

well as among the grasses (see page 267). It may save some misapprehension of Dr. Mueller's own work to add that this is evidently one of those sins not unusually committed by printers in the make up of pages, and which so often leads authors to pray heartily that the printer may be forgiven. This is apparent from other errors on the same page, *Andropogon* being wedged in between different species of *Ptilotus*, and some species of *Gomphrena* being placed both above and below *Ptilotus*, instead of all in one sequence as they should be.—THOS. MEEHAN.

Notes from Dayton.—*CONOBEA MULTIFIDA*.—In your catalogue of Indiana plants, I notice the remark, "leaves in threes." I have collected this plant in Ohio, Indiana and Illinois, and have generally found the leaves arranged ternately, although occasionally the binate type was also found.

NESÆA VERTICILLATA.—Besides finding the leaves opposite and whorled, I have also seen them arranged alternately. The quarnate arrangement of leaves is frequently seen in whorls close to the ground. The ternate, in whorls subtending the flower clusters; the binate, on non-flowering branches; and the alternate, in the last shoots of the season.—AUGUST F. FOERSTE.

New Species of Fungi, by Charles H. Peck.—*POLYPORUS ABORTIVUS*.—Pileus small, plane or centrally depressed, often deformed or wanting, whitish or alutaceous, the superior stratum soft and spongy, composed of a compact tomentum, the inferior firm, subcorky, continuous with the central substance of the stem; pores small, unequal, decurrent, whitish, with thin dentate or lacerated dissepiments; stems central, irregular, sometimes short or obsolete, centrally firm, externally soft, spongy-tomentose; spores globose or broadly obovate, .0002—.0003 of an inch long, generally containing a single large nucleus.

"Ground under an elm tree." Illinois. *J. Wolf*. Communicated by *Prof. S. A. Forbes*.

Var. subglobosus. Plant consisting of a depressed or subglobose mass, having the stem very short or obsolete, the central substance marked by concentric zones and the surface everywhere porous.

"Bark of an old hickory log." Mt. Carmel, Illinois. *J. Schneek, M. D.*

This curious *Polyporus* appears to belong to the section *MESOPUS*, Division *Spongiosa*, and to be related to *P. biennis*. The specimens sent me are scarcely more than an inch or an inch and a half in diameter, and none of them seem to be well developed, although affording spores in great abundance. More specimens are desirable.

TRAMETES PECKII *Kalchbrenner in litt.*—"Pileo suberoso, dimidiato, sessili, subdecurrente, hirsuto, azono, ferrugineo-fusco, demum expallente, margine acuto; poris majusculis, rotundato angulatis, pileo subconcoloribus vel senio fusciscentibus; substantia lignei coloris.

A priore (An American form of *Trametes Trogii* B.) abunde differt hirsutie longiore, minus scabra, poris multo majoribus, obscurioribus, etc."

Pileus corky, dimidiate, sessile, subdecurrent, hairy, zoneless, brownish-ferruginous, becoming pale, the margin acute; pores rather large, varying from rotund to angular, colored nearly like the pileus or when old becoming brown; substance wood-color.

Dead trunks of cottonwood trees, *Populus monilifera*, *P. angulata*, etc., Dakota. C. W. Irish.

PHYLLOSTICTA ASTRAGALI.—Spots none or indefinite; perithecia numerous, often occupying both surfaces of the leaf, .007–.0011 of an inch in diameter, rupturing the epidermis and partly covered by it, black, opening by a minute circular aperture; spores oblong or oblong-fusiform, colorless, .0005–.00065 of an inch long, .00012 broad.

Living, languishing or dead leaves of species of *Astragalus*. Canada. Prof. J. Macoun.

The fungus appears to kill the leaves. The spores sometimes have a faint semblance of a central transverse septum, which is apparently produced by the retraction of the endochrome toward each end.

MELANCONIUM TYPHÆ.—Nucleus very minute, dot like or narrowly elliptical, at first covered by the epidermis which at length ruptures either irregularly or longitudinally; spores oblong-fusiform, black, .0004–.0005 of an inch long, .00016 broad, somewhat persistently attached to their sporophores.

Dead leaves of *Typha angustifolia*. Charlotte, Vermont. June. C. G. Pringle.

This fungus is somewhat anomalous both in its minute size and in the persistent attachment of the spores to their sporophores, yet it appears to belong to the genus to which it is here referred.

ÆCIDIUM POLYGALINUM.—Spots yellowish, indefinite, sometimes occupying the whole leaf; peridia hypophyllous, crowded or scattered, short, the margin crenulate-lacerate; spores subglobose, .0008–.0011 of an inch long.

Living or languishing leaves of *Polygala Senega*. Ann Arbor, Michigan. Prof. V. N. Spaulding.

