PTERIDOPHYTES OF LAWRENCE COUNTY

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Specimens of all the species reported in this paper were collected by the author and are in his herbarium. A duplicate of each one was deposited in the Butler University herbarium. Duplicates of some are also in the Deam herbarium and in the Gray herbarium.

The following is a list of the ferns and their allies found in Lawrence County:

1. *Adiantum pedatum* L. (Common Maidenhair). Generally distributed on shaded hillsides and moist hollows in woods.

2. *Thelypteris Goldiana* (Hook) Nieuwl. (Goldie's Fern). This fern has been collected in widely scattered places in the county. It apparently prefers the sandstone areas. It seems to be more plentiful in the southwest part of the county. The finest specimens seen are in a deep, rocky, wooded ravine several miles northeast of Huron.

3. *Thelypteris hexagonoptera* (Michaux) Weatherby. (Broad Beech Fern). Generally distributed in rather dry, open woods.

4. *Thelypteris marginalis* (L.) Nieuwl. (Marginal Shield Fern). As far as is known this fern is found mostly in the eastern part of the county. It is quite common on some of the rocky, wooded hillsides of the Borden or Knobstone formation. Several colonies of a few plants have been found in the western part of the county on the Chester or Huron formation.

4a. *Thelypteris marginalis* (L.) Nieuwl. forma *elegans* (J. Robinson) Weatherby. This form, with large fronds and the pinuules toothed or lobed, is the common form associated with *Tsuga canadensis* where it grows on the steep slopes along Back Creek and Guthrie Creek.

5. *Thelypteris noveboracensis* (L.) Nieuwl. (New York Fern). Frequent and generally distributed throughout the county. It ordinarily prefers a dryish soil. An especially fine colony was noted on a steep bank of Back Creek, where it was associated with *Acer saccharum, Fagus grandifolia,* and *Tsuga canadensis.* Another colony covering an area of about one-half acre was noted in a low woods about two miles southwest of Zelma. Here it was associated with *Quercus palustris, Acer rubrum, Nyssa sylatica* and *Liquidambar Styraciflua.*

6. *Asplenium platyneuron* (L.) Oakes. (Ebony Spleenwort). Not uncommon in the county. It flourishes here on rich, moist banks and in rocky, open woods of both the limestone and sandstone sections.

7. *Asplenium platyneuron* var. *serratum* (E. S. Miller) BSP. The incised form of the pinnae has been collected west of Bedford in rocky woods bordering Salt Creek, in rocky woods near Avoca, and on a wooded slope about one-half mile north of Huron.

8. *Asplenium ebenoides* R. R. Scott. (Scott's Spleenwort). This rare hybrid has been found growing at three different places, all within five miles of Bedford. On November 28, 1932, it was found growing on a limestone boulder about two miles west of Bedford on the property of Mrs. Lulu Quackenbush. The colony consisted of four plants. On January 5, 1933, another colony was found in a rocky woods near Avoca, about five miles northwest of Bedford. This colony consisted of seven mature plants and at least three young plants which were definitely identified as those of the hybrid. The third place where it is known to grow is on a limestone bluff in a deep ravine about one and one-half miles north of Bedford. This was found on February 1, 1933. Only a single plant was found at this station.

9. *Asplenium pinnatifidum* Nutt. (Pinnatifid Spleenwort). This comparatively rare spleenwort was first discovered on March 28, 1934, on the sandstone cliffs above the entrance to the kaolin mines on the Dr. Joseph Gardner estate, 3.4 miles southwest of Bryantsville. Careful search revealed only about three dozen plants, which were widely scattered over the cliffs. The rocks upon which they grew are of the Mansfield formation. On February 19, 1935, it was found growing in large numbers on sandstone cliffs about three miles north of Huron. Hundreds of plants were observed in the clefts of the shady ledges. Other ferns growing on the same rocks were: *Asplenium Trichomanes, Polpyodium vulgare,* and *Woodsia obtusa.*

10. *Asplenium Trichomanes* L. (Maidenhair Spleenwort). Discovered June 4, 1933, on the sandstone outcrop of the Huron formation above Brown's Spring, on the property of J. E. Wilson, about one and one-half miles southeast of Huron. It has since been collected on rocks of the same formation at other widely separated places.

