narrow, close, remote from the stipe, olivaceous then fuliginous; spores brown.

Growing in rich soil on the Island of St. Thomas, W. I.; Oersted Ic. 20. Pileus 10 cm. in diameter; stipe 12-15 cm. long, 6-8 mm. thick. "A showy fungus." The hairy scales of the pileus resembling those on the surface of *Lentinus tigrinus*.

6. PILOSACE HOLOLEPIS FRIES, NOV. SYMB. MYC. 1851.

Pileus fleshy, convex, obtuse; the flesh firm; the cuticle whitish, at first smooth, at length breaking up into appressed scales which become scattered. Stipe arising from a bulbous base, smooth, white. Lamellae free, becoming brown; spores brown.

Growing on the ground in Costa Rica; Oersted, Ic. 28. Pileus 5 cm. and more in diameter; stipe 5 cm. long, 4-6 mm. thick.

7. PILOSACE OLIVAESPORA, A. (HYPHOLOMA) OLIVAESPORUS E. & E., JOURN. MYCOL. V, 27. 1889.

Pileus convex, subumbonate, brick-color or bay when moist, grayish-buff when dry, the surface covered with a dense furfuraceous coat which soon disappears. Stipe slender, flexuous, fistulous, furfuraceous and colored as the pileus. Lamellae rounded behind and free, at first purplish-violet, then purplish-brown, at length dark brown; spores when fresh olive-brown, becoming umber-brown in drying, elliptic, $3.5-4 \times 2$ mic.

Solitary or subcaespitose; growing among moss in swamps. Newfield, N. J., *Ellis*. Pileus 1.5-2 cm. in diameter; stipe 3-4 cm. long, 1-2 mm. thick.

(*To be continued.*)

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PUCCINIA purpusii P. Henn. Hedw. 37:270, 1898, [is Puccinia plumbaria Peck, on Phlox or some genus near it. Holway.] Holway's N. A. Uredin. 1:47. 15 May 1906.

- PUCCINIA *sidalceae* Holway n. sp. on *Sidalcea oregana* (Nutt.) Gray. Holway's N. A. Uredineae, 1:67. 10 May 1907.
- PUCCINIA *utahensis* Garrett n. sp. on *Thlaspi glaucum*. Holway's N. A. Uredin. 1:46. 15 May 1906.
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- SARCODON *blackfordae* (Peck) Banker n. n. [*Hydnum blackfordae* Peck.] Mem. Torr. Bot. Club, 12:142. 13 June 1906.
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- SPHACELOTHECA panici-leucophaei (Bref.) Clinton n. n. [*Ustilago panici-leucophaei* Bref., and *U. insularis* P. Henn. N. A. Flora, 7:28. 4 Oct. 1906.
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- SPHAERONEMA parasitica L. syn. of *Melanospora parasitica* q. v.
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NOTES FROM MYCOLOGICAL LITERATURE. XXVI.

W. A. KELLERMAN.

Bommer, E., et Rousseau, M., Mmes.

In the Rapports scientifiques of Résultats du voyage du S. V. Belgica en 1897-9, Expedition Antarctique Belge, we find under the title of "Champignons by the above authors, the following, collected in Terre de Feu, with descriptions and localities; Lycogala miniatum Pers.; Sarcoscypha racovitzae Bomm. et Rouss., Belonium graminis (Desm.) Sacc.; Mollisia riparia Sacc.; Cyttaria darwinii Berk.; Lophodermium arundinaceum Chev.; Lembosia drymidis Lév.; Podocrea deformans Bomm. et Rouss.; Chaetomium comatum Fr.; Puccinia cingens Bomm. et Rouss.; Acidium jacobsthallii henrici Magnus; Exidia rubra Bomm. et Rouss.; Tremella mesenterica Retz; Trametes albido-rosea Bomm. et Rouss.; Flammula inconspicua Bomm. et Rouss.; Omphalia stella Bomm. et Rouss.; Chalara cyttariae Bomm. et Rouss.; Cladosporium herbarum (Pers.) Lk.; Macrosporium

commune Rab.; *Sclerotium antarcticum* Bomm. et Rouss.; *Sclerotium* (*Myxomycetis*?)

Orton, W. A.

The annual summary of "Plant Diseases in 1906" occupies eight closely printed pages in the Yearbook of the U. S. Department of Agriculture for 1906.

Sheldon, John L.

In a short article relative to "The Taxonomy of a Leaf-Spot Fungus of the Apple and other Fruit Trees," it is pointed out that the spores are not hyaline, not *slightly* smoky but considerably smoky, even approaching olive-brown. Hence, *Phyllosticta pirina* Sacc. is transferred to the genus *Coniothyrium* — *C. pirina* (Sacc.) Sheldon n. n. See Torrey, July, 1907.

Overton, James Bertram.

This excellent piece of work — "The Morphology of the Ascocarp and Spore-formation in the many-spored Asci of *Thecotheus pelletieri*" — published in the Botanical Gazette, December 1906, could not be adequately sketched in a single paragraph even of considerable length. Copious literature is cited and discussed, then the work on *Thecotheus*, a Discomycete (*Ascobolaceae*) is outlined, and illustrated by two lithographic plates. This fungus has a fruit-body formed from several ascogonia (being a compound apothecium). The asci arise, says the author, from the subterminal cells of the recurved tips of the ascogenous hyphae which cells are binucleate; and the ascus nucleus is formed by the fusion of these two primary ascus nuclei. The ascus nucleus divides by triple division — and finally 32 free nuclei are formed in the ascus. Spore delimitation follows the process described by Harper; each spore is uninucleate.

Durand, Elias J.

Dr. Durand gives a brief account in the Journal of Mycology, July 1907, of "The Mycological Writings of Theodor Holmskjöld and their relation to Persoon's *Commentatio*." His points are that Holmskjöld's text has appeared in four forms: (1) as a privately distributed folio volume with plates, 1790; (2) as a contribution to Usteri's *Annalen* without plates, 1795; (3) as a volume edited by Persoon without plates, 1797; (4) as a volume of "*Beata ruris, Fungis danicis a Theodoro Holmskjöld impensa*", with plates, 1799. Persoon's *Commentatio* appeared first in his edition of Holmskjöld, 1797, and in the same year as a reprint from the last with a modified title and slightly modified text.

Sumstine, David R.

A description of "*Polyporus Pennsylvanicus* Sp. Nov." is given in the July No. of the *Journal of Mycology*. The plant is related to *P. polyporus*, *P. arcularius*, *P. elegans*, and *P. lentus*.

Sheldon, John L.

Diseased plants in the greenhouse of the West Virginia Experiment Station harbored a *Gloeosporium*, from which pure cultures were made and subjected to critical study. Perithecia appeared containing slender paraphyses and club-shaped asci with hyaline single-celled spores. The name given is *Physalospora Dracaenae* Sheldon n. sp. See "A Study of the Leaf-Tip Blight of *Dracaena Fragrans*," in the *Journal of Mycology*, July 1907.

Christman, A. H.

In the 15th volume of the *Transactions of the Wisconsin Academy of Sciences, Arts and Letters*, "The Nature and Development of the Primary Uredospore" is discussed and illustrated with a page of figures. The author says "The hyphae of the primary uredospores differ from those that produce the later uredospores, in that they apparently also produce spermatia while those of the secondary uredospores do not. In structure, too, there is a difference. "Those hyphae associated with the spermatia, in every case that I have observed, are composed of uninucleated cells, while the mycelial cells of stages unaccompanied by spermatia have regularly two more compact and smaller nuclei." The development of the cells preparatory to fusion is sketched. "The cells fusing are, as far as can be seen, *equal*, and the process is, at least apparently, a *fusion of equal gametes*, rather than the fertilization of an egg by the entrance of a nucleus from some other cell." The fusion cell is therefore practically, at least, a zygospore — but the reader must refer to the article to follow the argument.

Spaulding, Perley.

A brief account is given, *Science*, August 16 (1907), of "A Blight Disease of Young Conifers," due to a species of *Pestalozzia* — here proven for the first time in America to be a true parasite, as hitherto known in Europe. It occurred on two-year-old seedlings of *Pinus ponderosa* and *P. divaricata* in a conifer nursery in Nebraska. The disease is characterized by a gradual dying back of the needles from the tip to the base, thence into the stem, finally killing the tree. Pure cultures and successful inoculations on *Pinus ponderosa* were made. It is recommended to remove the diseased trees and spray with Bordeaux mixture.

Journal Royal Horticultural Society, Vol. XXX, 1906.

In this volume there were published two mycological articles by Ernest S. Salmon, namely, "On the American Mildew and the need for Legislation;" and "On a Fungus Disease of the Cherry Laurel," (*Prunus laurocerasus* L.).

Journal Royal Agricultural Society, Vol. 67, 1906.

In the "Annual Report for 1906 of the Consulting Botanist," William Carruthers, a short popular account is given of a few diseases of plants, as Pear rust (*Gymnosporangium sabinae* Dicks), and the American Gooseberry Mildew (*Sphaerotheca mors-uvae* Berk.).

Peck, Charles H.

In the "Report of the State Botanist 1906," which is Bulletin 116, Botany 10, New York State Museum, published July 1907, we find the usual plan of these valuable annual accounts. About two dozen species of Mushrooms are described and several new names are given. Eleven species of edible Fungi are described and illustrated by colored plates. A monograph is given of the New York species of *Hygrophorus*, and of *Russula*. These are accompanied with full clear keys, making them very useful to those who wish to study our Agarics. It would require small addition to extend the range and include all species in the Eastern United States; we hope to see these studies of Agaricaceae from year to year until all the genera are presented.

Sheldon, John L.

In an article in *Science*, August 9, 1907, this author states that he has been, during the past four years, collecting specimens of Apple leaves and fruits having spots on them caused by fungi. The fungus here discussed is *Phyllosticta solitaria* E. & E., found on leaves also of the crab-apple. Then it was found on the petioles of the common and the crab-apple, also on yearling and older branches. This disease has been called "fruit-blotch," "apple-blotch," "dry-rot," etc.

Heald, F. D.

In *Science*, for August 16, 1907, some observations on "*Gymnosporangium macropus*," as to the time of infection, were made in Nebraska, 1906 and 1907; concluding that two explanations suggest themselves: "(1) The fungus is either perennial in the cedar, or, (2) The aecidiospores of one season produce the cedar apples which appear in June of the next year and reach maturity in the autumn." Though there is some evidence of the perennial character of the fungus, the observer thinks his second explanation the more probable.

Bioletti, Frederic T.

In a Bulletin (186) of the California Agricultural Experiment Station, February 1907, we find an account of the "Oidium or Powdery Mildew of the vine,"—a description of the disease (*Uncinula spiralis*) and results of spraying. Of the four most serious fungous disease—*Peronospora*, Black Rot, Anthracnose and Powdery Mildew (or *Oidium*)—the last only is found in California. Anthracnose is a native of Europe, but the others originated on the wild vines of the eastern and central parts of the United States. The dryness of our climate [says the author] is undoubtedly the cause of our immunity to *Peronospora*, Anthracnose, and Black Rot, and while *Oidium* requires less moisture than these diseases for its development, it spreads more rapidly and is more difficult to control in a moist atmosphere than a dry one."

Rea, Carleton.

Based mainly on the characters of the exoperidium it is told in plain language "How to distinguish the species of British Lycoperda in the field," in a pamphlet of four pages, issued by the British Mycological Society, October 1906. The author suggests that George Massee's division of the species into those with rough spores and those with smooth spores is scarcely apropos—and commends Von Bembeke's sections, *Asterosporae* and *Subasterosporae*. He disagrees also with C. G. Lloyd's definition of *Calvatia* and *Bovistella*.

Thom, Charles.

The subject of "Fungi in Cheese Ripening" is discussed at length, as based on the investigation of this author, particularly of Camembert cheese and Roquefort cheese. *Penicillium camemberti* Thom (nomen novum) and *Penicillium roqueforti* Thom (nomen novum) are technically described; and *Oidium* or *Oospora lactis*, a cosmopolitan organism, also occupies a conspicuous place in the report.

Schrenk, Herman von, and Hedgcock, George G.

Some experiments to determine whether by wrapping grafts it would be possible to reduce the number of apple trees affected with crown-gall, are reported in Bulletin 100 of the U. S. Department of Agriculture, Bureau of Plant Industry. Some of the points in the summary are that the disease usually appears at or near the union of the scion and root piece and it is recommended that apple grafts be wrapped with cloth or rubber.

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NEW SPECIES OF FUNGI.

BY CHARLES H. PECK.

Clitocybe pulcherrima Peck n. sp.

Pileus fleshy, convex becoming umbilicate or centrally depressed, decurved on the margin, glabrous, lemon yellow, flesh white, yellowish under the cuticle; lamellae thin, close, arcuate, decurrent, whitish or faintly tinged with yellow; stem equal or slightly tapering upward, solid above, hollow toward the base, subglabrous, colored like or a little paler than the pileus; spores nearly or quite globose, $4\ \mu$ in diameter.

Pileus 2.5-5 cm. broad; stem 2.5-4 cm. long, 6-8 mm. thick. Among fallen leaves. Near Detroit, Michigan. October. Dr. O. E. Fischer.

A very beautiful species, belonging to Group 3, Tribe Disciformes, and related to *Clitocybe vernicosa*, *C. veneris* and *C. venustissima*, but differing from all of these in its pale yellow pileus.

Pleurotus elongatipes Peck n. sp.

Pileus fleshy but thin, convex or nearly plane, even on the margin, glabrous, white, flesh white; lamellae thin, close, rounded behind, adnexed, white; stem very long, solid or stuffed, often more or less curved or flexuous, usually eccentric, glabrous above, more or less tomentose toward the base, white; spores globose, $4\ \mu$ in diameter.

Pileus 5-10 cm. broad; stem 5-15 cm. long, 6-10 mm. thick. Decaying wood in woods. Near Detroit, Michigan. October. Dr. O. E. Fischer.

This species belongs to Group 2, Tribe Excentrici and is related to *P. lignatilis*, from which it may be separated by its glabrous pileus, adnexed lamellae, more glabrous elongated stem and by the absence of a farinaceous odor.

***Lactarius hibbardae* Peck n. sp.**

Pileus fleshy, broadly convex or nearly plane, with or without an umbo, slightly zonate, dry, minutely tomentose or pubescent, grayish brown tinged with pink, darker and smoother in the center, even on the thin and sometimes wavy margin, flesh whitish, odor weak or none, milk white, taste acrid; lamellae thin, narrow, close, adnate, some of them forked, cream color; stem equal or slightly tapering upward, stuffed, glabrous below, clothed at the top with a minute whitish tomentum, pinkish white; spores globose, 6-8 μ broad.

Pileus 1.5-2.7 cm. broad; stem 2.5-4 cm. long, 3-6 mm. thick. Ground under young pine trees. West Roxbury, Massachusetts. October. Miss A. Hibbard.

The species is related to *L. glyciosmus* from which it may be separated by the lack of squamules from the pileus, the absence of the very distinct and peculiar odor of that species and by the different character of the surface of the stem. The plants are sometimes cespitose. The species is dedicated to its discoverer.

***Entoloma suave* Peck n. sp.**

Pileus thin, broadly convex, umbilicate, with decurved margin, glabrous, shining, grayish brown; lamellae moderately close, slightly rounded behind, adnexed, yellowish becoming flesh color; stem equal or nearly so, glabrous, stuffed, whitish or pale yellow; spores broadly elliptic or subglobose, even, 6-8 μ long, 5-6 μ broad.

Pileus about 2.5 cm. broad; stem about 2.5 cm. long, 2-3 mm. thick. On old stumps in swampy places. Ellis, Magnolia and Newton, Massachusetts. November. G. E. Morris.

This is a very neat and attractive little mushroom, having a very regular glabrous and shining pileus and a beautiful nearly straight stem. Its peculiar features, which easily separate it from nearly all other species of the genus, are its umbilicate pileus and the even, not angular, spores.

***Leptonia abnormis* Peck n. sp.**

Pileus thin convex, broadly umbilicate, glabrous, hygrophanous, blackish brown, shining and obscurely striatulate on the margin when moist, dark grayish brown when the moisture has escaped, flesh colored like the pileus; lamellae broad, subdistant,

slightly rounded behind, adnexed, pinkish or pale flesh color when mature; stem equal, glabrous, hollow, whitish; spores broadly elliptic or subglobose, 6-7 μ long, 5-6 μ broad.

Pileus 2-2.5 cm. broad; stem about 2.5 cm. long, 2 mm. thick. Ellis, Massachusetts. November. G. E. Morris.

This species is peculiar in its glabrous pileus and broad shallow umbilicus. This is likened by Mr. Morris to the concavity of a kid-glove fastener.

***Pistillaria batesii* Peck n. sp.**

Densely gregarious, forming elongated almost compact patches on the stem of the host plant; club soft, fleshy, ovate or oblong, obtuse, sessile or narrowed below into a very short stem, pallid when moist, grayish pink and pruinose when dry, .5-1 mm. long; spores filiform, straight or curved, hyaline, 10-20 μ long, 1-2 μ broad.

Stems of purple poppy mallow, *Callirhoe involucrata*. Red Cloud, Nebraska. July. Rev. J. M. Bates.

This is one of the smallest species of the genus, and is parasitic on the under side of the creeping stems, appearing first near the base and advancing toward the growing point. I wish it to commemorate the name of its discoverer. Albany, New York. December 2, 1907.

DR. REHM'S FIRST REPORT ON GUATEMALAN ASCOMYCETAE.*

W. A. KELLERMAN.

Collections of Fungi in Guatemala the past three years include a large number of Ascomycetae. A dozen of these were placed in Dr. H. Rehm's hands recently and I am permitted to publish below his determinations, comments and descriptions of new species.

The specimens represent widely distant and diverse regions of that Republic, as well as great extremes in altitude; the Departamento, as well as exact locality in each case is indicated.

All of the remaining ascomycetous material secured will be submitted to Dr. Rehm, and the results will be published in later Numbers of this Journal.

* Contributions to Guatemalan Mycology, V.

POLYSTIGMA PUSILLUM Sydow (Ann. Myc. 1904, p. 167).

Cfr. Sacc. Syll. XVII, p. 780.

Sierra de las Minas (near San Gerónimo), 225 m. alt., Dept. Baja Verapaz, Guatemala, 1 Mar. 1907, leg. W. A. Kellerman No. 6155, *Andira excelsa*.

Exemplaria Sydowiana a Donnell Smith in *Andira excelsa*, Dept. Escuintla, Guatemala, lecta.

PHYLLACHORA ASPIDEOIDES Sacc. et Berl.

Cfr. Sacc. Syll. IX, p. 1013.

Exs. Rehm Ascom. 1382.

Sanarate, 810 m. alt., Dept. Guatemala, 29 Dec. 1906, leg. W. A. Kellerman, no. 6008.

ASTERINA MELASTOMATIS Lév.

Cfr. *Ast. Melastomatis* Lév. in Sacc. Syll. I, p. 51; Earle, Torr. Bot. Club, 1899, No. 12.

Melastomaceae (*Clidemia*?) Dept. Izabal, Livingston, 10 m. alt., 18 Jan. 1905, and Morales, 57 m. alt., Guatemala, Mar. 1907, leg. W. A. Kellerman, Nos. 6142, 6223.

PHYSALOSPORA PHASEOLI P. Henn.

Cfr. Sacc. Syll. XVII, p. 580.

VAR. GUATEMALENSE Rehm n. var.

Maculae orbiculares luteolae, 1-3 cm. lat., demum confluentes. Perithecia dispersa, globulosa, nigra, denum hemisphaerice prominentia, 0.15-0.2 mm. Asci 70-80 x 12 μ . Sporae oblongo-orbiculares, 9 x 8 μ , 1-stichae. Paraphyses filiformes, 1.5 μ .

In foliis———?, San Rafael near Guatemala City, Guatemala, 12 Feb. 1905, leg. W. A. Kellerman, no. 6224.

Modo peritheciorum minutae atque sporarum forma aliquantulum differt a descriptione citata. Physalosporae in foliis Phaseoli Rio Jurná St. Clara Amazoniae lectae.

PHYLLACHORA JACQUINIAE Rehm n. sp.

Stromata totum folium occupantia, gregaria, utraque in pagina conspicua, in epuiphylo magis prominentia, in hypophyllo tenuissime valve cincta, hemiglobosa vel oblonga, atra, 0.3-0.6 mm. diam., perithecia globulosa 1-3 minima, haud perspicue ostiolata includentia. Asci cylindranei, apice rotundati, 100 x 14-18 μ , 8-spori. Sporae ellipsoideae, utrinque rotundatae, glabrae, hyalinae, 1-cellulares, strato mucoso tenuissimo obductae, 14-

$15 \times 8-9\mu$, 1- rarius 2-stichae. Paraphyses filiformes, septatae, $2-3\mu$ cr.

Ad folia Jacquiniae aurantiacae Ait. El Rancho, Dept. Jalapa, Guatemala, leg. W. A. Kellerman, no. 4333.

Stromatibus perparvulis, totum folium quasi atramento conspurcatum, relinquentibus, creberrimis, dein magnitudine sporarum praeclara species.

PHYSALOSPORA KELLERMANII Rehm n. sp.

Perithecia in utraque foliorum languescientium, inde fuscidulorum pagina gregarie innata, hemisphaerice prominentia, lenticularia, glabra, atra, minutissime papillata, demum foveolam nigram in folii parenchymate relinquentia, parenchymatice, fuscidule contexta, 0.2 mm. diam. Asci cylindranei, teneri, $60 \times 8\mu$, 8-sporei. Sporae oblongae, utrinque rotundatae, 1-cellulares, hyalinae, guttulis minimis repletae, $12 \times 6\mu$, 1-stichae. Paraphyses filiformes. Ad Stillingiae acutifoliae (Müll. Arg.) Benth (?) folia.