The *Æcidium* in our specimens is associated with *Septoria consocia*. The spores are whitish, but probably in the fresh specimens they are yellow or orange.

ÆCIDIUM XANTHOXYLI.—Spots suborbicular, greenish-yellow; peridia short, hypophyllous, crowded; spores subglobose, .0009–.001 of an inch in diameter.

Living leaves and petioles of prickly ash, *Xanthoxylum Americanum*. Iowa. E. W. Holway.

The spores in the dried specimens are whitish, but they are probably yellow or orange in the fresh state.

PUCCINIA PRINGLEI.—Spots small, numerous, suborbicular, purplish on the lower surface of the leaf, concealed by the sori on the upper surface; sori epiphyllous, rarely hypophyllous, large, rather compact, occupying the whole spot, blackish-brown; spores oblong or subelliptical, slightly constricted at the septum, obtuse or subacute,

usually pale at the apex, verruculose, .0016-.002 of an inch long .0008-.0009 broad; pedicel colorless, generally about half as long as the spore.

Living leaves of *Viburnum pacuiflorum*. Canada. Aug. C. G. Pringle.

The spots are from one-half to one line broad. Each spot is generally occupied by a single sorus. Rarely a few sori appear along the principal veins on the lower surface of the leaf. The verrucæ or warts are irregularly scattered, but sometimes they manifest a tendency to a linear or longitudinal arrangement, and they are generally more numerous toward the apex of the spore. This is an interesting addition to the few species of Puccinia that inhabit the leaves of trees or shrubs. It is respectfully dedicated to its discoverer.

PUCCINIA HYSTERIIFORMIS.—Spots obsolete; sori scattered, rather large, oblong, at first covered by the epidermis which is at length ruptured longitudinally, black; spores oblong or oblong-clavate, blunt or pointed, strongly constricted at the septum, .0016-.0019 of an inch long, about .0008 broad; pedicel generally longer than the spore.

Living leaves of *Arenaria verna*. Utah. May. Prof. M. E. Jones.

The oblong sori and longitudinally ruptured epidermis present an appearance not unlike that of some species of Hysterium and suggest the specific name.

TRICHOBASIS BALSAMORHIZÆ.—Spots indefinite, brownish; sori scattered, sometimes confluent, amphigenous, reddish-brown; spores globose or subglobose, minutely rough; .0011-.0012 of an inch long, often containing one to three nuclei; pedicel nearly equal to the spore in length, soon deciduous.

Living leaves of *Balsamorhiza macrophylla*. Utah. May. M. E. Jones.

This will probably prove to be the stylosporiferous condition of some Puccinia or Uromyces. The large patches formed by the confluence of the sori occur mainly on or along the principal veins or midrib.

UROMYCES BOREALIS.—*Hymeniferous state*.—Spots none; peridia mostly epiphyllous, scattered or rarely collected in small clusters, short, white; spores subglobose, .00065-.0008 of an inch long.

Teleutosporiferous state.—Sori mostly epiphyllous, scattered, small, black or blackish-brown; spores obovate or subelliptical, smooth, .001-.0012 of an inch long, .0005-.00065 broad, with a prominent pale umbo at the apex; pedicel very short.

Living or languishing leaves of *Hedysarum boreale*. Canda. C. G. Pringle. Also on *Hedysarum Mackenzii*. J. Macoun.

In the dried specimens the *Æcidium* spores are whitish, but probably they are yellow in the fresh state. Sometimes a sorus surrounds a peridium of the *Æcidium*, in which case the appearance is that of a black dot with a white center.

USTILAGO OSMUNDÆ.—Spores produced in the pinnules of the fern, globose, brown, rough or verruculose, .0005-.0006 of an inch in diameter; the affected pinnules deformed, discolored, roughened and contracted into tufts.

Fronds of *Osmunda regalis*. Vermont. Aug. C. G. Pringle.

The loose, irregular and discolored tufts of pinnules at first sight are suggestive of the work of insects. The fungus in some instances breaks forth along the midvein of the pinnule, but generally the whole surface is roughened and defiled by it. The color of the affected pinnules varies from rusty or cinnamon brown to blackish-brown. The fungus is a singular one, and but a single specimen was communicated to me. Further investigation of it is desirable.

CERCOSPORA TILIÆ.—Spots small, numerous, suborbicular, brown with a paler center; flocci tufted, hypophyllous, minute; spores bacillary, brownish or cinereous, three to five-septate, .001–.0016 of an inch long, .00015–.00016 broad.

Living leaves of *Tilia Americana*. Charlotte, Vermont. June. C. G. Pringle.

The center of the spots on the upper surface is sometimes tinged with reddish-brown, on the lower surface, with cinereous.