11. *Athyrium acrostichoides* (Sw.) Diels. (Silvery Spleenwort). Not common, but generally distributed in the county. Found mostly in rich woods and on moist shady banks.

12. *Athyrium angustifolium* (Michaux) Milde. (Narrow-leaved Spleenwort). Infrequent, but generally distributed in rich, moist, shaded ravines. Often intimately associated with the preceding.

13. *Athyrium asplenioides* (Michaux) Desv. (Lowland Lady Fern). Infrequent in moist woods and by roadsides. The ones that grow by roadsides in full sunlight put on an aspect quite in contrast to those which grow in the shade. In fact the latter vary greatly in outline. The sun forms are characteristic in that the pinnae are obliquely ascending to almost erect. In most of the characters all the specimens at hand are representatives of this species. We have carefully searched for *A. angustum,* a closely allied species, but so far have been unsuccessful. The county is possibly a little south of its range in the state.

14. *Botrychium dissectum* Spreng. (Cut-leaved Grape Fern). A colony of less than a dozen plants was found on October 11, 1934, about two miles southwest of Bryantsville in rich, moist soil at the foot of a wooded ravine where it was associated with members of a large colony of *Botrychium obliquum.* The forest in the immediate vicinity was

made up of *Ulmus americana*, *Platanus occidentalis*, and *Carpinus caroliniana*. It has previously been reported for the county. Dr. Ray C. Friesner found it in 1921 on the grounds about Donaldson Cave in Spring Mill Park. The above two stations are somewhat similar in ecology. This fern is apparently rare with us. We have searched for it in this county for seven years. Having previously observed and collected it in Berks County, Pennsylvania, where it is infrequent, I regard it as rare here rather than overlooked.

15. *Botrychium obliquum* Muhl. (Grape Fern). Not very common, but generally distributed over the county. It has been collected in various situations. Of the twenty-two sheets in the writer's herbarium seven have been collected in the hard, white clay of our "flats," where it was associated with such plants as *Quercus palustris*, *Acer rubrum*, *Nyssa sylvatica*, and *Liquidambar Styraciflua*. Five specimens are from rather high ground, where they were associated with *Quercus alba*. However, for the most part it seems to prefer the bases of slopes or the bottoms of ravines, where it frequently grows with *Acer saccharum*, *Fagus grandifolia*, *Ulmus americana*, and *Platanus occidentalis*. Our specimens show considerable variation in the cutting of the fronds. Mr. E. W. Graves, of Bentonsport, Iowa, has seen the specimens and names them all *B. obliquum* Muhl.

16. *Botrychium virginianum* (L.) Sw. (Rattlesnake Fern). Rather common in rich woods. A form much reduced in size is frequently found. This has been named var. *gracilis*. This is now generally regarded as only a juvenile state. *Botrychia* show a tendency to begin fruiting at an early stage in the development of the plant. Small forms may, of course, also be due to insufficient nutrition.

17. *Camptosorus rhizophyllus* (L.) Link (Walking Fern). This fern is very common on shaded outcrops throughout the limestone areas. It is also seen in our sandstone areas, but not very frequently.

17a. *Camptosorus rhizophyllus* var. *auriculatus* Clute. The form with much elongated basal lobes is frequently found. It is quite common about one and one-half miles northwest of Bedford. It is also common in a rocky woods near Avoca. At the latter station, specimens have been collected with acuminated auricles more than four inches long, some of which were rooting at the main acumination and at both of the much elongated basal lobes.