Livingston, Dept. Izabal, Guatemala, 18 Jan. 1905, leg. W. A. Kellerman, no. 4339.

Propter perithecia demum fere sessilia paraphysibus modo ab Guignardia distat.

XYLARIA (?) CONOCEPHALA B. et Br.

Cfr. Sacc. Syll. I, p. 314; Cooke in Grevillea XI.

Los Amates, Dept. Izabal, Guatemala, alt. 90 m., 20 Feb. 1907, leg. W. A. Kellerman, no. 6226a.

Descriptio speciei l. c. atque mensura sporarum $18-20 \times 5-8\mu$ apud Cooke, in nostris exemplaribus $20-22 \times 6\mu$ bene quadrant, non minus exemplar a cl. Ule in Brasilia lectum cum descriptione exemplaris in Cuba lecti. Stromata nostra 8-9 cm. long., 1.5-2.5 cm. lat., stipite 1-4 cm. long, 0.5—1 cm. lat. longitrorsum furcato, glabro.

XYLARIA (Xyloglossa) ALBOPUNCTULATA Rehm nov. sp.

Stromata erecta, oblongo-claviformia, utrinque plus minusve compressa, apice rotundata, in stipitem c. 0.5 cm. long. et 0.8 cm. lat. abeuntia, glabra, carbonacea, 5-6 cm. long, 1.5 cm. lat., extus fusca, longitudinaliter substriolata, versus stipitem nigrescentia, intus solida, nigra, perithecis plane immersis, globosis, 1 mm. diam., ostiolis minimis, nigris, extus strias in areolis orbicularibus albidis, 0.3-1 mm. lat. perspicuis punctulata. Asci cylindranei, longissimi, 7μ lat., 8-sporei. Sporae fusiformes, plerumque naviculares, fuscae, 1-cellulares, $15 \times 6\mu$, 1-stichae. Paraphyses filiformes.

Los Amates, Dept. Izabal, Guatemala, alt. 90 m., 20 Feb. 1907, leg. W. A. Kellerman, no. 6226b.

Species proxima *Xylaria grammica* Mont., differt striis stromatis distinctis confluentibusque, perithecii minoribus atque defectu arcolarum albidarum.

XYLARIA MYOSURUS Mtg.

Exs. Rick f. austr. am. 27.

Los Amates, alt. 90 m. Dept. Izabal, and Retalhuleu, alt. 237 m., Dept. Retalhuleu, Guatemala, 10 Jan. 1907, leg. W. A. Kellerman, nos. 6227, 6228.

TRICHOSCYPHA TRICHOLOMA Mont. Ann. sc. nat. 1834, p. 77, tab. 4, f. 2; Cooke Mycogr. p. 252.

Cfr. Sacc. Syll. VIII, p. 160.

Synon: *Trichopeziza Hindsii* (Berk.) Cooke, Mycogr. p. 252.

Pilocratera Hindsii P. Henn. (Engl. bot. Jahrb. XIV 4, p. 363).

Peziza sulcipes Berk. (Hook. Journ. 1842, p. 141).

Trichopeziza sulcipes (Berk.) Cooke l. c. p. 252.

Los Amates, Dept. Izabal, 90 m. alt. Guatemala, 20 Feb. 1907, leg. W. A. Kellerman no. 6229.

Secundum Massee (Lin. soc. 31, p. 507) *Tr. Hindsii* Berk. *syn.* *Tr. sulcipes* Berk. et Cooke Mycogr. f. 199, et *Tr. sulcipes syn.* cum *Tr. tricholoma* (Mont.), Cooke Mycogr. f. 202. E contrario icones Cookei non quadrant cum Patouillard (Ann. myc. IV, p. 98), qui dicit: "*Lachnea Hindsii* et *L. tricholoma* Pat. proxime cognatae, utraque "d'une belle couleur saumon" modo sporis differunt, apud *Hindsii* ovoideis, utrinque obtusis, 2 magni guttatis, 25-30 x 12-15 μ , opud *tricholoma* ovoideis, utrinque acutatis, haud guttatis, 28-35 x 12-15 μ ." Exemplaria Kellermani autem sporis ellipsoideis, utrinque acutatis, crasse tunicatis, guttas oleosas 2 magnas atque 2 parvulas apicales includentibus gaudent. Asci (?). Excipulum e cellulis subrotundis hyalinis, 10-15 μ lat. contextum extus squamulis parvulis, crebris, versus marginem ciliiformiter, 1 mm. long., 100 μ ad basim latis, ex hyphis plus minusve conglutinatis, rectis, obtusis, septatis, hyalinis, crasse tunicatis, 5-10 μ cr. compositis obtectum. Apothecia cyathiformia, 2 cm. longe stipitata, sicca sublutea, sed color *Hindsii*, "amoene ruber" non convenit.

NEOTIELLA SERICEO-VILLOSA Rehm sp. ad interim.

Apothecia gregaria, ligno putrido insidentia, primitus globoso-clausa, demum urceolata, expansa, campanulaeformia, regular-

iter marginata, haud stipitata, disco coeruleo-livido, extus sericeo-villosa usque ad marginem, fuscidule cinerea, pilis simplicibus, rectis vel subcurvatis, interdum conglutinatis, obtusis, glabris, septatis, 500μ long., usque ad apicem aequaliter $5-7\mu$ lat., subhyalinis, fragilibus obiecta, 0.5-5 cm. diam., 0.5-2 cm. alt. Hymenium plane involutum!

Volcano Atitlán, alt. 2700 m. Dept. Solalá, Guatemala, 16 Feb. 1906, leg. W. A. Kellerman, no. 6204.

Peziza pulcherrima, hymenio plane carens, secundum formam et excipulum hirsutum forsitan Neotiellae Cooke species. Cfr. Sacc. Syll. VIII, p. 190. Similis videtur Lachnea Plumiera Tr. (Sacc. Syll. VIII, p. 170) Americae cent.

—————? On Cactus (Opuntia). Laguna (Lake Amatitlán), Dept. Amatitlán, alt. 1200 m., 8 Feb. 1905, leg. W. A. Kellerman, no. 6225.

"Asci $40-46 \times 25-32\mu$, sporae $20-22 \times 8\mu$ hyalinae."

Aegre fero, me plurimis microscopicis praeparatis intra excipula crasse tunicata modo ascos dispersos ovaes sporas plane involutas includentes invenisse. Constructio Ascomycetis suspicari licet ad Myriangiaceas pertinentem, haud Pyrenomycetem.

CULTURES OF UREDINEAE IN 1907.¹

BY J. C. ARTHUR.

The present article forms the eighth of a series of reports² by the author upon the culture of plant rusts, covering the years 1899 to the close of 1907. The grass and sedge rusts form a prominent part of the year's work, the same as in previous seasons, but it has been possible to include also some very interesting studies of a number of species of Gymnosporangium. This was chiefly brought about by two excursions made by my colleague, Mr. F. D. Kern, and myself for the express purpose of securing this sort of culture material, and for making observations regarding probable alternate hosts. The first trip was to Lake Forest, Ill., on April 6, where we secured *G. clavipes*, *G. clavaeforme* and *G. nidus-avis* in the locality where the last two were obtained by Dr. R. A. Harper for the distribution in Ellis & Everhart's North American Fungi and Fungi Columbiani. Explicit directions were given us by Dr. Harper to enable us to

¹ Read before the Botanical Society of America at the Chicago meeting, December, 1907.

² See Bot. Gaz. 29:268-276, 35:10-23; Jour. Myc. 8:51-56, 10:8-21, 11:50-67, 12:11-27 and 13:189-205.

go to the right spots. The second trip was to Colorado where collections were made April 27 at Boulder, May 1 at Glenwood Springs and May 2 at Wolcott. Unusual success attended this search for material, due in large part to the solicitous assistance of Mr. E. Bethel, of Denver, President of the Colorado Academy of Science, who accompanied us to Boulder, and gave detailed directions for finding infested trees at the other places. Mr. Bethel's intimate knowledge of the localities, and his own extensive observations upon these and other rusts of Colorado, all being placed at our disposal, made the few days of our stay in the state remarkably rich in results. The species of *Gymnosporangium* and *Roestelia* obtained upon this trip were found upon subsequent study to be in part quite distinct from the well known species to which they have heretofore been referred, and in part entirely new discoveries. These forms have recently been named and characterized by Mr. Kern,³ and two of the species, *G. Betheli* and *G. inconspicuum*, have been successfully cultivated.

For the third time the Botanical Society of America generously made a grant to forward this series of studies. This year it was sufficient to pay in large part for the assistance needed in testing the viability of spores, making the sowings, and recording the results, the balance being supplied by the Indiana Experiment Station.

The work was done by Mr. Frank Vasku, a senior student of the University of Iowa, recommended by Professor T. H. MacBride. Like the two previous men from the Botanical Department of the University of Iowa, who have assisted in this work, Mr. Fred. J. Seaver in 1903 and Mr. F. D. Kern in 1904, Mr. Vasku showed exceptional skill in conducting this class of work. His quick understanding of the problems, careful and accurate manipulation, and untiring devotion, were large factors in determining the amount and value of the season's results. Most of the sowings of *Gymnosporangium* spores were made by Mr. Kern, who took an especial interest in this part of the work, as it bore upon the subject of a thesis in preparation for the master's degree.

In order to study as many species as possible from a wide range of localities, and in this way to investigate the North American rust flora as a whole, it is necessary to depend upon the good will and generosity of contributors for much of the culture material and for hints regarding probable alternation of hosts. Those who have aided the work this year are Rev. J. M. Bates, Red Cloud, Neb., leading with 30 collections of culture material, and Messrs. E. Bethel, Denver, Colo., W. A. Kellerman, Columbus, Ohio, J. Dearness, London, Ont., C. W. Edgerton, Ithaca, N. Y., A. O. Garrett, Salt Lake City, Utah, H.

³ Bulletin Torrey Club 34:459-463. 1907.

D. House, Clemson College, S. C., J. J. Davis, Racine, Wis., T. D. A. Cockerell, Boulder, Colo., D. Reddick, Ithaca, N. Y., R. J. Pool, Lincoln, Neb., E. W. Olive, Madison, Wis., F. L. Stevens, West Raleigh, N. C., C. F. Baker, Santiago de la Vegas, Cuba, and Geo. W. Carver, Tuskegee, Ala. Host plants suitable to grow in pots and be used for inoculation were contributed by C. S. Sargent, Jamaica Plains, Mass., E. Bethel, Denver, Colo., and J. J. Davis, Racine, Wis. For these favors, and for the hearty co-operation of the above and other correspondents most grateful acknowledgment is here extended.

During the present season 98 collections of material with resting spores and 20 collections with active spores were employed, from which 438 drop cultures were made to test the germinating condition of the spores. Out of the 98 collections with resting spores 29 could not be brought to germination, although seemingly in perfectly healthy condition. This left 68 collections of available material, with which the cultures were made. These 68 collections belonged to 47 species of rusts, a considerable part, however, being forms whose life cycle had already been ascertained, the sowings being made for purposes of verification or extending the range of hosts. Beside these collections of resting spores sowings were made of nine species of *Gymnosporangium*, and of a few species of *Coleosporium*, *Aecidium* and *Peridermium*. Altogether 296 sowings were made, employing for the purpose 113 species of hosts, and more than two and a half times that number of individual plants, all grown temporarily in pots, so that the work could be done in the greenhouse under perfect control. In a few cases where small potted plants were not available cuttings were used, being kept alive by frequently changing the water in which they were thrust, and successively cutting off a bit of the stem to give fresh absorbing surface. The results of this work are given in the following paragraphs, and are divided into negative results, positive results with species whose life cycles have already been ascertained by the writer or other investigators, and positive results with species whose life cycles are now first placed on record.

Of the trials giving negative results the following may be recorded to serve for reference in future studies:

1. PUCCINIA on *Carex Pennsylvanica* Lam., collected at Sargent, Neb., by Rev. J. M. Bates, was sown on *Aesculus glabra*, *Napaea dioica*, and *Symphoricarpus racemosus*. Another collection made near Lafayette, Ind., by Mr. Frank Vasku, was sown on *Anemonella thalictroides*, *Ranunculus septentrionalis*, *Solidago Canadensis*, *Viola striata*, and *Trillium recurvatum*.

Still a third collection made at Boulder, Colo., by the writer, was sown on *Hydrophyllum capitatum*, *Lactuca Canadensis*, *Iris versicolor*, *Phryma leptostachya*, *Artemisia serrata*, and *A. dracunculoides*. None of these sowings gave infection. Similar material had been tried on five of these hosts before, and on twenty-nine other species, all with negative results.⁴ The rust on this host is common in the northern states east of the Rocky mountains, and appears from its morphological characters to be distinct from any described form. Fifty-five sowings have now been made, beginning in 1903, using forty-three species of hosts, and as no inoculation has been effected, the necessity for careful field observations to detect the probable alternate host becomes highly imperative in order to determine the real life cycle.

2. PUCCINIA on *Carex gravida* Bailey, sent twice by Rev. J. M. Bates, first from St. Paul, Neb., was sown on *Aesculus glabra*, *Viola cucullata*, *Ribes Cynosbati*, and *Hydrophyllum Virginicum*, and second from Red Cloud, Neb., was sown on *Hypoxis erecta*, *Houstonia purpurea*, *Laciniaria spicata*, *Lactuca Canadensis*, and *Artemisia dracunculoides*, with no infection. Similar material from the same region has been sown in previous years upon thirty-four other species of hosts with negative results.⁵

3. PUCCINIA on *Carex Douglasii* Boott. collected at Valentine, Neb., by Rev. J. M. Bates, was sown on *Symphoricarpus racemosus*, *Napaea dioica*, *Psoralea Onobrychis*, *Aesculus glabra*, *Laciniaria spicata*, *Hypoxis erecta*, and *Flacata comosa*, with no infection.

4. PUCCINIA ELLISIANA Thuem., on *Andropogon scoparius* Michx., collected at Boulder, Colo., by Mr. E. Bethel, was sown on *Arabis* sp., *Thalictrum dioicum*, *Actaea alba*, *Psoralea Onobrychis*, *Polygala Senega*, *Viola striata*, *Polemonium reptans*, *Solidago Canadensis*, *Boltonia asteroides*, *Senecio obovatus*, *Lepachys pinnata*, and *Smilacina stellata*, with no infection.

5. PUCCINIA VIRGATA Ellis & Ev., on *Chrysopogon avenaceus* (Michx.) Benth., collected at Grand Island, Neb., by Rev. J. M. Bates, was sown on *Ceanothus Americana*, *Napaea dioica*, *Caulophyllum thalictroides*, and *Cassia Chamacrista*, with no infection.

⁴See Jour. Myc. 10:10. 1904; 11:51. 1905; 12:12. 1906; and 13:191. 1907.

⁵See Jour. Myc. 10:10. 1904 11:52. 1905; and 13:191. 1907.

6. PUCCINIA EMACULATA Schw., on *Panicum capillare* L., collected in the vicinity of Lafayette, Ind., by Mr. F. D. Kern, was sown on *Psoralea Onobrychis*, *Viola cucullata*, and *Myosotis palustris*, with no infection. This rust was sown in previous seasons on twenty other species of hosts.⁶

7. PUCCINIA ARUNDINARIAE Schw., on *Arundinaria macrosperma* Michx., collected at Clemson College, S. C., by Mr. H. D. House, was sown on *Myrica cerifera*, *Ilex opaca*, *Smilax hispida*, and *Lysimachia quadrifolia*, with no infection.

8. PUCCINIA SCHEDONNARDI K. & S., on *Schedonnardus paniculatus* (Nutt.) Trel., collected at Boulder, Colo., by Mr. E. Bethel, was sown on *Napaea dioica*, *Sorbus Americana*, *Xanthoxylum Americanum*, *Falcata comosa*, *Triosteum perfoliatum*, *Laciniaria spicata*, and *Aster paniculatus*, with no infection. Like material was sown in previous seasons on eleven other species of hosts.⁷

9. PUCCINIA on *Muhlenbergia tenuiflora* (Willd.) B. S. P., collected at Red Cloud, Neb., by Rev. J. M. Bates, was sown on *Aesculus glabra*, *Lepachys pinnata*, *Napaea dioica*, *Hibiscus Moscheutos*, *Symphoricarpos racemosus*, with no infection.

10. PUCCINIA CRANDALLII Pam. & Hume, on *Festuca confinis* Vasey, collected at Boulder, Colo., by Mr. E. Bethel, was sown on *Draba Caroliniana*, *Bursa Bursa-pastoris*, *Cardamine bulbosa*, *Hydrophyllum Virginicum*, *Mertensia Virginica*, and *Cassia Chamaecrista*, with no infection.

11. PUCCINIA MONTANENSIS Ellis, on *Elymus condensatus*-Presl., collected at Glenwood Springs, Colo., by Mr. F. D. Kern and the writer, was sown on *Delphinium tricornes* three times, with no infection. This material was found intermixed with plants of *Delphinium*, species undetermined, but not *D. tricornes*, which exhibited a very abundant development of *Aecidium Delphinii* Barth., and it was assumed that the two forms were alternates. Although the relationship was not established by the attempted culture, yet it cannot be said to be absolutely disproved, as the species of *Delphinium* on which the *Aecidium* occurred was not used.

Another collection of apparently the same species of rust found on *Elymus brachystachys* Scribn. & Ball, at Eldorado Springs, Colo., by the same collectors, was sown on *Delphinium tricornes*, with no infection.

⁶ See Bot. Gaz. 35:12. 1903; Jour. Myc. 8:52. 1902; 10:10. 1904; 12:12. 1906; and 13:192. 1907.

⁷ See Bot. Gaz. 35:11. 1903 and Jour. Myc. 13:192. 1907.

12. PUCCINIA on *Poa longiligula* Scribn. & Will., collected at Boulder, Colo., by Mr. E. Bethel, was sown twice on *Arabis* sp., with no infection. This rust was found so closely associated with aecia of a species of *Arabis*, that it seemed almost certainly to be genetically connected. Healthy plants of apparently the same species of *Arabis* were secured from Colorado, and sowings made, the spores giving strong germination, but without positive results. The grass host was determined by Mr. P. L. Ricker of the U. S. Department of Agriculture.

13. PUCCINIA on *Eriocoma cuspidata* Nutt. (*Oryzopsis cuspidata* Benth.), collected at Glenwood Springs, Colo., by Mr. F. D. Kern and the writer, was sown on *Phacelia bipinnatifida*, *Hypoxis erecta*, *Symphoricarpos racemosus*, *Mertensia* sp. (from Colorado), *Triosteum perfoliatum*, *Aquilegia coerulea*, *Thalictrum polygamum*, *Amelanchier Canadensis*, *Hydrophyllum Virginicum*, *Solidago Canadensis*, *Laciniaria spicata*, *Ranunculus recurvatus*, *Cassia Chamaecrista*, and *Psoralea Oenobrychis*, with no infection.

14. PUCCINIA on *Agropyron repens* (L.) Beauv., collected in Kenosha county, Wis., by Dr. J. J. Davis, was sown on *Polymnia Canadensis* and *Hydrophyllum Virginicum*, with no infection. This is a leaf rust having close resemblance to *Puccinia rubigo-vera* on cereals.

15. UROMYCES RHYNOSPORAEE Ellis, on *Rhynchospora alba* (L.) Vahl., collected at London, Ont., by Mr. J. Dearness, was sown on *Menyanthes trifoliata* and *Decodon verticillatus*, with no infection.

16. UROMYCES JUNCII (Desm.) Tul., on *Juncus Balticus* Willd., collected at Scotia, Neb., by Rev. J. M. Bates, was sown on *Aesculus glabra*, *Symphoricarpos racemosus*, *Napaea dioica*, *Silphium perfoliatum*, *Ranunculus recurvatus*, *Psoralea Oenobrychis*, *Polygala Senega*, *Viola cucullata*, *Apocynum cannabinum*, *Polemonium reptans*, *Ambrosia trifida*, *Senecio obovatus*, *Dirca palustris*, *Decodon verticillatus*, and *Bidens frondosa*, with no infection. This rust appears to be morphologically identical with the European *Uromyces Junci*, which has aecia upon *Pulicaria dysinterica*, a host that was not at hand when sowings were being made. It is clearly distinct from the rust on *Juncus tenuis*, *Uromyces Silphii* (Syd.) Arth., not only on account of its structure, but because it refuses to grow on *Silphium*.

17. UROMYCES OROBI (Pers.) Lev., on *Lathyrus decapetalus* Pursh, collected at Boulder, Colo., by Prof. T. D. A. Cockerell, was sown on *Lathyrus palustris* and *Euphorbia Arkanseana Coloradensis*, with no infection. This rust is believed to be an autoecious species, and the failure to infect *Lathyrus* is not readily explained.

The following species of rusts were successfully grown, and the data supplement that obtained from previous cultures of this series, or that recorded by other American or European investigators. The results with *Gymnosporangium* are the most considerable since the work done by Dr. Roland Thaxter, concluded at the Connecticut Experiment Station in 1890.