ZYGODESMUS ATRORUBER.—Flocci creeping, intricate, branched, more or less rough or granular, forming a thin effused, dark-red, tomentose stratum, spores subglobose, echinulate, .00025–.0003 of an inch long.

Decaying poplar wood. Mt. Tom, Massachusetts. November. H. W. Harkness, M. D.

This species is readily known by its dark vinous-red color. It is apparently allied to *Z. effusus*, a species said to be alutaceous in color.

ZYGODESMUS GRANULOSUS.—Flocci slender, smooth, much branched, forming an effused ochraceous-brown stratum, the surface of which is covered with granules; spores subglobose, echinulate, about .0003 of an inch long.

Decaying birch wood. Mt. Tom, Massachusetts. November. H. W. Harkness.

This is related by its granulose surface to *Z. hydnoides*, but that species is described as rubiginous or rust colored, and its spores are said to be .0006 of an inch in diameter.

Caruel's New System of Plants.—We were so interested in looking over Prof. Bessey's notice under the above caption in the last *American Naturalist*, that we take the liberty of copying it: In the last number of his *Giornale Botanico Italiano*, Caruel proposes a system of plants which contains so many interesting points that it will be profitable to reproduce it here in a condensed form. He recognizes five grand divisions, viz: Gymnogamæ, Bryogamæ, Schistogamæ, Prothallogamæ and Phanerogamæ. The first is equivalent to the Thallophyta of many German botanists, but is treated very differently by the author. The Myxomycetes are very properly placed at the lower end of the division, in a separate class, the Plasmodiæ. In accordance with the rapidly growing idea first brought out by Cohn, the chlorophyll-bearing and chlorophyll-free plants are not separated as Algæ and Fungi; and the lichens are considered an order constituting with the Sphærideæ and Gymnoascideæ the cohort Angiosporatæ, the latter very nearly equivalent to the Ascomycetes of botanists. The

radical error, as it appears to us, in Caruel's disposition of the plants of the class *Thalloideæ* consists in making use of the asexual reproductive bodies in characterizing the sub-classes. Conidia and zoospores at least, and almost certainly the tetraspores also (chains of four conidia?), are homologues, whose differences are related to differences in the habitat of the plants producing them. Conidia (if we except tetraspores) are aerial, while proper zoospores are aquatic.

The position assigned to the *Characeæ* is scarcely a tenable one. They are too nearly related to the *Floridiæ*, and too distantly to the ferns to warrant placing them between the *Bryogamæ* and *Prothallogamæ*.

The separation of the *Phanerogamæ* into three classes will strike every one as an innovation of doubtful value. Why the orthography of *Gymnospermæ* should be changed to *Gynospermæ*, is also to be questioned. It will be observed that the cohorts and orders of the *Angiospermæ* rank higher respectively than do the groups bearing these names in the system most in vogue in this country: the families (omitted for want of space) in Caruel's system, are almost the equivalents of the orders of Bentham and Hooker, while Caruel's orders are nearly equivalent to Bentham and Hooker's cohorts.

Division GYMNOGAMÆ.

Class PLASMOIDEÆ.

Cohort *Plasmodiatæ*.

Order *Myxomycetes*; Fam. *Ceratiaceæ*, *Trichiaceæ*.

Class THALLODEÆ.

Sub-class SCHIZOSPOROPHORÆ.

Cohort *Schizosporatæ*.

Order *Nostochideæ*; Fam. *Chroococcaceæ*, *Oscillariaceæ*, *Nostocaceæ*, *Rivulariaceæ*, *Scytonemaceæ*.

Sub-class CONIDIOPHORÆ.

Cohort *Gymnosporatæ*.

Order *Puccinideæ*; Fam. *Sporotrichaceæ*, *Fusariaceæ*, *Stilbaceæ*, *Trichodermaceæ*, *Ustilaginaceæ*, *Pucciniaceæ*.

Order *Agaricideæ*; Fam. *Exobasidiaceæ*, *Tremellaceæ*, *Agaricaceæ*, *Lycoperdonaceæ*.

Cohort *Angiosporatæ*.

Order *Gymnoascideæ*; Fam. *Gymnoascaceæ*.

Order *Sphærideæ*; Fam. *Helvellaceæ*, *Sphæriaceæ*, *Erysiphaceæ*, *Tuberaceæ*.

Order *Lichenideæ*; Fam. *Myriangiaceæ*, *Verrucariaceæ*, *Parmeliaceæ*.

Sub-class ZOOSPOROPHORÆ.

Cohort *Euzoosporatæ*.

Order *Ulvideæ*; Fam. *Cladophoraceæ*, *Ulvaceæ*, *Sphacelariaceæ*, *Sporochneaceæ*.

Cohort *Zygosporatæ*.

