Rhizopus elegans (Eidam) Ber. & De T.

On masses of corn smut. Tippecanoe 2, 1896 (Wm. Stuart).

Thamnidium elegans Lk.

On vegetable refuse in greenhouse. Tippecanoe 1, 1896 (Arthur).

MISCELLANEOUS FUNGI.

Ascophanus carneus (Pers.) Boud.

On paper lying against sheep's dung. Tippecanoe 3, 1896 (Arthur).

Chætomium bostrychodes Zopf.

On sheep's dung. Tippecanoe 3, 1896 (Arthur). Determined by J. B. Ellis.

Monilia Martinii E. & S.

On a culture of mold in the laboratory. Tippecanoe 3, 1896 (Arthur).

Determined by J. B. Ellis, who thinks that while not agreeing exactly with this species as it usually appears, yet is not distinct enough to merit a separate description.

Podospora penicillata E. & E.

On sheep's dung. Tippecanoe 2, 1896 (Arthur).

Stilbum erythrocephalum Ditm.

On rabbit's dung. Tippecanoe 10, 1896 (Burrage).

Æthalia bombacina Pers. (*Institale bombacina* Fr., *Sporotrichum bombacinum* Lk.)

On dead wood under a board walk. Tippecanoe, 1895 (Stanley Coulter).

Determined by J. B. Ellis, who has also received it from North Carolina, Louisiana and Mexico, collected in similar situations. It forms large, thick, cake-like masses, six inches or more in length, of a dark purple color, with an efflorescence of white spores, and exudes a watery liquid that collects both inside and outside the mass in copious amber-colored drops.

The Uredineæ of Tippecanoe County, Ind. By Lillian Snyder.

Up to the present time about seventy species of *Uredineæ* have been found within Tippecanoe County, out of which there are about fifteen that are new to the State of Indiana. These species I wish to present to you, noting the points of interest concerning them. All the species herein mentioned have been closely examined by the writer in order to detect any differences from typical specimens that might exist, caused from difference in locality or otherwise.

Some of the additional species mentioned are so rare that it was with difficulty a good specimen was collected, while others are so abundant that it seems strange they have not been previously reported.

The collector's name, with date of collection, follows the name of the host, and the specimens may be found in the herbarium of the persons named. Those not so designated are in my own collection.

Sincere thanks are extended to Dr. J. C. Arthur for his assistance in the determination of many of the host plants.

Æcidium asterum Schw. Very common.

On *Aster* sp., 6, 1896.

Æcidium compositarum. As this is only a convenient name under which to place forms found on compositæ, the host holds an important part in the classification. The form on *Eupatorium* was found in May and June, growing in marshy ground. All plants observed were well covered with the *Æcidia.*

On *Eupatorium perfoliatum*, 5, 6, 1896.

Æcidium euphorbiæ Gmel. Common.

On *Euphorbia maculata*, 8, 1887 (Arthur).

On *Euphorbia dentata*, 5, 1896.

Æcidium geranii DC. Rare.

On *Geranium maculatum*, 5, 1894 (Golden).

Æcidium impatientis Schw. Common.

On *Impatiens pallida*, 6, 1896.

Æcidium œnotheræ Pk. Common.

On *Œnothera biennis*, 6, 1896.

Æcidium pentastemonis Schw. was collected in the immediate vicinity of Lafayette by Mr. Stuart, and although the species was found in abundance in that particular locality, a close examination of the *Pentstemon* plants on the part of others failed to reveal the parasite in other parts of the county.

The spots are irregularly scattered over the leaf, appearing purple in the fresh specimen, turning brown when dry.

On *Pentstemon pubescens*, 5, 1896 (Stuart).

Æcidium Ptelea B. & C. Rare.

On *Ptelea perfoliatum*, 6, 1896.

Æcidium ranunculacearum DC.

Cultures have been made by Plowright working out the life history of the species and thus connecting the first and third stages, but it is probable that the American differs from the European forms.

On *Anemone Pennsylvanica*, 6, 1895.

Æcidium trillii Burrill. In this species the sori are usually in circular patches, the central portion free from the rust, or eating through to the upper side of the leaf.

The species is very closely allied to *Æcidium courallancia* of Schweinitz.

On *Trillium sp.*, 6, 1894 (Golden).

Æcidium verbenæ Spreng. is extremely abundant. In the last season almost every plant of *Verbena stricta*, I observed, was affected with the rust. The plants grow along the roadside, and even on streets leading out of town.

The fungus may be found on the lower leaves of the host near the ground, and the *Æcidia* occur usually in white circular spots, scattered irregularly over the under surface of the leaves and producing a discoloration of the leaf.

On *Verbena stricta*, 6, 1896.

Æcoma agrimoniæ Schw. Common.