1. *PUCCINIA ALBIPERIDIA* Arth.—Teliosporic material on *Carex crinita* Lam., collected in the vicinity of Lafayette, Ind., by Mr. F. D. Kern, was sown on two plants of *Ribes Cynosbati* on April 16, giving rise to pycnia April 25, and aecia May 6 in one case, and in the other to pycnia April 29, and aecia May 14.⁸

2. *PUCCINIA CARICIS-ASTERIS* Arth.—Teliosporic material on a narrow leaved *Carex*, collected at Ithaca, N. Y. by Mr. C. W. Edgerton, was sown May 8 on *Aster paniculatus*, *Iris versicolor*, *Ribes Cynosbati*, and *Solidago Canadensis*, with infection only on the first named host, showing pycnia May 16, and aecia May 24. The collection was made adjacent to a clump of *Iris versicolor*, covered with aecia, and there was a possibility of genetic connection, which the culture dispels.

The 24th fascicle of Fungi Columbiani contained a specimen (No. 2366) of *Carex* rust labelled *Puccinia tenuistipes* Rostr., and collected as late as November, 1906, at London, Ont. As this species of rust has its aecia on *Centaurea Jacea*, according to a culture made by Schröter in 1885, and as that host is only occasionally found in North America along the seacoast, and no aecia having been seen on it in these localities, I wrote to Mr. J. Dearness, the collector, for further information and material. He most kindly secured viable material for me from the identical locality. This was sown May 15 on *Ribes Cynosbati*, *Aster cordifolius*, and *Solidago Canadensis*, with no infection. It was sown again May 25 on *Aster cordifolius* and *Erigeron annuus*, this time with the production of a few pycnia by June 10 on the *Aster*, but without formation of aecia. Still a third essay was made by sowing June 5 on *Aster paniculatus*, followed by an abundance of pycnia June 12, and aecia June 19, thus establishing the identity of the rust.

In visiting the locality in the spring of 1907, Mr. Dearness discovered that the host is not *Carex varia*, as published, but *C. rosea* Schk., and he has forwarded ample material to verify the determination.

In justification for the use of the name applied to the rust, Mr. Dearness writes, under date of June 22, 1907, that a collection was sent to the late Mr. J. B. Ellis in September, 1889,

⁸ For previous cultures see Jour. Myc. 8:53. 1902; 10:11. 1904; 11:58. 1905; 12:14. 1906; 13:196. 1907.

who thought it might be a new species and drew up a description. Not long afterward Mr. Ellis sent his notes and material to Dr. Rostrup, of Copenhagen, Denmark, who pronounced it to be *P. tenuistipes* Rostr., by which name it has since been called.⁹

3. PUCCINIA CARICIS (Schum.) Reb.—Teliosporic material on *Carex stipata* Muhl. from the vicinity of Lafayette, Ind., brought in by Mr. Frank Vasku, was sown on *Urtica gracilis* April 19, giving rise to pycnia April 27, and aecia May 2; while a similar collection brought in by Mr. F. D. Kern, and sown April 20, gave rise to pycnia April 27, and aecia May 1.

Teliosporic material on *Carex riparia* Curt., collected in November, 1906, at Scotia Junction, Neb., by Rev. J. M. Bates, was sown April 13, on *Ribes floridum* and *R. rubrum*, with no infection. Another sowing was made April 19 on *Urtica gracilis*, giving rise to abundant pycnia April 26, and aecia May 1. A second collection from the same region, taken in March, 1907, was sown April 4 on *Ribes floridum*, with no infection; and again April 19, on *Urtica gracilis*, giving rise, as in the former case, to abundant pycnia April 26, and aecia May 2. Similar material on *Carex riparia* from Iowa gave the same results in 1902.¹⁰

4. PUCCINIA ANGUSTATA Peck.—Teliosporic material on *Scirpus atrovirens* Muhl., from the vicinity of Lafayette, Ind., brought in by Mr. Frank Vasku, was sown on *Lycopus Americanus* April 22, giving rise to pycnia April 29, and aecia May 7.¹¹

5. PUCCINIA FRAXINATA (Schw.) Arth.—A collection made in November, 1906, on *Spartina cynosuroides* Willd., at Red Cloud, Neb., by Rev. J. M. Bates, was sown on *Fraxinus lanceolata* May 11, giving rise to pycnia May 18. The same collector sent similar material from Grand Island, Neb., in March, 1907, which was sown on *Fraxinus lanceolata* May 25, giving rise to pycnia May 30, and aecia June 13. A like collection taken in April, 1907, similarly sown May 8, gave pycnia May 17. These sowings were all made on cut branches placed in water, which accounts for the slow development and early termination of growth.¹²

⁹ For previous cultures see Jour. Myc. 8:54. 1902; Bot. Gaz. 35:15. 1903.

¹⁰ For previous cultures see Bot. Gaz. 20:270. 1900; 35:16. 1903; Jour. Myc. 8:52. 1902; 12:15. 1906.

¹¹ For previous cultures see Bot. Gaz. 29:273. 1900; Jour. Myc. 8:53. 1902; and 13:196. 1907.

¹² For previous cultures see Bot. Gaz. 29:275. 1900; Jour. Myc. 11:57. 1905; and 12:16. 1906.

6. *PUCCINIA SUBNITENS* Diet.—Teliosporic material on *Distichlis spicata* (L.) Greene was sent by Rev. J. M. Bates, from Red Cloud, Neb., and sown as follows:

April 10 on *Chenopodium album*; April 19, pycnia; April 23, aecia.
April 10 on *Bursa Bursa-pastoris*; April 26, pycnia; May 1, aecia.
April 10 on *Sarcobatus vermiculatus*; no infection.
April 17 on *Chenopodium album*; April 28, pycnia; May 1, aecia.
April 17 on *Sarcobatus vermiculatus* (two plants); no infection.
April 25 on *Chenopodium album*; May 6, pycnia; May 8, aecia.
April 25 on *Sarcobatus vermiculatus*; no infection.

Another collection of the rust on the same host, obtained by the writer at Ogallala, Neb., was sown on *Chenopodium album* April 29, giving rise to pycnia May 9, and aecia May 13. A sowing at the same time on *Sarcobatus vermiculatus*, and again on two plants June 1, gave no infection. It may be definitely concluded that this species of rust as it exists in Nebraska is not transferable to *Sarcobatus vermiculatus*.¹³

7. *PUCCINIA AMPHIGENA* Diet.—Teliosporic material on *Calamovilfa longifolia* (Hook.) Hack., collected at Burnett, Neb., by Rev. J. M. Bates, was sown on *Smilax hispida* May 2, giving rise to pycnia May 9, and aecia May 16.¹⁴

8. *PUCCINIA PHRAGMITIS* (Schum.) Körn.—Teliosporic material on *Phragmites communis* Trin., collected at Scotia Junction, Neb., by Rev. J. M. Bates, was sown on *Rumex crispus* May 1, giving rise to pycnia (date not noted) and aecia May 17.¹⁵

9. *PUCCINIA SIMILLIMA* Arth.—Teliosporic material on *Phragmites communis* Trin., collected at Scotia Junction, Neb., by Rev. J. M. Bates, was sown on *Rumex crispus*, with no infection, being mistaken for the previously mentioned species. Later it was sown on two plants of *Anemone Virginiana*, still with no infection. It was then sown on *Anemone Canadensis* June 3, giving rise to abundant pycnia June 11, and aecia June 19. This is a confirmation of the restricted range of aecial host, only one species of *Anemone* yet being found that can be infected.¹⁶

10. *PUCCINIA AGROPYRI* Ellis & Ev.—This is a very common rust of the Rocky mountain region. No culture of it has ever been tried in this country, but a collection made at Bozen, in the Austrian Tyrol, was successfully sown on *Clematis Vitalba*,

¹³ For previous cultures see Bot. Gaz. 35:19. 1903; Jour. Myc. 11:54. 1905; 12:16. 1906; and 13:197. 1907.

¹⁴ For previous cultures see Bot. Gaz. 35:20. 1903; Jour. Myc. 11:57. 1905; and 12:16. 1906.

¹⁵ For previous cultures see Bot. Gaz. 29:269. 1900; and Jour. Myc. 9:220. 1903.

¹⁶ For previous cultures see Bot. Gaz. 35:20. 1903.

by Dr. P. Dietel in 1892.¹⁷ While in the foothills of Colorado this spring Mr. F. D. Kern and the writer observed a plant of *Clematis ligusticifolia* with pycnia just starting, which was growing in the midst of some species of *Agropyron* heavily coated with the wintered telia of *Puccinia Agropyri*. Material was collected for cultures. The host was not in fruit, but is believed to be *A. pseudorepens* S. & S. Sowing of the spores was made on *Lioria Scottii* May 2, sparingly giving rise to pycnia May 15, but failing to develop aecia. A sowing was made May 10 on *Clematis Virginiana*, no plants of *C. ligusticifolia* being available, which gave rise to abundant pycnia May 20, and aecia May 27. This confirms the work by Dr. Dietel, and establishes the identity of the European and American form of the rust, which heretofore rested upon purely morphological grounds. This also shows that *Clematis Virginiana* may be a host for the species, although all collections so far reported on this host pretty certainly belong to the *Bromus* rust, *Puccinia tomiopara* Trel.

11. *PUCCINIA POCULIFORMIS* (Jacq.) Wettst.—Teliosporic material on an undetermined species of *Agropyron*, obtained at Lake Forest, Ill., by Mr. F. D. Kern and the writer, was sown May 17 on *Berberis vulgaris*, showing pycnia May 27, and aecia June 5. Another collection on *Agropyron tenerum* Vasey, and from Scotia Junction, Neb., by Rev. J. M. Bates, was sown in like manner April 24, showing pycnia May 3, and aecia May 14. Aeciospores from the latter culture were sown on *Avena sativa* May 25, giving rise to uredinia June 7.¹⁸

12. *PUCCINIA PAMMELII* (Trel.) Arth.—Teliosporic material on *Panicum virgatum* L., Collected at Red Cloud, Neb., by Rev. J. M. Bates, was sown on *Euphorbia corollata*, with no infection, and later was sown on *E. marginata* May 31, giving rise to pycnia June 6, and aecia June 12.¹⁹

A number of attempts have been made to grow the teliospores of this rust upon *Euphorbia marginata*, but heretofore without success. In these cases the material was collected in Indiana, where *E. marginata* does not occur, but *E. corollata* is common and abundant. The material used this season gives the reverse condition: it was collected in Nebraska, where *E. corollata* does not occur or is rare, but *E. marginata* is conspicuously abundant. From cultures so far attempted there is reason to think that we have to do with physiological species. Whether

¹⁷ Dietel, Ueber den Generationswechsel von *Puccinia Agropyri* Ell. et Ev.—Oesterr. bot. Zeitschrift 42:261. 1892.

¹⁸ For previous cultures see Jour. Myc. 8:53. 1902; 11:57. 1905; 12:17. 1906; and 13:198. 1907.

¹⁹ For previous cultures see Proc. Ind. Acad. Sci. for 1901:284. 1902; Jour. Myc. 11:56. 1905; 12:16. 1906.

any morphological distinctions exist is yet uncertain, but none has yet been detected.

13. *UROMYCES ACUMINATA* Arth.—Teliosporic material on *Spartina cynosuroides* Willd., collected at St. Paul, Neb., by Rev. J. M. Bates, was sown twice on thrifty plants of *Lysimachia quadrifolia*, with no infection. It was sown on *Steironema ciliata* May 14, giving rise to strongly developed pycnia May 22, and aecia May 27; while a second sowing May 30, gave pycnia June 6, and aecia June 11.²⁰

These results confirm the studies of previous seasons, showing that the rust called by this name in different sections of the country should be segregated into distinct species, or else into physiological species. More observations and material for cultures are required from all parts of the region east of the Mississippi river.

14. *UROMYCES SCIRPI* (Cast.) Burr.—Teliosporic material on *Scirpus fluviatilis* (Torr.) A. Gray, collected at St. Paul, Neb., by Rev. J. M. Bates, was sown on *Oxypholis rigidus*, with no infection. It was sown on *Cicuta maculata* May 3, giving rise to abundant pycnia May 13, and aecia May 20, thus confirming the work of last season.²¹

15. *UROMYCES SILPHI* (Syd.) Arth.—Teliosporic material on *Juncus tenuis* Willd., collected at Red Cloud, Neb., by Rev. J. M. Bates, was sown on *Silphium perfoliatum* April 23, giving rise to pycnia May 4, and aecia May 11. Similar material sent by the same collector from Grand Island, Neb., was sown on another plant of the same host May 31, giving rise as before to pycnia June 12, and aecia June 17. These results well confirm the work of last year.²²

16. *PHRAGMIDIUM SPECIOSUM* Fr.—Teliosporic material on *Rosa pratincola* Green (same as previously reported under the name *R. Arkansana*), collected in a meadow at Eldorado Springs (Boulder county), Colo., by the writer, was sown on *Rosa pratincola* May 20, giving rise to pycnia May 27, and aecia June 1.²³

17. *GYMNOSPORANGIUM JUNIPERI - VIRGINIANAE* Schw.—Teliosporic material on *Juniperus Virginiana* L., collected at Dayton, Ind., by Mr. F. D. Kern, was sown on *Crataegus punctata*, with no infection, and on a cultivated apple, *Malus Malus*,

²⁰ For previous successful and unsuccessful cultures see Jour. Myc. 12:24. 1906; 13:193. 1907.

²¹ For previous cultures and discussion see Jour. Myc. 13:199. 1907.

²² For previous cultures see Jour. Myc. 13:202. 1907.

²³ For previous cultures see Bot. Gaz. 35:17. 1903; Jour. Myc. 11:53. 1905.

April 12, giving rise to abundant pycnia April 24, but injury to the leaves prevented formation of aecia.²⁴

18. GYMNOSPORANGIUM GLOBOSUM Farl.—Teliosporic material collected as in the previous instance was sown on the Wealthy variety of *Malus Malus* April 12, giving rise to a few pycnia April 30, and afterward to aecia first observed July 12, although appearing much earlier.²⁵

19. GYMNOSPORANGIUM NELSONI Arth.—Teliosporic material on *Juniperus scopulorum* Sarg., collected at Boulder, Colo., by E. Bethel, was sown on *Amelanchier intermedia* Spach (*A. Botryapium* DC., as given in Britton & Brown's Illustrated Flora), April 16, giving rise to pycnia April 25, but further development stopped by injury to leaves.

Another collection made at the same place two weeks later by Mr. F. D. Kern was sown on *A. Canadensis* (L.) Medic. (plant from the Arnold Arboretum), April 30, giving rise to pycnia May 8, and aecia May 29. Another sowing was made on another plant of the same sort May 15, which gave a great abundance of pycnia May 22, and a fine development of aecia a month later, June 24. The above cultures were on leaves only. The same material was now sown on both leaves and fruit of *Amelanchier erecta* Blanch. (plants received from Edw. Gillett, of Southwick, Mass., under name of *A. Canadensis*, but identified by Mr. W. H. Blanchard as typical *A. erecta*), May 13, and gave pycnia on upwards of thirty fruits and many leaves May 20, and the first aecia June 5, reaching full and normal maturity June 24. Another sowing was made on leaves of *Sorbus Americana* May 15, which gave rise to pycnia in fair amount May 21, and normally formed aecia, especially on the rachis and midribs, June 24.

The above results confirm and much extend the somewhat uncertain work of last season.²⁶ It leaves no further doubt that *Roestelia Nelsoni* Arth. should be counted a synonym of *G. Nelsoni* Arth., as suggested in the original publication of the name.

20. GYMNOSPORANGIUM CLAVIPES C. & P.—Teliosporic material on *Juniperus Sibirica* Burgsd., obtained at Lake Forest, Ill., by Mr. F. D. Kern, was sown on leaves of *Amelanchier intermedia* April 10, giving rise to a few pycnia May 1, but without maturing aecia. Another sowing was made on fruit of *A. erecta*, also giving rise to a few pycnia June 5, but not maturing aecia. Checking of development was doubtless due in both instances to inherent weakness of the hosts. A sowing was made on *Malus coronaria* and *Cataegus* sp., with no infection.

²⁴ For previous cultures see Jour. Myc. 12:13. 1906; 13:200. 1907.

²⁵ For previous cultures see Proc. Am. Acad. Sci. 22:263. 1887; Bot. Gaz. 14:167. 1889; Jour. Myc. 13:200. 1907.

²⁶ See Jour. Myc. 13:203. 1907.

Cultures of this species were made by Prof. W. G. Farlow,²⁷ in 1883, from teliosporic material on *Juniperus Virginiana*, which gave rise to pycnia on leaves of *Malus Malus*, *Aronia arbutifolia* and *Amelanchier Canadensis*, but failed to mature aecia. Cultures were also made by Dr. Roland Thaxter²⁸ in 1886, from similar material, producing pycnia on leaves of *Malus Malus*, and both pycnia and well developed aecia on *Amelanchier Canadensis*, especially on stems and midribs. A difference in the source of material used in the earlier cultures, and for the present year, is worth noting. The former was taken from *Juniperus Virginiana*, the red cedar, while the latter came from *Juniperus Sibirica*, the dwarf juniper. This is the only species of *Gymnosporangium* so far known to inhabit both the true cedars and the true junipers, and the situation should receive careful study. Either the species is a more generalized one than usual, which is not borne out by the geographical distribution, or it is an aggregate of two closely related forms thus far confused.

21. *GYMMOSPORANGIUM CLAVARIAEFORME* (Jacq.) DC.—Teliosporic material on the stems of *Juniperus Sibirica* Burgsd., obtained at Lake Forest, Ill., by Mr. F. D. Kern, was sown on leaves of *Malus Malus* (Bechtel Crab variety), with no infection, and also on leaves of *Amelanchier intermedia* April 11, giving rise to a few pycnia April 20, but to no further development owing to withering of the leaves.

The first culture of this species was made in Denmark, by Oersted, in 1867. The numerous subsequent cultures by European investigators are summarized by Klebahn.²⁹ The only definite cultures with American material were made by Dr. Roland Thaxter,³⁰ in 1886 and 1887. He grew an abundance of pycnia and aecia on *Crataegus tomentosa* and *Amelanchier Canadensis*. Uncertain results were obtained in trials by Prof. L. H. Pammel.³¹

22. *GYMNASPORANGIUM NIDUS-AVIS* Thax.—Teliosporic material on *Juniperus Virginiana* L., obtained at Lake Forest, Ill., by Mr. F. D. Kern, was sown on *Amelanchier intermedia*, with no infection, and also on *Malus Malus* (Whitney Crab variety April 10, which gave rise to a few pycnia April 17, and aecia May 11, a period of incubation shorter than for most *Gymnosporangia*. The spores for sowing were taken from large sori on the branches. The only previous cultures of this species were made by Dr.

²⁷ Proc. Am. Acad. Sci. 20:313. 1885.

²⁸ Bot. Gaz. 11:236. 1886; Proc. Am. Acad. Sci. 22:264. 1887.

²⁹ Die wirtswechselnden Rostpilze, pages 339-345.

³⁰ Proc. Am. Acad. Sci. 22:262. 1887; and Bot. Gaz. 14:166. 1889.

³¹ Bull. Iowa Exper. Sta. 84:33. 1905.

Roland Thaxter,³² in an extensive series running from 1886 to 1890, inclusive. He grew it on *Amelanchier Canadensis* in great abundance, showing both pycnia and aecia, and in one instance pycnia were formed on the common apple, but failed to develop further. Thaxter also noted the early development of pycnia and aecia.

The following eight species have now been grown in cultures for the first time, so far as the writer knows. The two cases of amphispores and the one autoecious species resulted as anyone might have taken for granted, but in the other five cases the results are wholly unpredicted, and represent very material advancement in the knowledge of American heteroecious rusts.

1. *PUCCINIA VEXANS* Farl.—Material bearing both teliospores and amphispores on *Atheropogon curtispendus* (Michx.) Fourn. (*Bouteloua racemosa* Lag.), was sent from Boulder, Colo., by Mr. E. Bethel, and gave good germination for the amphispores, but the teliospores refused to grow. Sowing was made on *Atheropogon curtispendus* May 29, and uredinia were observed June 21, although they may have appeared earlier and been overlooked. The amphispores were the characteristic, dark-colored, thick-walled and four-pored form, while the urediniospores, to which they gave rise, had the usual light-colored, thin-walled and eight-pored appearance. The difference between the resting form (amphispore) and active form of the urediniospores belonging to this species is very striking. This is the second time, as far as the writer knows, that amphispores of this species have been seen to germinate.

2. *PUCCINIA CRYPTANDRI* Ellis & Barth.—Amphisporic material on *Sporobolus cryptandrus* (Torr.) A. Gray, obtained at Manitou, Colo., by Mr. F. D. Kern and the writer, was sown on a plant of the same species of grass May 9, and uredinia appeared May 24. In this case the difference between the resting or amphisporic form of the urediniospores and the active or summer form is not so marked as in the preceding species, and yet there is no mistaking one for the other.

3. *PUCCINIA OBTECTA* Peck.—Teliosporic material on *Scirpus Americanus* Pers., obtained near Lafayette, Ind., by Mr. F. D. Kern, was sown on *Urtica gracilis*, and *Silphium perfoliatum*, with no infection, and afterward on *Bidens frondosa* June 5, giving rise to a few pycnia June 19, and aecia first noticed July 6, but probably opening earlier. Another sowing was made on *B. frondosa* and also on *B. connata* June 24, both showing a good development of pycnia July 1, and aecia July 6.

³² Bot. Gaz. 11:238. 1886; Proc. Am. Acad. Sci. 22:264. 1887; Bot. Gaz. 14:167. 1889; and Bull. Conn. Exper. Sta. 107:5. 1891.