Order *Pandorinideæ*; Fam. *Botrydiaceæ*, *Pandorinaceæ*, *Ulotrichaceæ*.

Order *Zygnemideæ*; Fam. *Diatomaceæ*, *Desmidiaceæ*, *Zygnemaceæ*.

Order *Peronosporideæ*; Fam. *Mucoraceæ*, *Chytridiaceæ*, *Peronosporaceæ*, *Saprolegniaceæ*.

Cohort *Oosporatæ*.

Order *Vaucherideæ*; Fam. *Monoblepharidaceæ*, *Volvocaceæ*, *Vaucheriaceæ*, *Sphaeropleaceæ*, *Cedogoniaceæ*, *Coleochaetaceæ*.

Order *Fucideæ*; Fam. *Ectocarpaceæ*, *Fucaceæ*.

Sub-class TETRASPOROPHORÆ.

Cohort *Tetrasporata*.Order *Pseudoflorideæ*; Fam. *Porphyraceæ*, *Dictyotaceæ*.Order *Florideæ*; Fam. *Ceramiaceæ*, *Nemaliaceæ*, *Lemaneaceæ*, *Sphaerococcaceæ*, *Melobesiaceæ*, *Rhodomelaceæ*.

Division BRYOGAMÆ.

Class MUSCINEÆ.

Cohort *Muscineæ*.Order *Hepaticæ*; Fam. *Anthocerotaceæ*, *Ricciaceæ*, *Targioniaceæ*, *Monocleaceæ*, *Marchantiaceæ*, *Jungermanniaceæ*.Order *Musci*; Fam. *Andreaeaceæ*, *Phascaceæ*, *Sphagnaceæ*, *Bryaceæ*.

Division SCHISTOGAMÆ.

Class PUTERÆ.

Cohort *Puteræ*.Order *Puteræ*; Fam. *Characeæ*.

Division PROTHALLOGAMÆ.

Class ISOSPOREÆ.

Cohort *Isosporeæ*.Order *Filicariæ*; (1) Sub-order *Trichosporangia*; Fam. *Hymenophyllaceæ*, *Polypodiaceæ*, *Gleicheniaceæ*, *Osmundaceæ*.(2) Sub-order *Phyllosporangia*; Fam. *Marattiaceæ*.(3) Sub-order *Ophiosporangia*; Fam. *Ophioglossaceæ*.Order *Calamariæ*; Fam. *Equisetaceæ*.Order *Conariæ*; Fam. *Lycopodiaceæ*.

Class HETEROSPOREÆ.

Cohort *Heterosporeæ*.Order *Phyllocarpariæ*; Fam. *Selaginaceæ*, *Isoetaceæ*.Order *Rhizocarpariæ*; Fam. *Salviniaceæ*, *Marsiliaceæ*.

Division PHANEROGAMÆ.

Class GYNOSPERMÆ.

Cohort *Conifera*.Order *Strobilifloræ*; Fam. *Cycadaceæ*, *Pinaceæ*, *Taxaceæ*, *Gnetaceæ*.Order *Conifloræ*; Fam. *Welwitschiaceæ*.

Class ANTHOSPERMÆ.

Cohort *Dendroica*.Order *Spermifloræ*; Fam. *Viscaceæ*, *Loranthaceæ*.

Class ANGIOSPERMÆ.

Sub-class DICOTYLEDONES.

Cohort *Dimorphanthæ*.Orders *Julifloræ*, *Globifloræ*, *Clavifloræ*, *Urticifloræ*, *Euphorbifloræ*, *Begonifloræ*.Cohort *Monochlamydanthæ*.Orders *Nudifloræ*, *Involucrifloræ*, *Ranifloræ*, *Cactifloræ*, *Cytinifloræ*, *Daphnifloræ*.Cohort *Dichlamydanthæ*.Orders *Cirrifloræ*, *Myrtifloræ*, *Lythrifloræ*, *Rosifloræ*, *Tiliifloræ*, *Crucifloræ*, *Rutifloræ*, *Ericifloræ*, *Primulifloræ*, *Celastrifloræ*, *Umbellifloræ*, *Oleifloræ*, *Campanifloræ*, *Asterifloræ*, *Corollifloræ*.

Sub-class MONOCOTYLEDONES.

Cohort *Centranthæ*.Order *Centrifloræ*.Cohort *Hydranthæ*.Orders *Fluviifloræ*, *Alismifloræ*.Cohort *Lirianthæ*.Orders *Glumifloræ*, *Spadicifloræ*, *Liliifloræ*, *Labellifloræ*.



Peck, Charles H . 1881. "New Species of Fungi." *Botanical gazette* 6(10), 274–279. <https://doi.org/10.1086/325526>.

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DOI: <https://doi.org/10.1086/325526>

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