On *Agrimonia Eupatoria*, 7, 1896.

Coleosporium hydrangeæ (B. & C.) Only the uredospores of this species were found, and these seemed to be in great abundance in various parts of the county.

The species is described by most writers under the genus *Uredo*, but the third stage has recently been found and connected with the *Uredo*, thus putting it in the proper genus.

On *Hydrangea arborescens*, 9, 1896.

Coleosporium ipomoeæ (Schw.) Burrill. In this the teleutospores do not usually appear until late in autumn after frost. They occur in bright orange sori with spores from four to six celled, cells soon separating at the septa and losing their bright color.

On *Ipomœa* sp. 12, 1895 (Arthur), 7, 1896.

Coleosporium Sonchi-arvensis (Pers.) Lev. Common.

On *Solidago* sp. 6, 1896.

Diorchidium lateripes (B. & R.) Mg. Common.

On *Ruellia strepens*, 11, 1895 (Stuart), 6, 1896.

Gymnosporangium macropus Lk. Common.

On *Juniperus virginiana*, 3, 1889 (Bolley).

On *Pyrus coronaria*, 9, 1892 (Arthur), 6, 1896.

Melampsora populina (Jacq.) Lev. Common.

On *Populus monilifera*, 7, 1896.

Melampsora Salicis-capreæ (Per.) Wint. Common.

On *Salix discolor*, 8, 1896.

Phragmidium fragariæ (DC.) Wint. Rare.

On *Potentilla canadensis*, 6, 1896.

Phragmidium speciosum (Fr.) Arth.

Stages I and II of this species are found on the same host, the *æcidia* appearing in summer as reddish-yellow spots that follow the veins and petioles of the leaves, producing much distortion. The third stage appears about two months later, and, in specimen examined, on the same individual host as the *æcidia*.

On *Rosa Carolina*, 7, 9, 1895 (Arthur), 5, 1895.

Puccinia Anemone-virginianæ Schw. was first described by Schweinitz as early as 1822, in the "Synopsis Carolina," under the name *P. anemone-virginanæ*, and is referred to by him in a later work under the name *P. solida*.

The sori occur in dark-brown hardened spots, difficult to free from the host. The spores are long and linear, and slightly colored.

Only the third stage is known, and is quite common, first appearing about the month of July.

On *Anemone cylindrica*, 7, 1892 (Arthur).

Puccinia andropogi Schw. Very common.

On *Andropogon scoparus*, 9, 1896.

On *Andropogon furcatus*, 9, 1896.

Puccinia augustata Pk. Common.

On *Scirpus atrovirens*, 9, 1896.

Puccinia asteris Duby. Common.

On *Aster diffusus*, 6, 1896.

Puccinia Bolleyana Sacc. Rare.

On *Carex sp.*, 11, 1888 (Bolley).

Puccinia convolvuli (Per.) Cast. Common.

On *Convolvulus sepium*, 10, 1895 (Stuart).

On *Polygonum dumetorum*, 6, 12, 1896.

Puccinia cyperi Arth. Common.

On *Cyperus strigosus*, 9, 1896.

Puccinia circaeæ Pers. Rare.

On *Circæa lutetiana*, 7, 1896.

Puccinia coronata Cda. Common.

On *Arena sativa*, 11, 1896 (Stuart).

Puccinia caricis (Schum.) Wint. Very common.

On *Carex sp.*, 10, 1896.

Puccinia eleocharidis Arth. Rare.

On *Eleocharis palustris*, 11, 1896.

Puccinia flosculosorum (A. & S.) Wint. Common.

On *Taraxacum officinale*, 5, 1895; 6, 1896.

Puccinia graminis Per. Common.

On *Avena sativa*, 10, 1896.

On *Dactylis glomerata*, 10, 1896.

On *Hordeum jubatum*, 11, 1896.

Puccinia interstitialis (Schl.) Franz. Common.

On *Rubus villosus*, 5, 1896.

Puccinia Kuhniæ Schw. Rare.

On *Kuhnia eupatoriodes*, 9, 1888 (Bolley).

Puccinia Lobeliæ Gerard. Rare.

On *Lobelia syphilitica*, 8, 1896.

Puccinia ludibunda E. & E.

The original description of this species may be found in the proceedings of the Philadelphia Academy of Science, 1894. The projections at the apex of the spores, spoken of there, resembling closely *Pucc. coronata*, I have observed in some cases, but they are very small and inconspicuous.

The host plant was found in low ground along the Wabash River. Most all plants observed bore some rust, but, generally, the sori were few and scattering, and being small were difficult to see.

On *Carex sparganioides*, 10, 1896.

Puccinia menthæ Pers. Common.

On *Monarda fistulosa*, 6, 1896.