The telial stage is common and well known throughout the United States and extending into Mexico, but the aecial stage has rarely been collected. Collections of aecia are in the writer's herbarium from Nebraska and Wisconsin, and in the literature one is also recorded from Illinois. On the basis of a single collection on *Bidens frondosa* Professor Burrill separated it as a special form, and De Toni, in the seventh volume of Saccardo's Sylloge, supplied the name *Aecidium compositarum* var. *Bidentis* Burrill.

4. PUCCINIA ON CAREX STENOPHYLLA.—Teliosporic material of this rust collected at Boulder, Colo., by the writer, was sown on *Solidago Canadensis* and *Baptisia leucantha*, with no infection.

It was at this point in the work that a brief note of observation was seen in Dr. W. Tranzschel's second report on "Beiträge zur Biologie der Uredineen." This is a translation in full: "In July, 1900, I found in Turkestan, near Irkeschtam on the Chinese border, the *Aecidium Dracunculi* Thüm. on *Artemisia Dracunculus* in great abundance. Associated with the affected *Artemisia* grew *Carex stenophylla* Wahlb., on which was found uredosori." Accepting this as a hint, the Colorado material was now sown on *Artemisia dracunculoides*. As no potted plant was available, a sowing was made in the open, giving no infection, and another in the greenhouse on a cutting placed in water. The latter attempt gave very abundant and unequivocal results. The sowing was made May 31, and pycnia appeared June 6, followed by aecia June 15, both numerous and finely developed.

The type collection of this *Aecidium* was made in Siberia, at Minussinsk, also on the Chinese border, but about a thousand miles northeast of the locality where it was found by Dr. Tranzschel. This collection was distributed in Thuemen's Mycotheca Universalis, No. 1223. A collection of aecia on *Artemisia dracunculoides* from Nebraska was distributed in Ellis & Everhart's Fungi Columbiani, No 1664. A careful comparison shows no apparent difference between the Asian and American collections, and the two are accepted as the same species.

As a name and description seem to be demanded for this species, the following are submitted:

***Puccinia universalis* nom. nov. (*Aecidium Dracunculi* Thuem., not *Puccinia Dracunculi* Auers.)**

O. Pycnia chiefly epiphyllous, numerous in orbicular groups, punctiform, honey-yellow, rather inconspicuous; subepidermal, slightly depressed-globose, 100-160 μ broad by 90-112 μ high; ostiolar filaments 40-80 μ long.

I. Aecia chiefly hypophyllous, crowded in orbicular groups opposite the pycnia, 1-3 mm. across, peridia cylindrical, 0.5 mm. high, margin usually erect, erose, peridial cells rhomboidal, 20-30 μ long, overlapping,

inner wall medium thick, 3-4 μ , verrucose, outer wall thicker, 5-9 μ , smooth, striate; aeciospores globoid, small, 12-18 by 15-21 μ ; wall very thin, 0.5-1 μ , nearly colorless, very minutely granular.

On *Artemisia dracunculoides* Pursh, Colorado, Nebraska; *A. Canadensis* Michx., Iowa, Nebraska; *A. frigidia* Willd., Montana; *A. kansana* Britt., Nebraska. Type on *A. Dracunculus* L., Western Siberia.

II. Uredinia epiphyllous, scattered, oblong, 0.2-0.5 mm. long, rather early naked, cinnamon-brown, ruptured epidermis conspicuous; urediniospores broadly ellipsoid, 15-19 by 20-26 μ , wall cinnamon brown, 1-1.5 μ thick, rather finely echinulate, pores 2, equatorial.

III. Telia epiphyllous, scattered, roundish or oblong, 0.1-0.3 mm. wide by 0.2-1.2 mm. long, early naked, pulvinate, ruptured epidermis noticeable; teliospores clavate-oblong, 16-26 by 35-52 μ , wall dark chestnut-brown, lighter and about 1.5-2 μ thick below, thicker above, 7-12 μ , smooth; pedicel tinted, one-half length of spore, or more.

On *Carex stenophyllo* Wahl., Colorado, Nebraska, Montana.

5. PUCCINIA ON CAREX LONGIROSTRIS.—Field observations by Dr. E. W. Olive, and material furnished by him, including aecia host plants, supplied the entire basis for the result reported under this number.

Teliospores from *Carex longirostris* Torr. were sown June 4 on *Aster paniculatus*, *Erigeron annuus*, *Solidago Canadensis*, *Ribes Cynosbati*, and *Phryma leptostachya*, with no infection, except on *Phryma*, which showed pycnia June 10 in great abundance, and aecia June 15. The development was exceptionally strong and characteristic.

No rust has heretofore been reported on this species of *Carex*. The aecial stage was first collected at Spirit Lake, Iowa, by Dr. B. D. Halsted, in 1886, and has since been reported from Minnesota and Nebraska, and found by Dr. Olive this season at Madison, Wis. A description of the species in its several spore-stages is appended:

Puccinia Phrymae (Halst.) nom. nov. (*Aecidium Phrymae* Halst., Jour. Myc. 2:52. 1886.)

O. Pycnia amphigenous, few, crowded in small groups, inconspicuous, honey-yellow, becoming blackish-brown, slightly flattened globoid, 77-110 μ in diameter by 65-80 μ high; ostiolar filaments 40-50 μ long.

I. Aecia hypophyllous, gregarious, in large open groups on discolored spots 4-10 mm. across, very short, 0.2-0.3 mm. in diameter, pale yellow; peridia colorless, margin recurved, erose, peridial cells rhomboidal in longitudinal section, overlapping, inner wall thin, about 1 μ , finely verrucose, outer wall thicker, 3-4 μ , striate, smooth; aeciospores globoid, 12-16 by 14-19 μ , wall pale yellow, thin, 1 μ or less, finely verrucose.

On *Phryma leptostachya* L., Iowa, Wisconsin, Nebraska, Minnesota. Type from Spirit Lake, Iowa.

II. Uredinia hypophyllous, scattered, round or oblong, early naked, ruptured epidermis noticeable; urediniospores broadly ellipsoid, 15-18 by 18-20 μ , wall cinnamon-brown, 1-1.5 μ thick, finely and rather sparsely echinulate, pores 2, in upper part.

III. Telia hypophyllous, scattered, round or oblong, 0.2-0.4 mm. wide by 0.3-0.8 mm. long, early naked, dark chocolate-brown, pulvinate, ruptured epidermis noticeable; teliospores clavate-oblong, 12-15 by 35-45 μ , rounded or obtuse at apex, usually narrowed below, wall chestnut-brown, concolorous, 1-1.5 μ thick, much thicker, 9-13 μ : pedicel about length of spore or less, tinted.

On *Carex longirostris* Torr., Wisconsin.

6. PUCCINIA MUTABILIS Ellis & Gall.—While collecting for a few days in Colorado about the first of May, wintered-over teliospores were found on a number of species of *Allium*, in most cases not accurately determined for want of the inflorescence. In a few cases young leaves of the season showed freshly formed uredinia, and in one instance immature telia were observed beside the uredinia, evidently arising from the same mycelium. A few very young aecia, well isolated from other spore forms were also found. As it was clearly too early in the season to have had aecia mature and reinfect the host, and in this manner give rise to the uredinia, the question arose whether the aecia did not belong to some heteroecious species, while the uredinia and telia represented a species without aecia. Further search in the field brought to light some leaves which without question had remained alive over winter. In one case the dead tip of such a leaf bore telia of last year's growth, and on the adjoining green part of the leaf uredinia were forming. This seemed to show that the early uredinia were derived from wintered-over mycelium, but it left the question of the origin of the aecia unsolved.

Teliosporic material on what was believed to be *Allium reticulatum* Fraser, was obtained by the writer at Eldorado Springs, Colo., and sown on *Allium recurvatum* Rydb., May 18, giving rise to pycnia June 3, and aecia June 7. The life cycle of the rust with all spore forms is therefore established, although it is clearly possible in exceptional cases for the mycelium to be carried over the winter in leaves that retain their vitality and thus start the rust in the spring at the uredinial stage.

7. GYMNOSPORANGIUM BETHELI Kern.—Teliosporic material on *Juniperus scopulorum* Sarg., obtained at Boulder, Colo., by Mr. F. D. Kern, was sown on *Crataegus* sp. (received from the Arnold Arboretum) April 30, showing pycnia May 8, and aecia June 5, the aecia being fully matured by June 17. Another sowing was made on *Crataegus coccinea* May 15, showing pycnia May 21, and aecia June 24. Another sowing on *Crataegus punctata* May 15, gave pycnia May 21, but the leaves withered before aecia had formed. Another sowing on *Sorbus Americana* May 21, gave rise to numerous pycnia May 29, and an equal abundance of well formed aecia July 25.

Similar material obtained at Wolcott, about one hundred miles west of Boulder, was sown on *Crataegus cordata* (Mill.) Ait. May 5, on a tree out of doors, giving rise to pycnia May 17, and aecia July 1. Another sowing on *Sorbus Americana* May 15, gave a large number of pycnia May 24, and aecia well formed July 25. A sowing on *Amelanchier erecta* gave no infection.

All the foregoing sowings were on the leaves. The ample success attained admits of no question that the aecia, recently described under the name *Roestelia Betheli* Kern, do in fact belong to the large gall form of cedar rust, as suggested by Mr. E. Bethel³³ from field observations.

8. GYMNOSPORANGIUM INCONSPICUUM Kern. — Teliosporic material on *Juniperus Utahensis* (Engelm.) Lemmon, obtained from the type locality at Glenwood Springs, Colo., by Mr. F. D. Kern and the writer, was sown on the leaves of *Crataegus* sp., *Amelanchier Canadensis*, and *Pyrus communis*, with no infection. It was afterward sown on fruit of *Amelanchier erecta* May 10, which gave rise to abundance of pycnia May 24, and aecia June 15, the aecia being mature by June 19. The affected areas of the fruit became somewhat swollen, and of a yellowish white color, making them conspicuous. The aecia prove to be identical with *Roestelia Harknessianoides* Kern, and thus confirm the inference drawn from field observations.³⁴ It is an interesting fact that while the telia of this species of rust are very evanescent, the aecia persist and may be found on mummified fruits the year following infection, so that it is likely to become common in herbaria.

SUMMARY.

The following is a complete list of successful cultures made during the season of 907. It is divided into two series: species previously reported by the writer or other investigators, and species now reported for the first time.

A Species previously reported.

1. PUCCINIA ALBIPERIDIA Arth. — Teliospores on *Carex crinita* Lam., sown on *Ribes Cynosbati* L.

2. PUCCINIA CARICIS-ASTERIS Arth. — Teliospores on *Carex rosea* Schk., sown on *Aster cordifolia* L., and on *Carex* sp., sown on *Aster paniculatus* Lam.

3. PUCCINIA CARICIS (Schum.) Reb. — Teliospores on *Carex stipata* Muhl., and on *C. riparia* Curt., sown on *Urtica gracilis* Ait.

³³ Bull. Torrey Club 34:460. 1907.

³⁴ Bull. Torrey Club 34:463. 1907.

4. PUCCINIA ANGUSTATA Peck. — Teliospores on *Scirpus atrovirens* Muhl., sown on *Lycopus Americanus* Muhl.

5. PUCCINIA FRAXINATA (Schw.) Arth. — Teliospores on *Spartina cynosuroides* Willd., sown on *Fraxinus lanceolata* Borck.

6. PUCCINIA SUBNITENS Diet. — Teliospores on *Distichlis spicata* (L.) Greene, sown on *Chenopodium album* L., and *Bursa Bursa-pastoris* (L.) Britt.

7. PUCCINIA AMPHIGENA Diet. — Teliospores on *Calamovilfa longifolia* (Hook) Hack., sown on *Smilax hispida* Muhl.

8. PUCCINIA PHRAGMITIS (Schum.) Körn. — Teliospores on *Phragmites communis* Trin., sown on *Rumex crispus* L.

9. PUCCINIA SIMILLIMA Arth. — Teliospores on *Phragmites communis* Trin., sown on *Anemone Canadensis* L.

10. PUCCINIA AGROPYRI Ellis and Ev. — Teliospores on *Agropyron pseudorepens* S. & S., sown on *Vioria Scottii* (Porter) Rydb., and on *Clematis Virginiana* L.

11. PUCCINIA POCULIFORMIS (Jacq.) Wettst. — Teliospores on *Agropyron tenerum* Vasey, sown on *Berberis vulgaris* L., and aeciospores from this culture sown on *Avena sativa* L.

12. PUCCINIA PAMMELII (Trel.) Arth. — Teliospores on *Panicum virgatum* L., sown on *Euphorbia marginata* Pursh.

13. UROMYCES ACUMINATUS Arth. — Teliospores on *Spartina cynosuroides* Willd., sown on *Steironema ciliata* (L.) Raf.

14. UROMYCES SCIRPI (Cast.) Burr. — Teliospores on *Scirpus fluviatilis* (Torr.) A. Gray, sown on *Cicuta maculata* L.

15. UROMYCES SILPHII (Syd.) Arth. — Teliospores on *Juncus tenuis* Willd., sown on *Silphium perfoliatum* L.

16. PHRAGMIDIUM SPECIOSUM Fr. — Teliospores on *Rosa pratincola* Greene, sown on same host.

17. GYMNOSPORANGIUM JUNIPERI-VIRGINIANAE Schw. — Teliospores on *Juniperus Virginiana* L., sown on *Malus Malus* (L.) Britt.

18. GYMNOSPORANGIUM GLOBOSUM Farl. — Teliospores on *Juniperus Virginiana* L., sown on *Malus Malus* (L.) Britt.

19. GYMNOSPORANGIUM NELSONI Arth. — Teliospores on *Juniperus Scopulorum* Sarg., sown on *Amelanchier intermedia* Spach, *A. Canadensis* (L.) Medic., *A. erecta* Blanch., and *Sorbus Americana* Marsh.

20. GYMNOSPORANGIUM CLAVIPES C. & P.—Teliospores on *Juniperus Sibirica* Burgsd., sown on *Amelanchier intermedia* Spach, and *A. erecta* Blanch.

21. GYMNOSPORANGIUM CLAVARIAEFORME (Jacq.) DC.—Teliospores on *Juniperus Sibirica* Burgsd., sown on *Amelanchier intermedia* Spach.

22. GYMNOSPORANGIUM NIDUS-AVIS Thax.—Teliospores on *Juniperus Virginiana* L., sown on *Malus Malus* (L.) Britt.

B. Species reported now for the first time.

1. PUCCINIA VEXANS Farl.—Amphisporae on *Atheropogon curtipendulus* (Michx.) Fourn., sown on same host.

2. PUCCINIA CRYPTANDRI Ellis & Barth.—Amphisporae on *Sporobolus cryptandrus* (Torr.) A. Gray, sown on same host.

3. PUCCINIA OBTECTA Peck.—Teliospores on *Scirpus Americanus* Pers., sown on *Bidens frondosa* L., and *B. connata* Muhl.

4. PUCCINIA UNIVERSALIS Arth.—Teliospores on *Carex stenophylla* Wahl., sown on *Artemisia dracunculoides* Pursh.

5. PUCCINIA PHRYMAE (Halst.) Arth.—Teliospores on *Carex longirostris* Torr., sown on *Phryma leptostachya* L.

6. PUCCINIA MUTABILIS Ellis & Gall.—Teliospores on *Allium reticulatum* Fraser, sown on *A. recurvatum* Rydb.

7. GYMNOSPORANGIUM BETHELI Kern.—Teliospores on *Juniperus scopulorum* Sarg., sown on *Crataegus coccinea* L., *C. punctata* Jacq., *C. cordata* (Mill.) Ait., and *Sorbus American* Marsh.

8. GYMNOSPORANGIUM INCONSPICUUM Kern.—Teliospores on *Juniperus Utahensis* (Engelm.) Lemmon, sown on *Amelanchier erecta* Blanch.

NORTH AMERICAN SPECIES OF AGARICACEAE.

A. P. MORGAN.

THE MELANOSPORA. (Continued).

(Continued from page 255).

VII. HYPHOLOMA FRIES, SYST. MYC. I, 1821.

Pileus fleshy to submembranaceous, convex or campanulate then expanded; the veil marginal, woven into a web which adheres to the margin of the pileus. Stipe tubulous and stuffed or generally hollow, fragile to firm and tough, mostly fibrillose or scaly. Lamellae adnexed or adnate, the color at maturity becoming some shade of brown; spores brown or purple-brown.

The species usually caespitose, growing upon and around old decaying stumps and trunks.

1. APPENDICULATAE. *Pileus submembranaceous, thin and fragile, hygrophanous; the surface glabrous, often rugulose, scarcely striatulate. Stipe fistulous, fragile, glabrous or silky fibrillose, nearly always white. Lamellae usually narrow and close or crowded.*

The species of this tribe are to be distinguished from those of *Psilocybe* chiefly by their caespitose habit and the more evident veil.

a. *Lamellae at first white or whitish.*

1. HYPHOLOMA APPENDICULATUM BULLIARD, HERB. FR. 1788. A. (HYPHOLOMA) SACCHARINOPHILUS PECK, 25 N. Y. REP. 1872.

Pileus submembranaceous, ovoid then convex and expanded, glabrous, hygrophanous, when dry rugose and somewhat atomate, at first brown becoming tawny or pale ochre; the flesh thin, fragile, concolorous. Stipe equal, fistulous, glabrous, white, pruinose at the apex. Lamellae narrow, close adnexed, at first whitish then incarnate-brown; spores pellucid brown, elliptic, 6-8 x 3-4 mic.

Densely caespitose, growing on old stumps and trunks; New England to the Pacific Coast. *Pileus* 4-8 cm. in diameter; *stipe* 6-9 cm. long, 3-6 mm. thick.

2. HYPHOLOMA INCERTUM PECK, 29 N. Y. REP. 1876. HYPHOLOMA CUTIFRACTUM PECK, BULL. TORR. CLUB, 1895. STROPHARIA IRREGULARIS PECK, BULL. TORR. CLUB, 1900.

Pileus fleshy, convex or subcampanulate then expanded, often rugulose, hygrophanous, whitish with the center yellowish,

sometimes purplish-tinted around the margin; the flesh thin, fragile; the veil white, flocculent, fugacious. Stipe equal, fistulous, easily splitting, whitish, pruinose at the summit. Lamellae narrow, close, whitish then rosy-brown; spores purplish-brown, elliptic, $7-8 \times 5$ mic.

Subcaespitose; growing on the ground around old stumps in dooryards, orchards, etc. New York westward to Kansas. Pileus 3-6 cm. in diameter; stipe 6-10 cm. high, 2-4 mm. thick.

3. *HYPHOLOMA ROYSTONIAE*, *GYMNOCHILUS ROYSTONIAE* EARLE, HONGOS CUBANOS, 1906.

Pileus fleshy, convex then expanded, obtuse, glabrous, somewhat reticulate and striatulate, hygrophanous, pallid tinged with purple, becoming whitish when dry; the flesh thin and fragile; the veil of whitish filaments soon disappearing. Stipe short, fistulous, glabrous, white, with a mycelioid base. Lamellae moderately broad, close, adnexed, at first pallid, at length purple-brown; spores elliptic, $7-8 \times 4-5$ mic.

Subcaespitose, growing on rotten trunks of *Roystonia*; Cuba. Earle. Pileus 1-3 cm. in diameter; stipe 2 cm. long, 2 mm. thick.

4. *HYPHOLOMA MADEODISCUM* PECK, 38 N. Y. REP. 1884.

Pileus thin, convex becoming nearly plane, hygrophanous, when moist reddish brown, pale ochraceous when dry, the disk rugulose; the veil whitish, at first concealing the lamellae, at length depending in fragments from the margin of the pileus. Stipe tapering upward from a slightly thickened base, fistulous, white, somewhat silky. Lamellae close, slightly emarginate, at first whitish, becoming brown; spores brown, elliptic, $9-10 \times 6$ mic.

Growing on decaying wood in wet places; New York, Peck. Pileus 3-5 cm. in diameter; stipe 5-7 cm. long, 4-6 mm. thick. "I have not seen the plant growing in tufts."

5. *HYPHOLOMA MUSAE*, *GYMNOCHILUS MUSAE* EARLE, HONGOS CUBANOS, 1906.

Pileus convex then expanded, silky, striatulate, hygrophanous, pale ochraceous tinged with purple-brown, becoming pallid or whitish when dry; the flesh thin, fragile, watery; the veil delicate, whitish, appendicular and evanescent. Stipe slender, fragile, hollow, white, glabrous, but with the apex slightly mealy and with a mycelioid base. Lamellae narrow, crowded, adnexed, at first whitish, becoming purple-brown; spores elliptic, $6-8 \times 4-5$ mic.

Subcaespitose; growing on old leaves of *Musa*; Cuba, Earle. Pileus 1-3 cm. in diameter; stipe 3-6 cm. long, 2 mm. thick.

6. *HYPHOLOMA CAESPITOSA*, *CYMNOCILUS CAESPITOSUS* EARLE, *HONGOS CUBANOS*, 1906.

Pileus fleshy, convex then expanded, glabrous, faintly striate, hygrophanous, at first cinnamon-brown, becoming pale gray, darker in the center; the flesh thin pallid; the veil white, appendicular and evanescent. Stipe long, rather stout, hollow, flocculose, white. Lamellae adnexed, at first of a dirty white color, becoming dark brown, spores elliptic, about 7×5 mic.

Densely caespitose, forming large clumps at the foot of a trunk in a garden; Cuba, Earle. Pileus 3-5 cm. in diameter; stipe 6-12 cm. long, 4-6 mm. thick.

b. Lamellae colored from the first.