18. *Cystopteris bulbifera* (L.) Bernh. Bulblet Bladder Fern). Common on shaded limestone outcrops that afford enough moisture. It often grows on wet shaded hillsides.

19. *Cystopteris fragilis* (L.) Bern. (Fragile Fern). Common in damp, shady places, especially at the bases of rocks. Probably our most plentiful fern in point of numbers of individual plants.

20. *Dennstaedtia punctilobula* (Michaux) Moore. (Hay-Scented Fern). This is known to grow in only two places. A large colony has been discovered on a steep slope along Back Creek, about two miles northwest of Leesville. It is closely associated with *Tsuga canadensis*. The second place where it is known to grow is on a steep slope of a

"knob" about one-half mile southwest of Heltonville. Here it is associated with *Fagus grandifolia* and *Acer saccharum.*

21. *Onoclea sensibilis* L. (Sensitive Fern). Infrequent, but generally distributed throughout the county. It has been collected in springy places, along water courses, and in low woods.

22. *Pteretis nodulosa* (Michaux) Nieuwl. (Ostrich Fern). Only two colonies of this fern have been found. They are both on the flood plain of Salt Creek, about four miles southwest of Bedford. One colony, found on September 7, 1933, is on the wooded bank of the creek on the property of Frank Jackson. The other colony is in a similar habitat about one mile farther downstream on property belonging to James Meadows.

23. *Ophioglossum vulgatum* L. (Adder's Tongue). This has been discovered at four different places. It was first discovered on June 26, 1931, growing in a wet place, in a sugar maple and beech woods in Marshall Township. On June 9, 1933, it was found on a white oak and sugar maple slope about one mile north of Needmore. On June 3, 1933, it was found at the grassy edge of a sinkhole pond about two miles southwest of Bedford. On May 26, 1934, it was found in a "flatwoods" one mile south of Zelma. Here it was associated with *Quercus palustris, Acer rubrum, Nyssa sylvatica,* and *Liquidambar Styraciflua.* It was thinly scattered throughout these woods, which covered an area of approximately five acres.

24. *Osmunda Claytoniana* L. (Interrupted Fern). This fern is apparently confined to the western part of the county. It has been collected in a swamp about two miles northwest of Avoca. All the other observations were made in the southwestern area. The finest colonies of this species were noted in a wooded ravine about one mile south of Huron.

25. *Osmunda regalis* var. *spectabilis* (Wilde.) Gray. (Royal Fern). This has been seen growing in only two places. Several dozen clumps are growing at the edge of a "flatwoods" and along the roadside about two miles southwest of Zelma, in the eastern part of the county. The other place where it is known to grow is in a swampy woods about two miles northwest of Avoca. Only a single clump has been noted at the latter place. Cattle have quite evidently destroyed what probably was once a large colony.

26. *Pellaea atropurpurea* (L.) Link (Purple Cliff Brake). Common on some dry limestone ledges and cliffs. It has been noted at the following places: on a calcareous outcrop in a ravine one-half mile west of the Dive school, north of Bedford; on a bluff in Dickinson Park, north of Bedford; on outcrops on Duncan Bend of White River; on a bluff one-half mile upstream from Stumphole Bridge on White River; above Donaldson Cave in Spring Mill Park; at Bryant Bluff on White River; and on outcrops along White River one mile southeast of Williams.

27. *Polypodium vulgare* L. (Common Polypody). First observed on limestone rocks one and one-half miles west of Bedford. Several colonies have been seen on a steep slope along Guthrie Creek, where it

was associated with *Tsuga canadensis*. It has also been seen in rocky woods one-half mile north of Huron. Large and profuse colonies have been discovered on sandstone rocks along Indian Creek in Section 19 of Perry Township. It is not common in the county.

28. *Polypodium polypodioides* (L.) Watt. (Gray Polypody). Only one colony of this fern has been found. It was discovered on March 1, 1933, on a limestone boulder above the outlet of a subterranean stream on the steep bank of White River near the pump house of the Bedford Water Works. The colony covered an area of about twenty square feet.