On *Blephilia hirsuta*, 7, 1896.

On *Pycnanthemum sp.*, 10, 1896.

Puccinia nigrovelata Ell & Tracy. Rare.

On *Cyperus strigosus*, 3, 1896.

Puccinia nolitangere Cda. Found in the extreme northern part of the county in low ground. The plants in the immediate vicinity were badly affected with the rust, but efforts to find the species in other parts of the county proved unsuccessful.

The species was first described by Corda in Icones IV as early as 1841.

On *Impatiens fulva*, 9, 1896.

Puccinia Physostegiæ P. & C. Only the teleutospores were examined. These are usually placed obliquely on the pedicels, but none were found with pedicels parallel to the septum, as they are in the typical *Diorchidium* genus.

The original description of this species occurred in 1878 in the 29th Rep. N. Y. St. Mus.

On *Physostegia virginica*, 8, 1895 (Arthur).

Puccinia panici. Very common.

On *Panicum capillare*, 9, 1896.

Puccinia prenanthis (Per.) Fhll. Very rare.

On *Prenanthes alba*, 5, 1895 (Golden).

Puccinia podophylli Schw. Common.

On *Podophyllum peltatum*, 6, 1896.

Puccinia polygoni-amphibii Pers. Common.

On *Polygonum erectum*, 6, 1896.

Puccinia Rubigo-vera (DC.) Wint. Common.

On *Glumes of Rye*, 7, 1889 (Arthur).

On *Elymus virginicus*, 7, 1896.

Puccinia Sporoboli Arth. Found on *Sporobolus cryptandrus*, differs some from the form found on *S. heterolepsis*. On the former the spores are larger, usually constricted at septa, pedicels much longer, generally two or three times the length of the spore, and slightly tinted. The one-celled teleutospores spoken of in the original description were not present in specimen examined, probably due either to the different host species or more mature state of material. The grass is found in sandy places in great abundance. The leaves and stems are usually entirely covered with the rust, causing the leaves to curl.

On *Sporobolus cryptandrus*, 4, 1896.

Puccinia triodiæ Ell. and Barth. Has been until recently classed under *Pucc. emaculata* Schw., and has probably been reported as that species, but there are some differences existing along with the different hosts, making it certainly justifiable in separating the forms.

The host plant is found in dry, sandy soil, and the rust is very abundant, the sori usually covering the whole upper surface of the leaves. All plants observed were badly infected with the fungus. There are some differences in the teleutospores growing upon the different species of *Triodia*, mainly in size and shape of spores.

On *Triodia seslerioides*, 3, 1896.

Puccinia tenuis Burrill. Rare.

On *Eupatorium ageratoides*, 5, 1896.

Puccinia tanaceti DC. Common.

On *Helianthus grosse-serratus*, 6, 1896.

Puccinia vulpinoides D. & H. Rare.

On *Carex vulpinoides*, 11, 1888 (Bolley).

Puccinia windsoriæ Schw. Very common.

On *Muhlenbergia sylvatica*, 9, 1896.

Puccinia xanthii Schw. Very common.

On *Xanthium Canadense*, 6, 1896.

On *Ambrosia trifida*, 6, 1896.

Ræstelia lacerata (Sow.) Fr. Common.

On *Cratægus sp.*, 6, 1896.

Uromyces appendiculata (Pers.) Lév. Common.

On *Phaseolus diversifolius*, 6, 1896.

Uromyces caladii (Schw.) Farl. Common.

On *Arisæmia triphyllum*, 5, 1896.

On *Arisæmia Dracontium*, 6, 1896.

Uromyces Euphorbiæ (Schw.) C. & P. Common.

On *Euphorbia dentata*, 7, 1896.

On *Euphorbia hypericifolia*, 6, 1896.

*Uromyces gaurina** (Pk.)

The second stage or *uredo* stage of this species has been described by Peck in the Botanical Gaz. IV as early as 1879 under the name *Trichobasis gaurina*, of which he says that it is probable that the species is the second stage to some species of *Uromyces* or *Puccinia* not yet known. I found the teleutospores July 25, 1896, on the same host with *uredo* which correspond with those described by Peck. So I take it that the form recently found belongs to what has been previously known as *Uredo gaurina*, but must now be classed under the genus *Uromyces*.

On *Gaura biennis*, 7, 1896.

Uromyces Howei Pk. Common.

On *Asclepias incarnata*, 10, 1896.

On *Asclepias cornuti*, 9, 1896.

Uromyces hedysari-paniculati (Schw.) Farl. Common.

On *Desmodium Canadense*, 6, 1896.

On *Desmodium diellenii*, 6, 1896.

Uromyces junci (Schw.) Tul. Common.