7. *HYPHOLOMA CORONATUM* FRIES, *HYM. EUR.* 1874; *ICONES SEL.* 134, *HYPHOLOMA SUBAQUILUM* BANNING, 44 N. Y. REP. 1890; *HYPHOLOMA CALIFORNICUM* EARLE, *MYC. STUDIES*, 1, 1902.

Pileus submembranaceous, convex then explanate, obtuse, glabrous, hygrophanous, pale, umber, darker in the center and variegated with darker spots; the margin crowned by the dentiform appendiculate, white veil. Stipe slender, fistulous, smooth and glabrous, white. Lamellae narrow, crowned, adnate, carneo-purple or umber; spores umber, elliptic-oblong, $5-6 \times 3-4$ mic.

Caespitose; growing at the base of trunks in woods; Pacific Coast Cat.; Maryland, Banning. Pileus 3-6 cm. in diameter; stipe 5-8 cm. long, 3-5 mm. thick.

8. *HYPHOLOMA MUTABILE*, *AGARICUS MUTABILIS*, *FLORA DANICA*, 774; *AGARICUS VIOLACEO-LAMELLATUS*, *FLORE FRANCAISE* II, 1805; *AGARICUS CANDOLLIANUS* FRIES, *OBS.* II, 1818.

Pileus somewhat fleshy, companulate then convex and explanate, obtuse, glabrous, hygrophanous, at first brown, then becoming white with the center ochraceous, the flesh thin whitish. Stipe tapering upward from a slightly thickened base, fistulous, fragile, subfibrillose, white, the apex striate. Lamellae narrow, close, rounded behind, adnexed, at first violaceous then cinnamon-brown; spores brown, elliptic, 8×4 mic.

Caespitose; growing on the ground in woods, New York west to Nebraska. Pileus 5-10 cm. in diameter; stipe 7-9 cm. long, 3-6 mm. thick. The distinguishing feature of the species is the violet color of the young lamellae.

9. *HYPHOLOMA CAMPESTRE*, *GYMNOCHILUS CAMPESTRIS* EARLE, *HONGOS CUBANOS*, 1906.

Pileus fleshy, fragile, campanulate then expanded, glabrous, hygrophanous, at first grayish brown, then argillaceous, darker in the center, becoming reticulate when dry and striatulate. Stipe fistulous, fragile, white, glabrous except at the summit where it is striate and floccose-pulverulent. Lamellae narrow, close, adnexed, at first grayish-brown, at length dark brown; spores elliptic, 8-10 x 5-6 mic.

Gregarious; growing in grassy grounds; Cuba, *Earle*. Pileus 2-5 cm. in diameter; stipe 4-6 cm. long, 2-4 mm. thick. Much resembling *H. incertum*.

10. *HYPHOLOMA ARTRIFOLIUM* PECK, *BULL. TORR. CLUB*, 1896; *SYLLOGE XIV*, 152.

Pileus submembranaceous, convex or hemispheric then expanded, usually umbonate, radiately rugulose, hygrophanous, when wet wood-brown, when dry pale yellow or cream-color; the veil fugacious. Stipe slender, fistulous, fibrillose, pallid or cream-color. Lamellae rather distant, adnate, at first pale brown, at length dark brown or nearly black; spores dark brown, elliptic, 10-11 x 5 mic.

Subcaespitose; growing among bushes; California, *McClatchie*. Pileus 3-5 cm. in diameter; stipe 3-6 cm. long, 3-6 mm. thick.

11. *HYPHOLOMA HYDROPHILUM*, *SYLLOGE V*, 1041; *COOKE, ILLUSTR.* 605; *BOLBITIUS HYDROPHILUS* FRIES, *HYM. EUR.* 1874; *AGARICUS HYDROPHILUS* BULLIARD, *HERB. FR.* 1791.

Pileus submembranaceous, convex then expanded, subrepand, rugulose, hygrophanous, dark brown, becoming tawny when dry, the veil extremely fugacious, often none. Stipe fistulous, somewhat curved and often compressed, appressedly fibrillose, ferruginous, becoming pallid. Lamellae close, adnexed, ventricose, cinnamon brown; spores ferruginous, 7-8 x 3-4 mic.

Densely caespitose; growing about the base of trunks; Michigan, *Kauffman*. Pileus 1-2 cm. in diameter; stipe 5-6 cm. long, 2-4 mm. thick.

II. *FASCICULARIAE*. *Pileus fleshy, rather tough, not hygrophanous; the surface smooth and glabrous, dry or slightly viscid, bright-colored. Stipe long, thick, tough, stuffed or hollow, usually fibrillose, bright-colored.*

a. *Pileus smooth and dry, not viscid.*

12. *HYPHOLOMA FASCICULARE*, *AGARICUS FASCICULARIS* HUDSON, *FLORA AUGL.* 1778; *WILLDENOW, FLORA BEROL.* 1787; *WITHERING, ARR. IV,* 1796; *HYPHOLOMA PAPILLATUM* PATOUILLARD, *BULL. SOC. MYC.* 1898.

Pileus fleshy, ovoid then campanulate and expanded, subumbonate; the flesh thin, yellow; the surface smooth and glabrous, yellow, fulvous in the center. Stipe slender, flexuous, fistulous, fibrillose, yellow within and without. Lamellae narrow, crowded, adnate, at first sulphur-yellow, becoming green; spores elliptic, $6-7 \times 4$ mic.

Densely caespitose; growing on old stumps and about them on the ground. Probably common everywhere. Pileus 3-5 cm. in diameter; stipe 3-10 cm. or more in length, 2-4 mm. thick. Readily distinguished by its color, thinness and intensely bitter taste.

13. *HYPHOLOMA LATERITIUM*, *AGARICUS LATERITIUS* SCHAEFFER, *INDEX*, 1774; *PERSOON, COMM.* 1800; *AGARICUS FASCICULARIS, VAR. 3, WITHERING, ARR. IV,* 1796; *AGARICUS SUBLATERITIUS* FRIES, *EPICRISIS*, 1836; *AGARICUS PERPLEXUS* PECK, 23 *N. Y. REP.* 1870.

Pileus fleshy, convex then expanded, obtuse, discoid; the flesh rather thick, compact, white then yellowish; the surface smooth, becoming glabrous, tawny to brick-color, paler toward the margin. Stipe tapering downward, stuffed, fibrillose, ferruginous. Lamellae rather narrow, close, adnate, at first whitish, becoming sooty-ochraceous; spores purple-brown, elliptic, $6-7 \times 3-4$ mic.

Subcaespitose; growing on and about old stumps; common everywhere. Pileus 6-10 cm. in diameter; stipe 8-12 cm. or more long, 6-10 mm. thick. A large and variable Agaric; the taste bitter.

14. *HYPHOLOMA CAPNOIDES* FRIES, *OBS. II,* 1818; *ICONES*, 133.

Pileus fleshy, convex then explanate, obtuse; the flesh thin, white; the surface dry, smooth and glabrous, yellowish to ochraceous; the veil white, appendiculate. Stipe equal, often curved and flexuous, fistulous, silky-smooth, pallid. Lamellae broad, rather close, adnate, gray-blue becoming purplish-brown; spores elliptic, $7-8 \times 4-5$ mic.

Caespitose; growing on trunks of Pine in mountain woods, Pacific Coast Cat. Pileus 3-7 cm. in diameter; stipe 5-10 cm. long, 4-8 mm. thick. Odor and taste mild.

15. *HYPHOLOMA EPIXANTHUM* FRIES, *EPICRISIS*, 1836; *ICONES*, 133.

Pileus fleshy, convex then explanate, somewhat gibbous; the flesh thin, yellowish; the surface smooth, slightly silky, at length glabrous, yellow or pallescent, commonly darker in the center; the veil white. Stipe nearly equal, hollow, floccose-fibrillose, whitish at the apex and pruinose, below dilute ferruginous or brownish. Lamellae broad, close, adnate, pale yellow, at length cinerascens; spores elliptic, $6-7 \times 4$ mic.

Subcaespitose; growing on old trunks, especially of Pine; Atlantic states to Pacific. Pileus 4-8 cm. in diameter; stipe 6-8 cm. long, 6-8 mm. thick. The lamellae never becoming purple or green.

16. *HYPHOLOMA MARGINATUM*, *AGARICUS MARGINATUS* PERSOON, *OBS. MYC.* I, 1796; *AGARICUS DISPERSUS* FRIES, *EPICRISIS*, 1836; *ICONES*, 133.

Pileus fleshy, campanulate then convex and expanded, not hygrophanous, the flesh thin, pallid; the surface honey-color to fulvous, smooth, but around the margin white-silky or scaly from the veil. Stipe slender, tough, stuffed then hollow, equal, straight, silky-fibrillose, brown-ferruginous, pallid above. Lamellae broad, close, adnate, pale straw-color, afterward nebulous; spores ovoid-oblong, $12-14 \times 6$ mic.

Commonly solitary; growing in Pine woods on trunks and on the ground; N. Carolina, *Curtis*; Pacific Coast Cat. Pileus 3-5 cm. in diameter; stipe 5-7 cm. long, 2-4 mm. thick.

b. The surface of the pileus slightly viscid.

17. *HYPHOLOMA RUGOCEPHALUM* ATKINSON, *MUSHROOMS*, 1900.

Pileus fleshy, convex then expanded, broadly umbonate; the surface glabrous, radiately rugulose, slightly viscid, fulvous; the flesh thin, yellowish; veil marginal, lacerate. Stipe arising from a bulbous base, fistulous, smooth and glabrous, concolorous with the pileus; a slight annulus composed of a few threads of the veil remains upon the stipe. Lamellae rather broad, adnate, slightly sinuate, spotted with the black spores, lighter on the edge; spores purplish-black, minutely tuberculate, pointed at each end, $8-11 \times 6-8$ mic.

Subcaespitose; growing in damp places in woods; New York *Atkinson*. Pileus 6-10 cm. in diameter; stipe 8-12 cm. long, 6-10 mm. thick.

(To be continued.)

NOTES FROM MYCOLOGICAL LITERATURE. XXVII.

W. A. KELLERMAN.

Kern, Frank Dunn.

Some interesting species are described in the September No. of the Bulletin of the Torrey Botanical Club (1907) under the title of "New western Species of Gymnosporangium and Roeselia," the same being *Gymnosporangium betheli* n. sp. ("without doubt the most injurious to the cedars of all the species"); *Gymnosporangium durum* n. sp. (produces "a very regular, nearly globose, hard, woody gall"); *Gymnosporangium inconspicuum* n. sp. ("a very inconspicuous species; the small pulvinate sori breaking forth between the leaves soon become gelatinized and form a film over the surface of the leaves"). The *Roesteliae* are *R. betheli* n. sp., *R. harknessiana* Ellis & Ev. n. sp., and *R. Harknessianoides* n. sp.

Whetsel, H. H.

A lecture on "Some Bacterial Diseases of Plants: Their Nature and Treatment," delivered before the Massachusetts Horticultural Society [published in the Transactions for 1907], with stereoptican illustrations, classifies the diseases as *Blights* (Fire Blight of Pears, etc., Mulberry Blight, Walnut Bacteriosis, Alfalfa Blight, Bean Blight), *Rots* (Black Rot of Cabbage, etc., Soft Rot of Turnips, etc.), *Wilts* (of Cucumbers, squashes, and melons, of potatoes, tomatoes and egg plant, of Sweet corn, of Tobacco), *Galls* (of Olive and Oleander, and root galls or nodules of Legumes). The annual history of the Fire Blight is fully given; the fact is emphasized that the blight bacteria are never carried by the wind and they do not exist in the soil; the milky drops of a sticky fluid oozing from diseased tissues transported by flies and other insects explains the inoculation of the host plants.

Saccardo, P. A.

We find in Boletín de Sociedade Broteriana, XXI, 1894-5, forty species enumerated under the title "Fungi aliquot Africani lecti Cl. A. Moller, Is. Newton et A. Sarmiento, auctore P. A. Saccardo." New species are: *Dimerium radio-fissile*, *Meliola thomasiana*, *Leptosphaeria larvalis*, *Micropeltis clavigera*, *Mic. corynespora*, *Mic. molleriana*, *Diplodia vignae*, *Septoria thomasiana*, *Rhabdospora insulana*, *Gloeosporium colubrinum*, *Tuberulina apiculata*.

Hunter, George William.

In "Elements of Biology, a practical text-book correlating Botany, Zoology and human Physiology," we find about a dozen pages devoted to Fungi, Parasites, and Saprophytes.

Shear, C L.

Bulletin No. 110, Bureau of Plant Industry, U. S. Dept. Agr., is devoted to the "Cranberry Diseases." Special attention is given to *Guignardia vaccinii* Shear (blast and scald); *Acanthorhynchus vaccinii* Shear (rot); *Glomerella rufomaculans vaccinii* Shear (anthracnose); *Exobasidium oxycocci* Rostr. (hyperthrophy); a large number of less important diseases are given, fungi which attack the fruit, and the leaves or stems. Preventive and remedial measures are included, also a bibliography of cranberry diseases. There are seven full page illustrative plates, the first a colored frontispiece showing Cranberry Scald. The American Cranberry has been in cultivation seventy-five years or more and is attacked by many fungous enemies; however, only five species have been reported on the wild plant in its native habitat.

Lawrence, W. H.

Bulletin 66, Washington State Experiment Station, is devoted to "Blackspot Canker;" studies, observations, and experiments, with thirteen pages of illustrations. The fungus has been described by Peck as *Macrophoma curvispora*, and by Cordley as *Gloeosporium malicorticis*. "Neither of the descriptions agree closely with the fungus observed in these investigations."

Smith, G. D.

Mr. Smith sends out a printed list of one hundred "Mushrooms and Toadstools" which he offers (at reasonable prices) in both stereographs and lantern slides. "They will be in natural colors and can be used to a very great advantage in school work as well as for a general study of the subject." We have seen many of the photographs and can say that they are admirable. Mr. Smith's address is 450 Spicer Street, Akron, Ohio.

Shear, C. L. (and Quaintance, A. L.)

The Fungus (and Insect) Enemies of the Grape east of the Rocky Mountains are recounted and briefly described, with text illustrations, and remedies, in Farmers' Bulletin No. 284. Those regarded as chief are Black-rot (*Guignardia bidwellii*), Downy Mildew (*Plasmopara viticola*). Powdery Mildew (*Uncinula necator*), Anthracnose (*Sphaceloma ampelinum*), and Ripe-rot (*Glomerella rufomaculans*).

Fink, Bruce.

Cladonia bacillaris, *Cl. macilenta*, and *Cl. didyma* are described and discussed in the September No. of the *Bryologist*: "Further Notes on Cladonias, XII." Illustrations natural size, also magnified two or three diameters, are given of *Cladonia bacillaris* and *Cl. macilenta*.

Arthur, J. C.

In the *JOURNAL OF MYCOLOGY*, September 1907, Dr. Arthur makes his seventh report, "Cultures of Uredineae in 1906." He calls especial attention to the experimentally unravelled life history of the Rust which inhabits flax, remarking of this study of the serious menace to successful flax growing that "it greatly clarifies the problem of controlling the flax rust in the interest of the cultivator." Of selected materials after tests, 48 collections were available belonging to three species of Rusts, exclusive of the aecial pine rusts, and from these 223 sowings were made. Also 53 sowings were made with *Caecoma* and *Peridermium* spores from pine, all without infection, 27 sowings with teliospores of *Gymnosporangium*, and 23 sowings with various aeciospores. That is, 324 sowings were made, and 134 species grown temporarily in the greenhouse were used as hosts. The tabulation of negative results, and repetitions of previous work is extended—and in that connection a new species is described, namely *Uromyces effusus*. We take space to reproduce the summary for species here reported for the first time: 1. *MELAMPSORA LINI* (Link) Desmaz.—Teliospores on *Linum usitatissimum* L. sown on *L. Lewisii* Pursh and *L. usitatissimum* L. 2. *UROMYCES SILPHII* (Syd.) Arth.—Teliospores on *Juncus tenuis* Willd. sown on *Silphium perfoliatum* L. 3. *GYMNOSPORANGIUM NELSONI* Arth.—Teliospores on *Juniperus scopulorum* Sarg. sown on *Amelanchier canadensis* (L.) Medic. and *Sorbus americana* Marsh.

Fink, Bruce.

Illustrated and discussed are *Cladonia cristatella* and *Cladonia coccifera* in "Further Notes on Cladonias, XII," The *Bryologist* for November, 1907. The first named species is a distinctly North American lichen; the second is known in all the grand divisions except Africa.

Hebden, Thomas.

A list of fourteen species is given, "Some British Columbia Lichens" (Rossland, B. C.), in the November *Bryologist*, 1907.

Lawrence, W. H.

The disease "Apple scab in Eastern Washington" is discussed in Bulletin 75 of the Experiment Station, fourteen pages, no figures used, but the two stages of the fungus are noted, its life history given, and Bordeaux mixture recommended as a preventive.

Floyd, Bayard F.

A popular account of "Some common Fungus Diseases and their Treatment" was published in the Annual Report of the Missouri State Horticultural Society, 1905, and reissued as Circular of Information No. 21, Missouri Agricultural Experiment Station.

Maire, René.

We find the interesting first fascicule of "Étude des Champignons récoltes en Asie Mineure" in the Bulletin de la Société des Sciences de Nancy, 1906. Some of our commonest species flourish in the Orient, as *Cystopus candidus*, *Erysiphe polygoni*, *Phyllactinia corylea*, *Sphacelotheca reiliana*, *Puccinia menthae*, etc. Several new species are described, also a new genus of Hysteriaceae, namely, *Hadotia*. The author says ce genre correspond exactment, parmi les Hystériacées scolécosporées, aux genres *Hysterium*, *Hysterographium*, *Glonium*, etc., des autres tribus. It should be noticed also that the author transfers *Physoderma asphodeli* Vestergren (*Cladochytrium asphodeli* Debray) and *Cladochytrium urginiae* Pat. et Trab. (*Physoderma debeauxii* Bubák, *Entyloma debeauxii* Bubák) to the genus *Urophlyctis*.

Fink, Bruce.

In "Further Notes on *Cladonias*, IX," two species very closely related are fully discussed, namely, *Cl. squamosa* and *Cl. subsquamosa*. Certain forms of *Cl. squamosa* may, besides, be confused with forms of *Cl. furcata*. Halftone illustrations are given of *Cl. squamosa denticollis* f. *squamosissima*, and *Cl. squamosa phyllocoma*.

Journal of Mycology, Vol. 13, Sept., 1907.

The titles in this No. are as follows: Atkinson and Edgerton, *Protocoronospora*, a New Genus of Fungi; Jennings, A Case of Poisoning by *Amanita phalloides*; Davis, A New Species of *Protomyces*; Arthur, Cultures of *Uredineae* in 1906; Wilson, An Historical Review of the Proposed Genera of *Phycomycetes*; Kellerman, Index to North American Mycology; Notes from Mycological Literature, XXV; Editor's Notes.

Atkinson, Geo. F., and Edgerton, C. W.

These authors describe a new genus and new species, under the head of "*Protocoronospora*, a new Genus of Fungi" in the September No. of the *Journal of Mycology*. Professor Atkinson found this disease on the cultivated vetch—first discovered on the stems and pods from a small patch of vetch on the horticultural grounds of Cornell University and later collected on vetch in the fields on the University farm where it seems to be abundant and a serious pest, often being associated with an *Ascochyta*. In structure this new fungus is said to resemble that of species of *Corticium*. The new species is named *Protocoronospora nigrans* by the authors.

Broteria, Vol. VI, 1907, II Parte.

The mycological articles in this *Revista de ciencias naturales do Collegio de S. Fiel* are as follows: *Les Myxomycètes, Étude des Espèces connues jusqu'ici par C. Torrend*; *Contributio ad monographiam Agaricacearum et Polyporacearum Brasiliensium auctore Dr. J. Rick*.

Sturgis, W. C.

In the Colorado Publication, General Series No. 30, Sept. 1907, we find "*The Myxomycetes of Colorado*," including a General account of the Group, Key to the Orders and Genera, and an enumeration of the known Colorado species with critical notes, distribution, etc. A new variety of *Didymium squamulosum* (var. *claviforme*) is proposed, also one of *Spumaria alba* (var. *solida*); and a new species, *Physarum testaceum*. *Comatricha suksdorfii* Ell. & Ev. and *C. aequalis* Peck are reduced to the rank of varieties under *C. nigra*. Almost 100 species and varieties are here reported as belonging to the flora of Colorado.

Jennings, O. E.

A detailed account is given of "A case of poisoning by *Amanita phalloides*," in the *Journal of Mycology*, September, 1907. One person lost his life and others were seriously poisoned.

Davis, J. J.

A description is given by Dr. Davis of "A new species of protomyces," namely, *P. gravidus*, on *Bidens cernua* and *Bidens connata*, sparingly on *Bidens frondosa*, Wisconsin, July to November. See *Journal of Mycology*, September, 1907.

Wilson, Guy West.

In the September No. of the Journal of Mycology may be found "An historical Review of the proposed Genera of Phycomycetes, I. Peronosporales;" the genera being arranged chronologically, with the type species, the synonyms, the homonyms, and other information. Those listed as tenable in this order are: Albugo, Basidophora, Bremia, Chlorospora, Kawakamia, Peronospora, Phleophythora, Phytophthora, Plasmopara, Pseudoperonospora, and Sclerospora.

Smith, Erwin F.