29. *Polystichum acrostichoides* (Michx.) Schott. (Christmas Fern). Common. Generally distributed on rocky, wooded slopes of ravines and wooded slopes along streams.

29a. Forma *incisum (Polystichum acrostichoides* var. *Schweinitzii)* (Beck) Small. This form, in which the pinnae are much incised, has been collected on steep, shaded slopes along Guthrie Creek and on a wooded slope one-half mile north of Huron. It has been noted at a number of other places in the county. It is quite variable. The fronds are generally large with deeply toothed and often pinnatifid pinnae.

29b. Forma *crispum*, which has the edges of its pinnae crisped and ruffled, has been collected on a number of occasions. Another form in which the pinnae are forked has been collected.

30. *Pteridium latiusculum* (Desv.) Maxon. (Bracken or Brake). Only four colonies of this fern have been seen in this county. One was located about two miles northeast of Springville on the right-of-way of the Bedford-Bloomfield branch of the Monon Railroad. The colony extended along the side of the railroad and along the fence for about eighty feet. A second colony was discovered in an abandoned field about one mile southwest of Zelma. Both of the above colonies were growing in the white clay soil which is characteristic of our "flats." The other two colonies were found in the black-white oak type of woods. One was discovered about two miles southwest of Bryantsville and the other on the wooded slope of a "knob" one mile north of Bartlettsville. This fern certainly is not plentiful in this county. The writer has diligently searched for it since 1926.

31. *Woodsia obtusa* (Spreng.) Torr. (Blunt-lobed Woodsia). On rocky banks and cliffs throughout the county. It prefers the drier and sunnier side of rocky ravines. In the limestone sections it is commonly found in rocky woods where *Quercus Muhlenbergii* thrives.

32. *Equisetum arvense* L. (Horsetail). This plant has been collected at a number of places in moist, sandy soil. It is common about the stone mills where limestone is fabricated for building purposes. It thrives in the waste that results in the process of sawing the stone. The waste, a slush, which is a mixture of water, sand, and limestone dust, offers an excellent medium in which the plant grows. Plants collected are quite variable. No great profit is seen in endeavoring to distinguish forms or varieties in this species. Most, if not all, of its variants are pretty plainly direct responses to environmental conditions.

33. *Equisetum prealtum* Raf. (E. *hyemale* var. *affine* A. A. Eaton) (Scouring Rush). This has been collected on gravelly bars in streams, in ditches, along roadsides, and at various places along our railroads. C. A. Weatherby of the Gray Herbarium has seen all the specimens that were collected and writes: "These seem to me all the same thing, differing only in size, and in two cases, in the sporadic branching which occasionally occurs in this species."

34. *Lycopodium complanatum* var. *flabelliforme* Fernald (Ground Pine). As far as is known there is but one station in the county for this plant. It was first found in 1929 by Mr. Thomas Owens in Spice Valley Township growing under *Carya ovata* and *Liriodendron tulipifera* in an abandoned field that is reforesting itself. Fruiting specimens were collected in October 1933. The colony, covering an area of several hundred square feet, is growing in sandy soil derived from the Mansfield formation.

The following species, first found while this paper was in press, should be added to the above list:

35. *Cheilanthes lanosa* (Mx.) Watt. (Hairy Lip Fern.) Two colonies of this species were discovered on April 28, 1935, growing in clefts of sandstone cliffs about two miles north of Huron, in Section 29 of Spice Valley Township. The plants were growing in dense little clumps on semi-shaded rocks, upon which were also growing *Woodsia obtusa* and *Asplenium pinnatifidum*. This interesting fern, which is mostly southern in its distribution, is here about as far north as it ranges. We first found it in Indiana in 1926 on the sandstone bluffs along White River in Martin County. This Lawrence County station is its northern limit in Indiana as far as is known.