On *Juncus tenuis*, 10, 1896.

Uromyces lespedezæ (Schw.) Pk. Rare.

On *Lespedeza repens*, 9, 1894.

Uromyces orobi (Per.) Wint. is rare. In only one locality could I find plants affected with the fungus, and then only a very few leaves could be found bearing rust. Plants not ten feet distant seemed to be perfectly free from any infection.

On *Vicia Americana*, 10, 1896.

**Uredo sori* scattered, brown; spores globose, finely echinulate 19-22$^{\mu}$ w. by 20-26$^{\mu}$ l.; teleutosori dark brown, erumpent, roundish; spores sub-globose, ovate or oblong, vertex strongly thickened with a blunt-colored apiculus, smooth, 19-24$^{\mu}$ w. by 20-30$^{\mu}$ l.; pedicels once to three times the length of the spore, hyaline.

Uromyces polygoni (Per.) Fkl. Common.

On *Polygonum aviculare*, 6, 1896.

Uromyces trifolii (A. & S.) Wint. Rather common.

On *Trifolium protense*, 7, 1896.

Uromyces terebinthi (DC.) Wint. Very common.

On *Rhus toxicodendron*, 10, 1896.

Besides these species a few additional host plants have been found, the most interesting and noteworthy of which is *Polygonum dumetorum* var. *scandens*.

A number of species are common on *Polygonum* species, but in the past season *Pucc. Convolvuli* has been found upon this host in great abundance. The rust occurs on the leaves, petioles, and occasionally on the stems in about the same manner as it does on plants of *Convolvulus*. In fact, had I not been especially fortunate in securing the host plant in bloom I should certainly have been led to believe that I had found the rust upon some species of *Convolvulus*, as the foliage and manner of growth of the two plants are very similar.

Although there are some differences existing between the two forms of fungi, I believe without a doubt they belong to the same species.

Uredospores growing upon *Polygonum dumetorum* are not so uniform, and of a much darker color than those on *Convolvulus*, while *teleutospores* upon the former are slightly larger, more varied, with pedicles more deeply tinted, and sometimes placed obliquely on the spore.

The uredospores were collected the latter part of June, and were not abundant. The marked differences between these spores and uredo of authentic specimens of *Uromyces polygoni* and *Puccinia Polygoni amphibii* led me to make further search for material, and in the early part of the present month the teleutospores of the above species were found in great abundance upon the same individual host as the earlier stage. Host plants of the same species in various other localities of the county were examined, but were not affected in the least with any rust.

Dactylis glomerata (*Pucc. graminis*). As far as I have been able to make out, *Pucc. graminis* has never been reported as growing upon this host, the usual species found upon it being *Pucc. coronata* Cda. Through the experiments of Eriksson, he has found that, among other host plants, *Pucc. graminis* will grow upon *Dactylis glomerata*.

The rust was found in the Experiment Station yard, appearing in linear sori, and almost covering both sides of the leaves of the host. Although the grass grew there in great abundance, only one or two tufts seemed to be infected with the fungus.

Hordeum jubatum (*Pucc. graminis*). Although some search has been made for this plant, I have never found it in great abundance. Gray's Manual gives the range sandy sea shore, Upper Great Lakes and westward. Bulletin of Indiana Experimental Station, No. 29, reports the plant as frequently occurring along the Wabash River, but rather sparingly.

The few plants that I have found have their leaves dotted over rather scantily with the uredo, and the culms entirely covered with the teleutospores of *P. graminis*, the latter appearing sub-epidermal.

Traumatropic Curvature of Tendrils. By D. T. McDougal.

Mechanism of Curvatures of Roots. By D. T. McDougal.

On the Occurrence of the Russian Thistle (Salsola Kali Tragus) in Wabash County. By Albert B. Ulrey.

[Abstract.]

The Russian thistle is recorded as occurring in two localities near North Manchester, Ind. One locality is on the Erie R. R., while the other is somewhat more than a half mile from the Big Four road.

Some Additions to Our Knowledge of the Anatomy and Embryology of the Holostomidæ. By L. J. Rettger.

[Abstract.]

The holostomidæ belong to the class of trematodes and to that division of this class designated as the *digenea*, on account of their passing through two stages, entirely marked off from each other in reaching maturity. They vary in size from almost microscopic forms to forms five to ten mm. long. The holostomidæ are usually parasitic in the intestines of birds, though they have been noted occurring elsewhere. Comparatively few forms are known through all their larval stages, and in some of the few cases apparently known there is still a large element of uncertainty. This lack of definition is caused by the difficulty of finding the larval forms, and then growing the larvæ into the adult parasites.

During last winter while engaged in studying some forms of distomum, I chanced to find living parasites in the liver of Lymnæa stagnalis innumerable