Dr. Smith takes issue with Howard S. Reed in statements relative to "The Parasitism of Neocosmospora" — this title used by both authors in articles in Science. "Inference versus fact," is the key to the situation — *i. e.* many inferences in the first article are declared by Dr. Smith to be unwarranted, for example, that the ginseng-fungus belongs to the genus Neocosmospora; that the ginseng-fungus and the watermelon-fungus (first described by Dr. Smith as *Fusarium nivium*) are identical; that the watermelon-fungus can enter the plant only when a way has been opened for it by other fungi, *e. g.*, by *Thielavia*, etc. Besides the discussion and criticism, some experiments are reported indicating that the ginseng-fungus and watermelon-fungus behave differently and are probably identical organisms.

Rick, J.

An important paper, "Contributio ad monographium Agaricacearum et Polyporacearum Brasiliensium," is published by Dr. J. Rick, in Volume VI, 1907, II part, Series Botanica, of Broteria. This is based on prolonged exploration and study in that region, and the installment in question contains 186 species, 10 of which are described as new. Many in the list enumerated are cosmopolitan — a further illustration and justification of the view of Lloyd and Bresadola as to wide distribution of most species.

Annales Mycologici, Vol. V, No. 3, June, 1907.

The articles are as follows: Rehm, Ascomycetes exs. Frasc. 39; Neger, F. W. and Dawson W., Ueber Clithris quercina (Pers.) Rehm.; Keissler, Karl von, Beitrag zur Pilzflora Kaerntens; Bresadola, J., Fungi Javanici lecti a cl. Prof. Dr. E. Heinricher; Schorstein, Josef, Polyporus; Dietel, P., Einige Neue Uredineen aus Sued-amerika; Jaap, Otto, Beitrage zur Pilzflora der Schweiz; Lind, J., Bemerkenswerte Pilzfunde in Daenemark; Neue Literatur; Referate und kritische Besprechungen.

Dietel, P.

Under the title of "Einige neue Uredineen aus Suedamerika," *Annales Mycologici*, June, 1907, the following are described by Dr. Dietel: *Uromyces celtidis* on leaves of *Celtis* sp.; *Puccinia usterii* on leaves of a *Malpighiaceae*; *Puccinia compressa* on a *Bignoniaceae*; *Puccinia transformans* on *Solanum tomatillo*; *Puccinia tessariae* on *Tessaria absinthioides*; and *Coleosporium braziliense* on a *Labiata*.

Smith, Elizabeth H.

Technical Bulletin No. 3, Massachusetts Agricultural Experiment Station, April, 1907, contains "The Blossom end Rot of Tomatoes," which after study and experiment is decided to be *Fusarium solani* Mart.

Smith, Ralph E.

The Report of the Plant Pathologist, to July 1, 1906, California Experiment Station, Bulletin 184, January, 1907, deals very largely with Pear Blight work, also discusses Walnut Blight (*Pseudomonas juglandis* Pierce) peculiar to the Pacific Coast, Lemon Rot, and a few other diseases. A 10-page list is given of Plant Diseases of California.

Rolfs, F. M.

The Report of the Department of Botany and Horticulture, Florida Experiment Station, 1905, notes many diseases of Bean, Cabbage, Cantaloupes, Celery, Dewberries, Grape-fruits, Lettuce, Oranges, Peaches, Potato, Tomato, and Watermelon.

Cobb, N. A.

A very thorough study of the "Fungus Maladies of the Sugar Cane, as occurring in Hawaii," is given by Mr. Cobb as Bulletin 5, Division of Pathology and Physiology, Experiment Station of the Hawaiian Sugar Planter's Association, 1906. The diseases are as follows: Root Disease [*Ithyphallus coralloides* n. sp.], Leaf-splitting Blight [*Mycosphaerella striatiformans* n. sp.], Rind Disease, Pineapple Disease [*Thielaviopsis ethacetica* Went.], Eleau [possibly caused by insects preceding a fungus]. The following also is described: *Marasmius sacchari* *Hawaiiensis* Cobb n. var. There are seven fine plates. The text is on good glazed paper.

Fink, Bruce.

Cladonia decorticata and *Cladonia degenerens* are discussed and figured in the May *Bryologist* (1907) under the title "Further Notes on Cladonias, X."

Orton, W. A.

In Farmers' Bulletin 302, U. S. Department of Agriculture, Mr. Orton gives a brief account of the disease of Sea Island Cotton, namely, Sore-shin and Damping-off (due to *Rhizoctonia*); Bacterial Blight (*Bacterium malvacearum* Erw. Sm.); and Wilt (*Neocosmospora vasinfecta* (Atks.) Erw. Sm.).

Cobb, N. A.

The "Third Report on Gumming of the Sugar-Cane" forms Bulletin No. 3, Division of Pathology and Physiology, Experiment Station of the Hawaiian Sugar Planters' Association. This disease was first discovered in Australia; it is caused by *Bacterium vascularum* (Cobb) Grieg-Smith.

Butler, E. J.

Mr. Butler, the Imperial Mycologist, Department of Agriculture in India, gives an account of "Some Diseases of Cereals caused by *Sclerospora graminicola*," being Vol. II, No. 1, Memoirs, Botanical Series, March, 1907. The grasses involved are *Pennisetum typhoideum*, *Andropogon sorghum*, *Setaria italica*, and *Euchlaena* (*Rheana*) *luxurians*.

Petch, T.

There is a brief but excellent summary by Hasselbring in the September Botanical Gazette, 1907, of "Fungi in termite nests," as given by the above author in Ann. Roy. Bot. Gar. Paradeniya. "The only form on the normal comb is a hyphomycete which was not determined, but from the descriptions seems to be like *Sterigmatocystis*. This fungus seems to be endemic in the nests, not found outside them. When the combs grow old they give rise to two forms of agarics, which, however, the author regards as one species (*Volvaria eurlhiza*). A third form in the fresh termite comb is *Xylaria nigripes*. . . . All the forms described are eaten by the termites. When an inhabited comb is enclosed under a bell-jar the termites eat off the heads of the hyphomycete and also the *Xylaria* as it develops. They also eat the stalks of the agarics following them to the surface of the ground. It is probable, therefore, that the fungi of the termite nests form food for the inhabitants, as do the "fungus gardens" for the leaf-cutting ants."

Hedwigia, Band XLVI, Heft 3-4, 15 Feb., 1907.

In this No. only two articles are mycological, namely, Edv. A. Waino, *Lichenes novi rariosque*; Fr. Bubák und J. E. Kabát, *Mykologische Beiträge* (Anfang).

Vanha, J.

A paper by this author in *Zeitschrift fuer Zuckerindustrie in Boehmen* 1902, namely, "Eine neue Blattkrankheit der Ruebe," is reviewed by Dr. G. Lindau who points out that the statement to the effect that this new species (*Microsphaera betae*) does not as the author stated, produce zoosporangia. Es handelt sich hier ueberhaupt nicht um Zoosporen, sondern um den oeligen Plasma-inhalt der Konidien, der Brown'sche Molekularbewegung erkennen laesst.

Bulletin de la Société Mycologique de France, Tome XXIII, 2e Fascicule, 15 July, 1907.

The articles are as follows: N. Patouillard, Champignons nouveaux du Tonkin, Quelques Champignon de l'Afrique occidentale; A. Sartory, Récolte et emploi de l'*Elaphomyces granulatus*, Etude biologique du *Cryptococcus* (*Saccharomyces*) *glutinus* Fres. (Kuetz.); G. Bainier, Mycothèque de l'Ecole de Pharmacie XII-XVII; Dumée, Note sur l'*Agaricus pudicus* Bull.; L. Lutz, Nouveau procédé de conservation des Champignons avec leurs couleurs; F. Guegen, Bibliographie analytique; W. Russell, Distribution des Champignons comestibles et vénéneux dans les bois des Casseaux; Felix Pyat, Compte-rendu de l'Exposition de Champignons du Jardin des Plantes d'Angers.

McAlpine, D.

The Department of Agriculture, Victoria, issued in 1906 a splendid book on "The Rusts of Australia, their Structure, Nature and Classification," by D. McAlpine. The first 75 pages are devoted to the general characters and mode of life and the remainder of the book (pp. 77-347) is occupied with the classification and technical descriptions, Bibliography, Glossary, Descriptions of Plates and Indexes. There are 54 full-page plates — the first ten natural in size and color and nearly all of the others micro-photographs of spores x 250. The descriptions are admirable — full and conveniently paragraphed. This book has been critically and appreciatively commented upon by Dr. Arthur in previous pages of this Journal.

Whetzel, H. H.

Bulletin 236, February, 1906, Cornell University Experiment Station, is an important contribution to the subject of "Blight Canker of Apple trees." The term "Canker" is applied to diseases which cause the death of definite areas of bark on the limbs and bodies of trees. The diseased areas may be smooth and sunken or enlarged or roughened. The distinct canker diseases of apple trees which have been described in pathological literature are as

follows: European canker (*Nectria ditissima* Tul.); New York Apple-tree Canker (*Sphaeropsis malorum* Pk.); Black Spot Canker (*Gloeosporium malicorticis* Cordley); Illinois Apple-tree Canker (*Nummularia discreta* Tul.); Bitter rot Canker (*Glomerella rufomaculans* (Berk.) Spal. & v. Schar.); and Blight Canker of Apple-trees (*Bacillus amylovorus* (Burr.) de Toni). It is to the last of these that Mr. Whetzel's illustrated Bulletin is specially devoted.

Smith, Clayton O.

The Leaf-spot on Cucurbits [*Sphaerella citrullina* (Chester) Smith]. A Leaf-spot disease of Egg-plant (*Ascochyta lycopersici* Brun.), and Leaf-spot on Bean and Cowpeas (*Phyllosticta phaseolina* Sacc.) are included in the "Study of the Diseases of some Truck Crops in Delaware." The perfect stage of *Phyllosticta citrullina* Chester (transferred to *Ascochyta citrullina*) was obtained by cultures, namely, *Sphaerella* as given above.

Berger, E. W.

Aschersonia aleyrodes, *Aschersonia favo-citrina*, and the Brown Fungus are those alluded to and recommended under the heading "Whitefly conditions in 1906 — the use of the Fungi," in Bulletin No. 88, Florida Agricultural Experiment Station, January 1907. Spraying for Scale would kill these fungi serviceable for reducing the Whitefly. It is suggested that to reduce the scale, fungi may be introduced, namely, the Red Headed Scale Fungus (*Sphaerostilbe coccophila*), the Gray Headed Scale Fungus (*Ophionectria coccicola*), and the Black Scale fungus (*Myrangium duryii*).

Edgerton, C. W.

The conclusions of "The Rate and Period of Growth of *Polyporus lucidus*," Torrey, Vol. 7, No. 5, May 1907, are: (1) *Polyporus lucidus* is a fast growing member of the Polyporaceae, growth averaging about one-half centimeter per day for the growing period; (2) Growth is exogenous, taking place entirely at the edge of the plant and continuing as long as conditions are favorable; (3) The change in the development from stalk to pileus is a gradual process; (4) The average lateral growth is but slightly more than the terminal growth.

Smith, R. Grieg.

In the Proceedings of the Linnean Society of New South Wales, 1904, Part 3, June 29, is described the "Red String of the Sugar Cane," not to be confounded with the Sereh Disease (cause ?), Sugar Cane Disease of Massee [*Trichosphaeria sacchi-*

ari], the Pine-apple Disease of the Cane [Thielaviopsis ethacetica Went.], and the Red Smut of the Sugar Cane [Colletotrichum falcatum Went.], but is caused by a new species of Bacteria, namely, Bacillus pseudoarbus Gr. Sm. n. sp.

Otto Jaap, Fungi Selecti Exsiccati, ser. IX and X.

This installment was issued April 1907, the Nos. being 201-250. A wide range of groups is represented including many interesting species.

Comptes Rendus des Séances de l'Académie des Sciences, Tome 140, Jan.-June, 1905.

The mycological articles are as follows: Hyphoides et Bactérioides, Paul Vuillemin; La Miltose hétérotypique chez les Ascomycètes, René Maire; Production expérimentale de l'appareil ascospore de la Morille, Marin Molliard; Sur les conditions de développement du mycélium de la Morille, G. Fron; La culture de la Morille, Ch. Répin; Sur la biologie des Saprologaniées, Paul Dop; Nouvelles espèces d'endophytes d'Orchidées, Noel Bernard; Sur le Stearophora radicola, Champignon des racines de la Vigne, L. Mangin et P. Viala; La rouille blanche du Tabac et la nielle ou maladie de la mosaïque [Bacillus maculicola], Georges Delacroix; Sur une pourriture bactérienne des choux.

Comptes Rendus des Séances de l'Académie des Sciences, Tome 142, Jan.-June, 1906.

The mycological articles given below are found in this volume: P. Hariot et N. Patouillard, Sur un nouveau genre de Champignons de l'Afrique orientale anglaise; Nicolas Jacobesco, Nouveau Champignon parasite, Trematovalsa matruchoti, causant le chancre de Tulleul; P. Viala et P. Paccottet, Sur les levures sporulées de Champignons à périthèces (Gloeosporium); P. Viala et Pacottet, Sur les kystes des Gloeosporium et sur leur rôle dans l'origine des levures; J. Beauverie, Sur la maladie des Platanes due au Gnomia veneta (Sacc. et Speg.) Klebahn [Gloeosporium nervisequum (Fuck.) Sacc.] particulièrement dans les pépinières; Dangeard, La Fécondation nucléaire chez les Mucorinées.

Miyake, Ichiro.

Under the title "Ueber einige Pilz-Krankheiten unserer Nutzpflanzen," Botanical Magazine, March 1907, a few interesting fungi are fully described, among others the following: Gloeosporium theae-sinensis Miyake n. sp. found on Tea leaves in the vicinity of Tokio, Japan. The species is said to be distinct from Gloeosporium theae Zimm. described from Africa.

Stockdale, F. A.

This Report of Mr. Stockdale, Mycologist attached to the Imperial Department of Agriculture for the West Indies, printed in the Bulletin of Miscellaneous Information, Botanical Department, Trinidad, October 1907, deals with three diseases of the Cocoa-nut Palm, called Root-disease, Leaf-disease, and the Bud-rot. The first named is the most serious, caused apparently by a Botrydiplodia. The Leaf-disease is caused by a Pestalozzia, possibly *P. palmarum* Cke.—yellowish spots on the leaflets especially near the tips.

Peck, Charles Horton.

In the Bulletin of the Torrey Botanical Club, July 1907, Dr. Peck describes "New Species of Fungi" — *Collybia subsulphurea*, *Omphalia vestita*, *Omphalia curvipes*, *Lactarius rufulus*, *Lactarius xanthogalactus*, *Entoloma modestum*, *Ecclia cinericola*, *Naucoria tabacine bicolor* var. nov., *Agaricus pattersonae*, *Psathyrella caespitosa*, *Hydnum kauffmanii*, *Macrophoma tiliacea*, and *Cucurbitaria erratica*.

Bulletin de la Société Royale de Botanique de Belgique, Tome 43, 1906.

The articles pertaining to mycology are the following: *Aperçu historique sur les espèces du g. Scleroderma* (Pers. p. p.) emend Fries de la Flore Belge, et *Considérations sur la détermination de ces Species*, par Ch. Van Bambeke; *Nouvelles Stations de Péronosporées en 1905*, par l'abbé Hyag. Vanderyst; *Lichens rares ou nouveaux pour la Belgique*, par Bouly de Lesdain; *Quelques remarques sur Polyporus rostkowii* Fr., par Ch. Van Bambeke; *Liste de Lichens recueillis à Spa*.

Comptes Rendus des Séances des Sciences, Tome 141, July-Dec., 1905.

Pertaining to mycology are the following articles: *Un nouvel ennemi des Caféiers on Nouvelle-Calédonie* [*Pellicularia koleroga* Cooke], I. Galland; *Sur la Structure et l'Évolution du Rhacodium ceblare*, F. Gueguen; *Nouvelles recherches sur l'appareil reproducteur des Mucorinées*, J. Dauphin; *Sterigmatocystis nigra et acide oxalique*, P. G. Carpentier.

Reed, Howard S.

In Science for Oct. 4, 1907, under the head of "The parasitism of *Neocosmora*," a reply is made to previous criticism by Dr. Erwin F. Smith in the same Journal.

Lewton-Brain, L.

A lecture on "Rind Disease of the Sugar Cane" forms Bulletin 7, Division of Pathology and Physiology, Experiment Station of the Hawaiian Sugar Planters' Association, in which it is shown that the imperfect fungus in same connection is *Melanconium sacchari*. The lecture also illustrates the structure of the Red Rot caused by *Colletotrichum falcatum*, and besides gives some reasons for thinking that *Thielaviopsis ethacetica* and *Melanconium sacchari* are different stages of one and the same fungus.

Clinton, G. P.

The Report of the Botanist, G. P. Clinton, Connecticut Agr. Exp. Station, Report 1906, Part V, issued May 1907, is an admirable one. The four sections are as follows: (1) Notes on fungus diseases, etc.; (2) Experiments to prevent Onion Brittle; Dry Rot Fungus, *Merulius lachrymans*; Root Rot of Tobacco, *Thielavia basicola*. The illustrations are sixteen full-page plates, halftones. The *Thielavia basicola* has not heretofore been brought into prominent notice in this country. The report on the study of this Tobacco disease is accompanied by the synonymy and bibliography.

**Comptes Rendus des Séances de l'Académie des Sciences,
Tome 143, July-Dec., 1906.**

Mycological articles are the following: E. Pinoy, Reproduction expérimentale du mycétome à grains noirs; Georges Delacroix, Sur une maladie de la Pomme de terre produite par *Bacillus phytophthorus* (Frank) Appel; L. Mangin et P. Hariot, Sur la maladie du rouge chez l'*Abies pectinata* [*Rhizosphaera* n. g., *Menoidea* n. g.]; G. Odin, Sur l'existence de formes levures stables chez *Sterigmatocystis versicolor* et chez *Aspergillus fumigatus*, et sur la pathogénicité de la levure issue de ce dernier type.

INDEX TO AMERICAN MYCOLOGY.

Alphabetical List of Articles, Authors, Subjects, New Species and Hosts, New Names and Synonyms.

W. A. KELLERMAN.

- ACANTHORHYNCHUS Shear n. gen. Ascomycetae. Bull. Torr. Bot. Club, 34:313. June 1907.
- ACANTHORHYNCHUS vaccinii Shear n. sp. on leaves of *Vaccinium macrocarpum*. Bull. Torr. Bot. Club, 34:314. June 1907.
- ACER rubrum, dead wood, host to *Flammula expansa* Peck n. sp. N. Y. State Mus. 1906 Bull. 116 (Bot. 10):24. July 1907.
- ADIANTUM curvatum Kf., host to *Cryptopeltis ferruginea* Rehm n. n. [Brazil, S. A.] Ann. Mycolog. 4:410. Oct. 1906.
- ADIANTUM curvatum Kf., host to *Cryptopeltis oblecta* Rehm n. sp. [Brazil, S. A.] Ann. Mycolog. 4:409. Oct. 1906.
- AECIDIUM compositarum silphii Burrill, *syn. of Uromyces silphii* q. v.
- AECIDIUM ipomoeae Schw. (Berk. Grev.) *syn. of Albugo ipomoeae panduranae* q. v.
- AECIDIUM ipomoeae-panduranae Schw., *syn. of Albugo ipomoeae panduranae* q. v.
- AECIDIUM patagonicum Speg. n. sp., on leaves of *Collomia gracilis*. [Argentine, S. A.] An. Mus. Nac. Buenos Aires, Ser. III, 8:66. 1902.
- AECIDIUM silphii Syd. Ured. 1546, *syn. of Uromyces silphii* q. v.
- AESCLUSUS glabra Willd., host to *Cucurbitaria erratica* Peck n. sp. Bull. Torr. Bot. Club, 34:349. July 1907.
- AGARICUS pattersonae Peck n. sp., ground under pine and cypress trees. Bull. Torr. Bot. Club, 34:347. July 1907.
- ALBUGO, The Genus, see *Studies in North American Peronosporales*
- ALBUGO, Key to the species. [Wilson.] Bull. Torr. Bot. Club, 34:63-64. Feb. 1907.
- ALBUGO (Pers.) S. F. Gray. [Synonymy, description, type, monograph. Wilson]. [Uredo § *Albugo* Pers.; *Cystopus* Lév.] Bull. Torr. Bot. Club, 34:63. Feb. 1907.

- ALBUGO bliti (Biv.) Kuntze [Uredo bliti Biv.; Caeoma amaranthi Schw.; Cystopus bliti de Bary; Cystopus amaranthi Berk.; Cystopus amaranthacearum Zalew.; Cystopus cyathulae Winter. Wilson.] Bull. Torr. Bot. Club, 34:77. Feb. 1907.
- ALBUGO candida (Pers.) Kuntze [synonymy, description and distribution. Wilson.] [Aecidium canadidum Pers.; Uredo candida Pers.; Uredo cheiranthi Pers.; Cystopus candidus Lev.] Bull. Torr. Bot. Club, 34:64. Feb. 1907.
- ALBUGO ipomoeae-panduranae (Schw.) Swing. [Aecidium ipomoeae-panduranae Schw.; Ae. ipomoeae Schw. (Berk.) Caeoma convolvulatum Link; Uredo convolvulae Spreng.; Cystopus convolvulacearum Otth., ditto Speg.; Cystopus ipomoeae-panduranae Stev. & Swing. Wilson.] Bull. Torr. Bot. Club, 34:68. Feb. 1907.
- ALBUGO lepigoni (de Bary) Kuntze [Erysibe sphaerica b carophyllacearum Wallr.; Cystopus lepigoni de Bary; Cystopus argentinus Speg. Wilson.] Bull. Torr. Bot. Club, 34:71. Feb. 1907.
- ALBUGO occidentalis Wilson n. sp., on Blitum capitatum L., and Chenopodium rubrum L. Bull. Torr. Bot. Club, 34:82. Feb. 1907.
- ALBUGO platensis (Epeg.) Swing. [Cystopus platensis Speg.] Bull. Torr. Bot. Club, 34:79. Feb. 1907.
- ALBUGO portulacae (D. C.) Kuntze Uredo portulacae D. C.; Cystopus portulacae de Bary. Bull. Torr. Bot. Club, 34:83. Feb. 1907.
- ALBUGO siberica (Zalew.) Wilson n. n. [Cystopus sibericus Zalew.] [Siberia.] Bull. Torr. Bot. Club, 34:68. Feb. 1907.
- ALBUGO spinulosa Kuntze, *syn. of Albugo tragopogonis* q. v.
- ALBUGO swertiae [Berl. & Kom.] Wilson n. n. [Cystopus convolvulacearum Speg. var. swertiae Berl. & Kom.] Bull. Torr. Bot. Club, 34:72. Feb. 1907.
- ALBUGO tragopogonis (DC.) S. F. Gray [Uredo candida b tragopogi Pers.; Uredo tragopogi DC.; Cystopus spinulosus de Bary; Cystopus cubicus de Bary; Cystopus pulverulentus B. & C.; Cystopus brasiliensis Speg.; Albugo spinulosa Kuntze; Cystopus tragopogonis spinulosus Davis; Cystopus mikaniae Speg. Wilson.] Bull. Torr. Bot. Club, 34:72. Feb. 1907.
- ALBUGO tropica (Lagerh. ined. [Wilson] [Cystopus tropicus Lagerh.] On Peperomia pellucida H. B. K. [S. A.] Bull. Torr. Bot. Club, 34:68. Feb. 1907.
- (To be continued.)

JOURNAL OF MYCOLOGY

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W. A. KELLERMAN, PH. D., COLUMBUS, OHIO

EDITOR'S NOTES.

"Personally I see no good reason for capitalizing any specific names, and my preference is decidedly in favor of following the practice of the zoologists" — an opinion expressed by a scientific writer which it is desirable to commend and heed. The zoologists as early as 1842 declared that "Specific names should *always* be written with a small letter even when derived from persons or places, and generic names should always be written with a capital." This custom has not changed; never was *Sitta canadensis* used in any other way, nor *Psaltriparus lloydi*, *Turdus aliciae bicknelli*, *Corvus americana*, *Papilio bairdi*, *Aphis brassicae*, or the balance of them. So written they are satisfactory for every purpose and from every point of view. But the botanical mind is at times apparently unstable; witness the following taken from a Catalogue: *Verbesina Virginica*, *Commelina virginica*, *Lycium Vulgare*, *Eleocharis Mutata*, etc. The reasons for invariably decapitalizing specific names — adjectives they are, or if nouns adjectiveal in significance — are ample in our opinion, but it would be of little avail to bring them forward again. It is "taste," mere custom perhaps, that carries the day for some people. But "tastes" differ; in our opinion the name *Tylostoma lloydii* "looks" quite as well as *sayi* or *batesii* — and if *Tylostoma lloydii* would perchance give offense to the mycologist honored, then it would seem a botanical name is after all not looked upon as something very impersonal.

Thirteen Parts of the Index to North American Mycology have now been issued — covering a period of seven years. This work has received cordial approval from many mycologists and a goodly number is found on the mailing list. It has been decided to extend the scope, and hereafter the area covered will be South as well as North and Central America. Installments may appear in every No. of the JOURNAL, but the Part or *Separate printed on one side of page only*, will not be distributed until the end of the year. Then all the items will be issued in one alphabetical list, the price to subscribers remaining approximately as at present.

The present No. is issued early, but the second No. of the year will be considerably delayed as usual.

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W A Kellerman

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WILLIAM ASHBROOK KELLERMAN.

When the January number of the *Journal of Mycology* was issued, no one had the remotest idea that the succeeding number would record the death of its founder, editor and publisher. Like a thunderbolt from a clear sky came the cablegram from Zacapa, Guatemala, announcing the death of William Ashbrook Kellerman, March the eighth.

On December 17th Dr. Kellerman accompanied by three students from the Ohio State University, started on his fourth scientific expedition to Guatemala.

The previous journeys he had made to this country had been so successful, and so enjoyable from every point of view, that it was with the keenest delight and most pleasureable anticipations that the party set out in quest of the interesting Guatemalan flora. Frequent letters home gave emphatic assurance that their expectations were more than realized. Nature was genial, kind, and seemed to have given to them the key to her treasures; good health and good spirits, was the constant theme for self-congratulation.

The trip was practically completed and the material which had been collected was packed ready for shipment to the United States. One more little journey up a mountain near Los Amates was undertaken, and it was here, on the top of the mountain, where what had been considered but a slight indisposition, began to develop into unmistakable fever. But so eager and enthusiastic in the work of collecting was Dr. Kellerman that he tried to ignore his increasing indisposition and insisted upon continuing some twelve miles further to the village

of Izabal, the goal they had set. They broke up camp and started for Izabal, but after having gone about three miles, were forced to return and make preparations for going down the mountain. After a night's rest the descent was undertaken. Dr. Kellerman was able to dress himself and walk to where his mule was waiting. Los Amates was reached about five o'clock in the afternoon. Here they stayed all night and took the train for Zacapa, the following day. They went at once to a hotel; Dr. Kellerman went to bed, and a physician was called.

The next morning, Sunday, March the eighth, he seemed in good spirits, and at noon laughed and joked about the good dinner he was to have; ate a reasonable amount, rested fairly well through the afternoon and near five o'clock asked for toast and tea, and said he thought he could go to sleep—about midnight he passed unconsciously from that sleep into the mystery of death.

One of the young men with Dr. Kellerman on the trip said, "I think it was utter exhaustion and lack of sleep as much as malaria that caused his death. He would get up some mornings at three o'clock and begin work. He certainly was fine to us, and would almost daily ask for suggestions regarding the next year's trip and the necessary equipment. Only the other night he was telling us he didn't see why he was not good for twenty years yet, and discussed his plans for writing a book on Guatemalan plants, which he hoped soon to publish. He had more grit than any man I ever knew."

While no accurate statement can as yet be made as to the amount of material collected, specimens representing over one thousand species were brought back from this last ill-fated trip. Every one of them had been collected with a thrill of joy; for if ever anyone had joy in his work, that one was Dr. Kellerman. And, in Guatemala there seemed to be a fascination which took entire possession of body and soul. He deemed the climate elysian; the country a paradise, and while collecting there, his happiness was supreme.

The members of his family have traveled widely, and it had long been understood among them that if death should come to anyone while far from home, the burial should be at the place of death. Dr. Kellerman was therefore buried at Zapaca, and there, in the country he so loved his body rests.

William Ashbrook Kellerman was born at Ashville, Ohio, May 1st, 1850. In 1874 he graduated from Cornell University. He was married in July, 1876, to Stella V. Dennis, who was in complete sympathy with his scientific career and who aided him in the preparation of some of his most important books and papers. After teaching five years in the State Normal School at Oshkosh, Wis., he spent two years studying in Europe and received the degree of Ph. D. in Zurich. Upon his return to

the United States, he was elected Professor of Botany in the State Agricultural College at Lexington, Kentucky. Later he accepted a similar position in the Kansas State Agricultural College, where he remained seven years. During four years of this time he was Kansas State Botanist. In 1891 he came to the Ohio State University as Professor of Botany, which position he held up to the time of his death.

Every moment of time which was not consumed in regular class and laboratory work, was devoted to collecting material for herbaria, so that wherever he was located he built up a considerable memorial in the shape of either newly inaugurated or largely increased herbaria. Noteworthy among these are the Kansas State herbarium at the Kansas Agricultural College and the Ohio State herbarium at the Ohio State University, which is so complete that the distribution of the flora of Ohio may be determined with considerable accuracy by simply consulting the index to this herbarium. His own private herbarium of flowering plants numbers 30,000, and his herbarium of parasitic fungi is second to none in the country.

His "Ohio Fungi Exsiccati" is an unusually fine series of herbarium specimens which were distributed to the leading herbaria of Europe and America. He had also begun the distribution of Guatemalan species, the first decade of which appeared in November, 1906, under the name "Fungi Selecti Guatemalenses."

Numerous new species have been described by him and a genus and various species have been named in his honor* which will in the future mutely testify to the high esteem in which he was held by his fellow botanists.

For the World's Fair in Chicago, in 1893, Dr. Kellerman prepared the Forestry Exhibit of the State of Ohio representing every tree indigenous to the state. The exhibit showed twigs, leaves, flowers, fruit, cross-section of trunk, lengthwise section, split surface, and bark.

For this collection he was awarded a Columbian Exposition medal and diploma. The work of preparation was done for the love of it and upon condition that, after the close of the exposition the entire exhibit should become the property of the Ohio State University. He, himself, felled many of the trees.

*The names given by botanists complimentary to his work are as follows:

Kellermannia, a genus of Sphaeropsideous fungi.

Aecidium Kellermannii.

Plasmopora Kellermannii.

Rosellinia Kellermannii.

Rhabdospora Kellermannii.

Diaporthe Kellermanniana.

Physcomitrium Kellermani.

Cercospora Kellermani.

Helianthus Kellermani.

Galera Kellermani.

Leptothyrium Kellermani.

Physalospora Kellermanii.

This work was a sample of the recreation which filled all his vacations. In the ordinary understanding of the meaning of a vacation, he never had one—for vacation was a time for uninterrupted work.

The JOURNAL OF MYCOLOGY was inaugurated in 1885 by Dr. Kellerman, J. B. Ellis and B. M. Everhart, Dr. Kellerman taking the initiative, and the responsibility of publication. The Journal was published four years under this arrangement, and was then discontinued because of the expense involved. The Division of Pathology, United States Department of Agriculture, took up the work and issued three volumes during 1889-94.

In 1902 Dr. Kellerman again undertook the work of publishing and editing the Journal, this time assuming the entire responsibility himself. In 1902-3 it was issued quarterly; from that time up to the present it has been bi-monthly. Mycologists need not be told that it required an inexhaustible amount of energy and zeal to carry on this work, but even the drudgery of proof-reading and the mechanical work of publishing the Journal were not deemed drudgery by this tireless worker, who found so much pleasure in every phase of his work.

In the words of one of his students,—“One would be inclined to believe that he would become consumed of his own zeal, so relentless and persevering was he in the performance of his duties, and so great was his capacity in the accomplishment of what he planned to do.”

This seems especially apropos, when we consider that notwithstanding the pressure of his varied work, he began in 1903 the publication of a Mycological Bulletin, which has been issued monthly since its inauguration.

In spite of his rare zeal as a collector, it was as a teacher that he believed he was doing his best work. He watched the progress of his students with the keenest interest and always manifested genuine pleasure in their success and promotion.

No effort was too great for him to make in guiding and helping students who showed a desire for assistance, and no time was ever considered lost that was spent in giving advice and suggestions to even the most elementary students. Such disinterested enthusiasm had its results, and the list of American botanists who at the present day attribute their start in botanical work to his influence is a long one. Nor was it for the student alone that he thought and planned and worked. His colleagues of humbler rank, the teachers in the public schools, found him ever ready and eager to discuss their work and give advice and suggestion. Even to the farmer in the field he was an inspiration, in proof of which the following quotation from a recent letter is given:

“As a mycologist, I am what I am because there was a Dr. W. A. Kellerman. July 16th, 1885, I was plowing like Cin-

cinnatus of old, in the field on my farm, when the Doctor's life and mine touched. While standing by the plow in conversation, he stooped to a plant (*Amarantus retroflexus*), plucked off a leaf, turned it over, and with the turning over of that leaf, came the turning point in my life! The leaf contained well-developed pustules of a parasitic fungus. My first mycological work as collector is noted in the *Journal of Mycology*, 1888, pages 26-29."

The loss of such a man, upright in character, possessed of lofty ideals, and an enthusiasm which was an inspiration to all with whom he came in contact, will be felt not only by his students, but by botanists the world over.

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- Notes from Mycological Literature, XX. (Ibid, Vol. XII, pp. 164-183, July, 1906.)
- A New *Plowrightia* from Guatemala. (Ibid, Vol. XII, pp. 185-187, Sept. 1906.)
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- Mycological Bulletin, Vol. IV. (Editor, 1906.)
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- Arthur's Uredinales of the North American Flora. (Ibid, Vol. XIII, pp. 89-94, May, 1907.)
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- Obituary, Professor A. P. Morgan. (Ibid, Vol. XIII, pp. 233-236, Nov., 1907.)
- Saccardo's Recent Arrangement and Nomenclature of Fungi. (Ibid, Vol. XIII, pp. 242-246, Nov., 1907.)
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- Mycological Bulletin, Vol. V. (Editor, 1907.)

NORTH AMERICAN SPECIES OF AGARICACEAE.

A. P. MORGAN.

18. *HYPHOLOMA AMBIGUUM* PECK, BULL. TORR. CLUB, 1898.

Pileus fleshy, convex becoming nearly plane, glabrous slightly viscid when moist, straw-color inclining to pale orange; the flesh thin, white; veil white, thick appendiculate, deciduous. Stipe slender, equal, fistulous, squamose near the base, paler than the pileus. Lamellae close, adnexed, at first grayish, becoming blackish-brown; spores elliptic, 12-15 x 7-8 mic.

Growing in Fir woods; Oregon, Lane. Pileus 5-13 cm. in diameter; stipe 12-22 cm. long. The dried specimens have the general appearance of some species of *Stropharia*.

19. *HYPHOLOMA PECOSENSE* COCHERELL, JOURN. MYCOL. X, 1904.

Pileus fleshy, convex, umbonate; the surface smooth, slightly viscid, cream-color, subochraceous in the center; veil pale yellow, lacerate, appendiculate. Stipe long, fistulous, smooth and glabrous, shining, yellowish white or pale ochraceous, striate at the apex and white-furfuraceous. Lamellae narrow, decurrent, pale purplish-gray, becoming purple-brown; spores purple-brown, ovoid, 12 x 8 mic.

Pecos, New Mexico, Graham. Pileus 2.5-4 cm. in diameter; stipe 6-9 cm. long.

III. *VELUTINA*. *Pileus fleshy, but the flesh thin; the dermis radiately fibrillose, the fibres loosened and appressed or broken into scales, sometimes flocculose. Stipe fibrillose and scaly or flocculose.*

a. *Lamellae narrow.*

20. *HYPHOLOMA HISTOSQUAMULOSUM*. PECK. 25 N. Y. REP. 1872.

Pileus firm, convex or expanded, hairy-squamulose, hygrophanous, grayish-brown when moist, gray when dry. Stipe short, firm, equal, hollow, slightly hairy-squamulose, and colored as the pileus. Lamellae narrow, rounded behind, gray, then brown; spores subelliptic, 6 mic. long.

Growing on prostrate trunks of maple trees in woods; New York, Peck. Pileus 1-2 cm. in diameter; stipe 2-3 cm. long, 1-2 mm. thick.

21. *HYPHOLOMA ORUELLUM*. A (*HYPHOLOMA*) ORNELLUS, PECK. 34 N. Y. REP. 1881.

Pileus convex or nearly plain, slightly scaly, reddish-brown tinged with purple, paler around the margin; the veil flocculose, appendiculate. Stipe equal or tapering downward, solid, squamulose, pale yellow. Lamellae moderately close, pallid or yellowish, becoming brown; spores brown, elliptic, $6-8 \times 4-5$ mic.

Growing on decaying wood. New York, *Peck*. Pileus 2-3 cm. in diameter; stipe 3-5 cm. high, 2-3 mm. thick.

22. *HYPHOLOMA LONGIPES*. PECK. BULL. TORR. CLUB, 1895. SYLLOGE XIV, 152.

Pileus thin, campanulate, hygrophanous; the surface fibrillose, at length glabrous, yellow-brown, when dry brown or isabelline-brown; the veil flocculose, appendiculate, fugacious. Stipe long, slender, fistulous, white, striate at the apex, white-villous at the base. Lamellae narrow, close, adnate, whitish, becoming blackish; spores elliptic, $13 \times 7-8$ mic.

Growing on the ground among fallen leaves; California, *McClatchie*. Pileus 3-5 cm. in diameter; stipe 5-10 cm. long, 2-3 mm. thick.

23. *HYPHOLOMA FLOCCULOSUM*. *GYMNOCHILUS FLOCCULOSUS* EARLE, HONGOS CUBANOS, 1906.

Pileus thin, fleshy, convex then expanded, somewhat hygrophanous, at first of a chocolate-color or red-brown, afterward paler, especially when dry; the surface when young covered with scattered woolly tufts, but later nearly glabrous; the margin without striae and at length revolute; the veil thin and evanescent: Stipe rather short, firm, hollow, white; the surface minutely roughened to scaly. Lamellae narrow, close, adnexed, at first pallid, at length purple-brown; spores elliptic, $7-9 \times 5-6$ mic.

Gregarious; growing in the damp ground underneath buildings; Cuba, *Earle*. Pileus 2-4 cm. in diameter; stipe 2-4 cm. long, 2-3 mm. thick.

24. *HYPHOLOMA FLOCCULENTUM*. McCLATCHIE, PROC. CAL. ACAD. 1897. SYLLOGE XVI, 123.

Pileus campanulate then convex, ochraceous-brown; the surface when young covered with a thick stratum of white fibrils, these at length to some extent fall away leaving the pileus flocculent; veil white, lacerate, appendiculate. Stipe nearly straight, equal, usually white, velvety-pulverulent, the apex striate. Lamellae close, adnate, subventricose, at first gray-incarnate, at

length purplish-brown; spores brown, elliptic or ovoid, 8-10 x 6 mic.

Growing on the ground next to rotten trunks, California. *McClatchie*. Pileus 2-5 cm. in diameter; stipe 3-5 cm. long, 2-6 mm. thick.

b. Lamellae rather broad.

25. HYPHOLOMA LACRIMABUNDUM, AGARICUS LACRYMABUNDUS BULLIARD, HERB. FR. X. 194 FRIES, ICONES, 134.

Pileus fleshy, ovoid then convex and expanded, obtuse; the flesh thin, white; the dermis thick, firm, pale umber, its surface ornamented with dark-colored fibrillose scales; the veil white, fibrillose deciduous. Stipe long, fistulous, whitish, fibrillose-scaly. Lamellae broad, close, adnate, subsinnate, at first whitish then purple-brown; spores purple-brown, subelliptic, inaequilateral, 7-9 x 5 mic.

Densely caespitose; growing among rotten wood; evidently common everywhere. Pileus 5-7 cm. in diameter; stipe 7-10 cm. long, 6-9 mm. thick.

26. HYPHOLOMA PYROTRICHUM, AGARICUS PYROTRICHUS HOLMSKEOLD, BEATA OT, II, 1790. AGARICUS LACRYMABUNDUS BULLIARD, HERB. FR. X. 525.

Pileus fleshy, conic then hemispheric and expanded, obtuse; the flesh thin, fulvous; the dermis radiately fibrillose, flame-color to fulvous, the fibrils fasciculate into subappressed scales; the veil tawny, lacerate, deciduous. Stipe subequal, fistulous, fibrillose-scaly, becoming tawny. Lamellae broad, close, adnate, at first pallid, then brownish; spores ovoid-oblong, 9-11 x 5-6 mic.

Cæspitose and very showy; growing about the trunks of trees in woods; Dayton, Ohio. Pileus 6-9 cm. in diameter; stipe 6-8 cm. long, 4-6 mm. thick.

27. HYPHOLOMA VELUTINUM. AGARICUS VELUTINUS PERSEON, SYNOPSIS. 1801, COOKE, ILLUSTR. 563.

Pileus fleshy, hygrophane, campanulate then expanded, subumbonate; the flesh very thin and fragile, concolorous; the dermis radiately fibrillose, at first lurid, becoming fulvous, at length clay-isabelline when dry; veil white-floccose, lacerate, appendiculate. Stipe subequal, fistulous, silky-fibrillose, dingy clay-color. Lamellae broad, rather close, adnexed-seceding, at first brownish, the edge white, then bay-brown and black-punctate; spores brown, elliptic, 9-12 x 5-7 mic.

Subcaespitose; growing in streets, along roads, etc. Probably common everywhere. Pileus 6-12 cm. in diameter; stipe 6-12

cm. or more long, 4-15 mm. thick. The size appears to be quite variable, there are small forms, while the stature is sometimes gigantic.

28. *HYPHOLOMA AGGREGATUM* PECK, 46 N. Y. REP. 1892.

Pileus thin, convex, or subcampanulate, grayish-white, obscurely spotted with appressed brownish fibrils. Stipe rather long, hollow, somewhat floccose or fibrillose, white. Lamellae subdistant, rounded behind and nearly free, at first whitish, then brown or blackish-brown with a whitish edge; spores brown, elliptic, 7-8 x 4-5 mic.

Densely caespitose; growing at the base of trees and stumps in woods. New York, *Peck*. Pileus 2-3 cm. in diameter; stipe 5-7 cm. long, 3-4 mm. thick.

VIII. *STROPHARIA* FRIES, MONOGRAPHIA I, 1857.

Pileus fleshy, convex then expanded, the surface various; the veil marginal, when the pileus expands all or most of it left behind upon the stipe. Stipe tubulous or sometimes solid, glabrous or more often fibrous-scaly; the annulus entire or lacerate, usually persistent. Lamellae adnexed or adnate, becoming at length brown or purple-brown, spores brown or purplish-brown.

A genus corresponding to *Armillaria* and *Pholiota*.

§ 1. *FIBRILLOSAE*. Dermis of the pileus radiately fibrillose, the surface not viscid.

I. *SPINTRIGERAE*. *The fibrillae innate, the surface of the pileus smooth and glabrous; the stipe also nearly always glabrous.*

a. *Stipe solid, white or whitish.*

I. *STROPHARIA JOHNSONIANA* PECK, 54 N. Y. REP. 1900. *AGARICUS JOHANSONIANUS* PECK, 23 N. Y. REP. 1870.

Pileus fleshy, convex then expanded, obtuse; the flesh rather thin, soft, white; the surface smooth, glabrous, yellowish in the center, outwardly white; the margin striatulate when moist. Stipe solid, equal, white, smooth, striate at the summit; the annulus tumid, white, persistent. Lamellae rather narrow, close, rounded behind and slightly adnexed, white, becoming brown; spores brown.

Growing in grassy ground in pastures; New York, *Peck*. Pileus 5-10 cm. in diameter; stipe 5-10 cm. high, 6-10 mm. thick.

2. STROPHARIA CAESIFOLIA PECK, BULL. TORR. CLUB, 1895. SYLLOGE XIV, 157.

Pileus convex, glabrous, white or whitish, sometimes brownish in the center. Stipe solid, equal or slightly thickened at the base, glabrous, white or whitish; annulus white, persistent. Lamellae close, rounded behind and adnexed, at first pale blue, becoming dingy bluish-brown; spores subelliptic, 10-12 x 6-8 mic.

Growing in low-sandy pastures; Kansas, *Bartholomew*. Pileus 3-5 cm. in diameter; stipe 3-4 cm. long, 4-6 mm. thick.

3. STROPHARIA BILAMELLATA PECK, BULL. TORR. CLUB, 1895. SYLLOGE XIV, 151.

Pileus fleshy, convex, whitish or yellowish; the flesh white. Stipe short, solid, white; the annulus well developed, white, on the surface striate-lamellate. Lamellae close, adnate, at maturity purple-brown; spores purple-brown, elliptic, 10-11 x 5-6 mic.

Growing on the ground; California, *McClatchie*. Pileus 3-5 cm. in diameter; stipe 2-3 cm. long, 7-8 mm. thick.

4. STROPHARIA MAGNIVELARIS PECK, ALASKA CRYPT, 1904. SYLLOGE XVII, 86.

Pileus fleshy, convex then nearly plane, sometimes umbonate; the surface glabrous or obscurely radiate-fibrillose or fibrillose-scaly, ochraceous to fulvous when dry. Stipe long, slender, glabrous, solid, whitish, the base a little thickened; annulus membranaceous, ample, firm, white, persistent. Lamellae rather close, brown or blackish when mature; spores ellipsoid-oblong, 14-16 x 7-8 mic.

Growing on the ground; Alaska, *Trelease*. Pileus 2-3 cm. in diameter; stipe 5-7 cm. long, 2-4 mm. thick.

b. *Stipe fistulous, smooth or scaly.*

5. STROPHARIA HOWEANA. AGARICUS HOWEANUS PECK, 26 N. Y. REP. 1873.

Pileus fleshy, convex then expanded, subumbonate; the flesh thin and fragile, white; the surface yellowish, smooth and glabrous or sometimes cracking into areas. Stipe tapering upward from a slightly thickened base, fistulous, smooth and glabrous; the veil thin, fugacious, portions sometimes adhering to the margin of the pileus. Lamellae close, rounded behind and adnexed, at first whitish, becoming ferruginous-brown; spores elliptic, 8 x 5 mic.

Growing on the ground; New York, *Peck*. Pileus 5-7 cm. in diameter; stipe 7-10 cm. long, 4-8 mm. thick.

6. STROPHARIA HARDII ATKINSON, JOURNAL OF MYCOLOGY XII, 194.

Pileus fleshy, convex then expanded, obtuse; the flesh thin, yellowish; the surface smooth and glabrous, pale ochraceous. Stipe thick, stout, with a short root, floccose-scaly, yellowish; the annulus membranaceous, persistent. Lamellae rather broad, subventricose, adnexed, brownish; spores purple-brown, suboblong, $5-9 \times 3-5$ mic.

Growing on the ground; Ohio, *M. E. Hard.* Pileus 6-9 cm. in diameter; stipe 10 cm. high, 10-15 mm. thick.

II. OCREATAE. *The fibrillae of the surface of the pileus superficial, broken up into scales appressed or squarrose; the stipe also fibrous-scaly.*

a. Lamellae rather broad.

7. STROPHARIA CAPUT-MEDUSAE FRIES, EPICRISIS, 1836. ICONES SEL. 131. COOKE ILLUSTR. 540.

Pileus fleshy, ovoid then convex and expanded, obtuse or subumbonate; the flesh thin, white, fragile; the dermis radiately fibrillous, its surface at first densely scaly-squarrose, the brown or blackish tufts soon disappear, leaving a smooth umber cortex, paler toward the margin. Stipe tapering upward from a solid base, hollow above, below the annulus clothed with brown squarrose scales, above white-mealy; annulus membranaceous, persistent, whitish with a brown border. Lamellae rather broad, ventricose, at first argillaceous, at length pale umber; spores purple-brown, fusiform, $16-18 \times 5$ mic.

Subcaespitose; growing in Pine woods about the base of trunks. Pacific Coast Cat. Pileus 4-7 cm. in diameter; stipe 5-8 cm. long, 9-12 mm. thick.

8. STROPHARIA SULLIVANTII, A (PSILOCYBE) SULLIVANTII MONTAGUE, SYLL. CRYPT, 1856.

Pileus fleshy, convex-hemispheric; the flesh thick, incarnate-fulvous, becoming rufous; the dermis consisting of brown, silky, conic warts closely crowded together; the thin margin ornamented with radiating, flexuous, branched lines. Stipe thick, hollow within, naked above and striatulate, below the middle oblong-thickened and covered over with the same warts as those of the pileus. Lamellae broad behind and tapering outward, adnexed-seceding, purplish-brown, becoming black; spores brown, elliptic, 9-10 mic. in length.

Growing on the ground. Columbus, O. *Sullivant.* Pileus 11-12 cm. in diameter, the lamellae next the stipe almost a centimeter in width; stipe 10 cm. and beyond long.

9. STROPHARIA COPRINOPHILA ATKINSON, JOURN. MYC. VIII, 1902.

Pileus fleshy, convex then expanded and recurved; the flesh thin, white, soft; the surface dingy white finely floccose, often with numerous appressed scales; the margin appendiculate with fragments of the veil. Stipe equal or somewhat enlarged at the base, fistulous, whitish, fibrillose; the delicate annulus near the base. Lamellae broad, adnate, grayish then dark brown with a purplish tinge; spores purplish-brown or glackish, subelliptic, 7-8 x 3.5-4.5 mic.

Caespitose; parasitic on clusters of *Coprinus atramentarius*. New York, *Atkinson*; Minnesota, *Taylor*. Pileus 2-6 cm. in diameter; stipe 3-7 cm. high, 6-15 mm. thick.

b. Lamellae rather narrow.

10. STROPHARIA FOEDERATA A. (PSALLIOTA) FOEDERATUS. B. & M. SYLLOGE CRYPT, 1856.

Pileus fleshy, ovoid thin campanulate and expanded, the center slightly depressed; the flesh thin, white; the surface fulvous but sprinkled with minute white scales; the margin striatulate and appendiculate with fragments of the veil. Stipe tapering upward, hollow, scaly-squarrose below the ample annulus. Lamellae narrow, adnate behind and tapering thence to the margin of the pileus, at first lilac or rose color, at length becoming brown, spores ovoid oblong, brown, almost 10 mic. long.

Growing on the ground in pastures; Columbus, O., *Sullivan*. Pileus 5-7 cm. in diameter, the lamellae about 2 mm. in breadth; stipe 10 cm. long and 10 mm. and beyond thick. The species should be placed near *Str. ocreata* Holmsk.

II. STROPHARIA TUBERCULATA HYPHOLOMA TUBERCULATUM, PATOUILLARD, BULL. SOC. MYC. 1899.

Pileus fleshy, at first globose, greenish, furnished with tuberculi-form scales; afterward campanulate, at length expanded, thin, smooth or scarcely striatulate. Stipe fistulous, fragile, whitish, rugulose, somewhat scaly below; annulus thin, membranaceous, the margin fimbriate, white, persistent, inserted about the middle or upper third of the stipe. Lamellae narrow, reaching the apex of the stipe, white, afterward purplish, at length brown-black; spores purple, ovoid, smooth, 6-8 x 3 mic.

Caespitose; growing on old trunks of *Hura crepitans*; Guadeloupe, *Duss.* Pileus 1-4 cm. in diameter; stipe 5-10 cm. long, 3-5 mm. thick.

12. STROPHARIA FLOCCOSA EARLE. HANGOS CUBANOS, 1906.

Pileus fleshy, convex, then expanded and depressed; the flesh thin, grayish; the surface brown-ochraceous, with a tinge of purple, when dry densely flocculose-scaly. Stipe equal or tapering slightly upward, fistulous, whitish, densely pubescent; the annulus thick, whitish, persistent. Lamellae adnate, close, rather narrow, of a uniform color, becoming dark purple-brown; spores elliptic, ovoid, $6-7 \times 4$ mic.

Gregarious or caespitose; growing on the ground underneath buildings; Cuba, Earle. Pileus 2-4 cm. in diameter; stipe 4-6 cm. long, 2-4 mm. thick.

§ 2. VISCIPELLES. Dermis of the pileus a thin membrane covered by a viscous epidermal layer; the surface of the membrane usually smooth and glabrous.

I. STERCORARIAE. *Plants with much the habit of species of Panaeolus; growing on manure or in richly manured soil.*

a. *Pileus convex, obtuse.*

13. STROPHARIA SEMIGLOBATA. AGARICUS SEMIGLOBATUS BATSCH. EL. FUNG. CONT. I., 1786; AGARICUS GLUTINOSUS CURTIS, FLORA LAND, 1777; FUNGUS PARVUS, ALBUS, CUM LUTEOLA PORTE IN SUMMITATE CAPITULI, VISCO NITENTE RESPLENDENS. J. BANHIMES, HIST. PL. 1650.

Pileus fleshy, hemispheric, then convex, obtuse; the flesh very thin, white; the dermis a thin, smooth, yellowish membrane, with a thick glutinous epidermal layer, at first continuous downward with that of the stipe. Stipe tall, slender, straight, fistulous; the annulus rather distant, merely the upper margin of the glutinous investment of the stipe. Lamellae very broad, adnate, black-nebulous; spores purple-brown, elliptic, $10-15 \times 8-10$ mic.

Solitary or gregarious; growing on manure in pastures; common everywhere, a world-wide species. Pileus 1-2 cm. in diameter; stipe 6-10 cm. long, 2-3 mm. thick.

14. STROPHARIA STERECORARIA, AGARICUS STERECORARIUS FRIES, SYST. I, 1821.

Pileus fleshy, hemispheric, then convex and explanate; the flesh thin, white; the dermis a thin yellowish membrane, the surface smooth, glabrous and slightly viscid. Stipe tall, slender, straight, stuffed with a distinct pith, below the distant annulus flocculose and slightly viscid. Lamellae very broad, adnate, at first white, at length umber or olive-black; spores purple-brown, elliptic, $16-20 \times 12-15$ mic.

Solitary or gregarious; growing on manure in woods. Probably common enough, but not distinguished from semiglobatus, which it closely resembles. Fries gives the color of the younger pileus livid-yellow, of the adult pileus egg-yellow. Pileus 2-3 cm. in diameter; the stipe 7-12 cm. long, 3-5 mm. thick.

15. STROPHARIA SICCIPES KARSTEN, SYMB. AD MYC. FENN IX, 46.

Pileus fleshy, hemispheric, then expanded, obtuse; the surface smooth and glabrous, viscid, argillaceous-white, changing to yellow when dry. Stipe stuffed, becoming hollow, straight or flexuous, slightly fibrillose, dry, pallescent; the annulus incomplete, dry, distant. Lamellae broad, adnate, subdecurrent, argillaceous, then brownish-nebulous, at length brown; spores brownish and pellucid, elliptic, $12-15 \times 7-9$ mic.

Growing on cow manure; New York, *Peck*. Pileus 2-3 cm. in diameter; stipe 4-7 cm. long, 2 mm. thick.

b. Pileus ovoid then expanded, umbonate.

16. STROPHARIA SUBMERDARIA BRITZELMAYR, HYM. SUDB. VIII.

Pileus fleshy, ovoid, then convex and expanded, subumbonate; the flesh thin, white; the surface smooth and glabrous, viscid, cream-color to pale ochre, becoming ochre-yellow in the center; the veil white, flocculose, mostly appendiculate. Stipe tapering upward from a thickened base, flexuous, with a narrow tubule, white, dry, silky fibrillose; the slight annulus near the apex. Lamellae broad, close, adnate, pale ochraceous becoming mottled by the spores, at length subdecurrent purple and brown; spores purple-brown, elliptic-oblong, $10-12 \times 7-8$ mic.

Subcaespitose; growing on cow manure; Preston, O. Pileus 3-5 cm. in diameter; stipe 3-5 cm. long, 3-5 mm. thick. This is probably the much larger variety alluded to by Fries under *Str. merdaria*.

17. STROPHARIA UMBONASCEUS, STROPHARIA UMBONESCEUS SACCARDO, SYLLOGE V. 1887; A. (STROPHARIA) UMBONATESCEUS PECK, 30 N. Y. REP. 1877.

Pileus at first ovoid-conic, then expanded and umbonate, smooth, viscid, yellow, the umbo inclining to reddish. Stipe tall, slender, hollow, generally a little paler than the pileus. Lamellae broad, plane, then ventricose, blackish-brown with a slight olivaceous tint; spores purplish-brown, almost black, $15-18 \times 10$ mic.

Growing on manure in pastures; New York, *Peck*; Preston, O. Pileus 1-2.5 cm. in diameter; stipe 7-10 cm. long. This seems closely related to *Str. mammillata* Kalchbr.

IV. INNUCTAE. *Not finnicolous; growing on the ground or on old wood in fields and woods.*

a. Stipe solid.

18. STROPHARIA SQUARROSA. AGARICUS SQUARROSUS VAHL. IN FLORA DANICA, 1191; AGARICUS DIPILATUS PERSEON, SYNOPSIS, 1801; AGARICUS HORNEMANNI FRIES, OBS. II, 1818.

Pileus fleshy, convex, then expanded, obtuse; the flesh thick, compact, white; the surface smooth, viscid when moist, yellowish, becoming brownish. Stipe long, thick, solid below the ample annulus squarrose with revolute white scales. Lamellae broad, adnate-decurrent, at first whitish then blackening; spores purple-brown, elliptic, $10-14 \times 5-8$ mic.

Growing on the ground and on trunks in Pine woods; New York, Peck. Pileus 8-20 cm. in diameter, the lamellae 7-12 mm. in breadth; stipe 10-20 cm. long, 1-3 cm. thick. A large and showy fungus.

19. STROPHARIA DRYMONIA, MORGAN SP. NOV.

Pileus fleshy, subglobose, then convex, expanded and explanate or somewhat depressed; the flesh thick, compact, white; the surface smooth and glabrous, viscid, pale ochre to ochraceous; the veil thin and fragile, lacerate and subappendiculate. Stipe elongated, tapering upward, thick, solid, white, glabrous; the annulus frail, deciduous. Lamellae narrow, crowded, adnexed, at first white then grayish-brown; spores brown, $5-6 \times 3-4$ mic.

Growing on and among rotten wood in woods; Preston, O. Pileus 6-10 cm. in diameter. Stipe 8-14 cm. long, 6-10 mm. thick above the base.

20. STROPHARIA MICROPODA, MORGAN, SP. NOV.

Pileus fleshy, subovoid, then convex and expanded, obtuse; the flesh thick, firm, pale yellow; the dermis a thin membrane, lilac or livid in color, covered by a thick greenish layer of glutin; the veil lacerate, subappendiculate. Stipe very small, solid, fibrillose-scaly, pale yellow above and within, below livid; the slight annulus at the summit of the stipe. Lamellae rather broad, close, arcuate, emarginate, at first pale drab, then changing to livid, at length olivaceous; spores in mass at first livid, becoming olive-brown, oblong, inequilateral, $6-7 \times 3-4$ mic.

Subcaespitose; growing on dead branches of Quercus, Hickoria, etc.; Preston, O. Pileus 4-7 cm. in diameter, the lamellae 5-8 mm. in breadth; stipe 3-4 cm. long, 4-7 mm. thick. After drying the pileus and lamellae become olivaceous, the stipe yellow-green.

b. Stipe Fistulous.

21. STROPHARIA PSEUDO-CYANEA, AGARICUS PSEUDO-CYANEUS DECMAZIERES CAT. 22 SEC. DUBY BOTANICON GALLICUM, 1830; ALSO FRIES, INDEX, 1828; AGARICUS ALBO-CYANEUS PERSOON, MYCOLOGIA EUR.

Pileus fleshy, ovoid, then campanulate and expanded umbonate, the flesh thin, soft, white, the surface smooth, viscid, green, becoming white. Stipe slender, flexuous, hollow, smooth, dry, whitish; the annulus thin and fragile, fugacious. Lamellae rather broad, white-incarnate, then brown and purpurascens; spores purplish-brown, elliptic, $7-8 \times 4-5$ mic.

Growing in the rich soil of pastures and meadows; New York, *Peck*. Pileus 3-6 cm. in diameter; stipe 5-7 cm. long, 6-9 mm. thick. This is an obscure species characterized by Fries as thinner and smaller than *A. aeruginosus*; also by having the stipe dry, not viscid. Cooke's figures of *A. albo-cyaneus* must be something different from the species of Fries and Karsten; they may be the generic species.

22. STROPHARIA MELASPERMA, AGARICUS MELASPERMUS FRIES EPICRISIS, 1836; COOKE ILLUSTR. 536; AGARICUS MELANOSPERMUS BULLIARD, HERB. FR. 1791.

Pileus fleshy, convex, then expanded and explanate or somewhat depressed; the flesh thin, soft, white; the surface smooth, at first slightly viscid, whitish, straw-colored in the center. Stipe nearly equal, stuffed, white, silky-fibrillose, striate at the apex; the annulus membranaceous, white, deciduous. Lamellae broad, close, adnexed, ventricose, whitish, then gray-violet at length blackening; spores brown, ovoid, 10×6 mic.

Growing in meadows and pastures; New York, *Peck*. Pileus 3-5 cm. in diameter; stipe 4-6 cm. long, 5-7 mm. thick.

23. STROPHARIA VIRIDULA, AGARICUS VIRIDULUS SCHAEFFER, ICONES, TAB. I, 1762, INDEX, 1774. AGARICUS AERUGINOSUS CURTIS, FLORA LAND, 1777.

Pileus fleshy, ovoid then campanulate and expanded, subumbonate; the flesh rather thin, white; the dermis a thin separable membrane, yellowish, smooth or with scattered superficial scales, at first covered over by a dense bluish-green gluten which gradually disappears. Stipe nearly equal or tapering slightly upward, fistulous, below the annulus white, fibrillose or scaly, at first smeared with the bluish-green gluten. Lamellae broad, adnate, at first whitish, then brown, at length purplish; spores purplish-brown, elliptic, $7-9 \times 4-5$ mic.

Growing on the ground in fields and on trunks in woods. A common species. Pileus 5-10 cm. in diameter; stipe 6-10 cm. long, 5-10 mm. thick. In the form I find in this region the gluten quickly loses its color and becomes pellucid.

24. STROPHARIA DISTANS, AGARICUS DISTANS PER-
SOON, DISP. METH. FUNG. 1797; AGARICUS SQUAMOSUS PER-
SOON SYNOPSIS FUNG. 1801; FRIES, OBS. MYC. II, 1818.

Pileus fleshy, convex, then expanded and explanate, obtuse or subumbonate; the flesh thin, whitish; the surface viscid when moist, ochraceous, covered with scattered floccose scales. Stipe tall, slender, tapering upward, fistulous, pallid above, ferruginous and villous-scaly below the distant annulus. Lammellae broad, close, adnate, cierreous, then blackening; spores elliptic-oblong, 10-14 x 6-8 mic.

Growing on the ground in fields and woods; N. Carolina, *Curtis*; New York, *Peck*. Pileus 3-7 cm. in diameter; stipe 6-12 cm. long, 4-6 mm. thick.

25. STROPHARIA CUBENSIS EARLE, HONGOS CU-
BANOS, 1906.

Pileus fleshy, convex, then nearly explanate, umbonate; the flesh thin, white, inclining to yellow; the surface smooth and glabrous, viscid when young and moist, shining when dry, ochraceous with a tinge of lilac. Stipe arising from a more or less thickened base, tapering upward, hollow, glabrous, yellowish at the summit, dark gray below, turning green and blue when cut or bruised, annulus ample, thick, persistent. Lamellae broad, close, ventricose, adnexed, at first pale gray, at length purple-brown; spores elliptic, 13-15 x 9-10 mic.

Solitary or somewhat gregarious; growing in rich soil and pastures where the land is wet; Cuba, *Earle*. Pileus 3-8 cm. in diameter; stipe 6-10 cm. long, 4-10 mm. thick.

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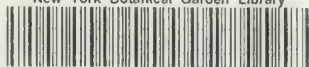
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