

## The Pteridophytes of the Valparaiso Moraine of Porter County, Indiana

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Porter County, Indiana is rich in species of plants owing to the varied physiography provided by the dune and sandy areas near Lake Michigan in the northern part of the county, to the moraine running through the middle of the county, and to the Kankakee marsh on the south. Of the eighty-two species, varieties, and hybrids of pteridophytes reported for Indiana in Deam's Flora of Indiana (2), forty-three were reported from Porter County. Four additional species have been reported for the county in the Indiana Plant Distribution Records published in the Proceedings of the Indiana Academy of Science (3).

Much of the botanizing done in Porter County has been done in the sand dunes. Because of the popularity of the dunes as a summer resort and the ease with which a wide variety of environments can be studied, many of the reports for the county have been made on the basis of collections in the dune area. The extent of the work done in the dunes and adjacent sandy areas is indicated by the several floras which have appeared, including the floras of the dunes and nearby areas. A few of such published floras are those by Lyon (4,5), Pepoon (7), and Peattie (6).

The probability that the morainal region of Porter County has not been studied and reported as intensively as the areas to the north is evidenced by the collection during the present study of several species and varieties not previously reported for any part of the county. The following species and varieties collected while this study was made are not included in Deam's Flora (2) or in subsequent reports: *Cystopteris fragilis* (L.) Bernh. var. *protrusa* Weatherby, *Athyrium pycnocarpon* (Spreng.) Tidestr., *Dryopteris spinulosa* var. *fructuosa* (Gilbert) Trudell, *Equisetum arvense* var. *boreale* (Bong.) Rupr., and *Equisetum hyemale* L. var. *affine* (Engelm.) A. A. Eaton.

The geological formation known as the Valparaiso Moraine extends across the middle portion of Porter County and covers a large area, with varied physiography, microclimates, soils, and water relations. This variation in environments has favored the development of a flora rich in species. The greater part of the moraine has been disturbed much more than the dune area.

The most complete geological study of the area is that of W. S. Blatchley (1) published in the 22nd Annual Report of the Department of Geology and Natural Resources of Indiana. The moraine in Porter County consists of about two hundred thirty-five square miles of land

and comprises a band seventeen miles wide on the western border of the county which swings northeast and narrows to seven miles in width at the eastern county line. The entire area is covered with a sheet of drift which is as much as one hundred twenty-five feet thick at Valparaiso. The extent and location of the moraine in Porter County is shown on the map in figure 1.

The richest pteridophyte collections were made in three areas, although a greater part of the moraine was covered. The first is a cut-over mesophytic forest located on the south side of U. S. Highway 6 about three miles east of its junction with Indiana Highway 49. This forest has been ungrazed for about 17 years and is at present a classified forest. The principal tree species in the forest at present are sugar maple (*Acer saccharum*), beech (*Fagus grandifolia*), white oak (*Quercus alba*), black oak (*Q. velutina*), and red maple (*Acer rubrum*). Many physiographic features of the moraine are represented in this forest. The second collecting site is a small beech-maple forest (*Acer saccharum* and *Fagus grandifolia*), cut over, but not recently grazed. It is located about two miles northeast of Valparaiso, just north of the Grand Trunk Railroad and west of Indiana Highway 2. The third area is a small, partially drained tamarack bog along Salt Creek about two miles directly south of the main part of Valparaiso. This bog is unprotected from grazing and may soon cease to be as rich botanically as at present.

#### Annotated List of Species Collected on the Valparaiso Moraine

1. *Botrychium dissectum* var. *obliquum* (Muhl.) Clute. Three specimens of this fern were observed in the beech-maple forest.

2. *Botrychium virginianum* (L.) Sw., the rattlesnake fern, was one of the more common ferns on the moraine. Many specimens were observed in all three collecting areas, as well as in many other places on the moraine. One specimen measured thirty-two inches from the ground to the tip of the fertile portion of the frond.

3. *Osmunda regalis* L. var. *spectabilis* (Willd.) Gray, the royal fern, was one of the more conspicuous ferns in the wet mucky places in all three areas referred to earlier.

4. *Osmunda Claytoniana* L., the interrupted fern, was one of the more difficult ones to find, but later findings suggest that many of the ferns which were at first glance considered to be the cinnamon fern were actually the interrupted fern without fertile portions on the fronds.

5. *Osmunda cinnamomea* L., the cinnamon fern, was very common in the tamarack bog and on the slopes of the pockets and ridges in the mesophytic forest.

6. *Cystopteris fragilis* (L.) Bernh., the fragile fern, is one of the most common ferns on the moraine. It was found in all three areas referred to, as well as in many widely scattered woods. In many places it was the most common species in the herb layer.

(a). *C.f.* var. *protrusa* Weatherby. One specimen which seems to belong to this variety of the fragile fern was collected. It was found

growing on a rotting log in a mucky portion of the beech-maple forest. Since it was the only specimen noted, it may have been an environmental variant of the typical form.

7. *Onoclea sensibilis* L., the sensitive fern, is a very common fern in moist areas. Numerous specimens were seen along roads, in the tamarack bog, in the beech-maple forest, and in wet places generally.

8. *Dryopteris hexagonoptera* (Michx.) C. Chr. Several small clumps of the broad beech fern were found in the higher parts of the beech-maple forest and on the slopes of pockets in the mesophytic forest. Some specimens were thought to belong to the narrow beech fern (*D. Phegopteris*) but the determination is doubtful, so for the present they are being considered variants of the broad beech fern.

9. *Dryopteris Thelypteris* (L.) A. Gray var. *pubescens* (Lawson) A. R. Prince, the marsh fern, was common in very wet places in numerous locations on the moraine. Frequently it was found growing together with the sensitive fern in wet meadows.

10. *Dryopteris cristata* (L.) A. Gray, the crested fern, was found only in the tamarack bog where it was common.

11. *Dryopteris spinulosa* (O. F. Muell.) Watt. This fern is one of the more common ones on the moraine in wet areas. Many clumps were seen in the tamarack bog and in the mesophytic forest. It was less common in the beech-maple forest.

a. *D.s.* var. *fructuosa* (Gilbert). This variety was found in the mesophytic forest in association with the typical form.

12. *Polystichum acrostichoides* (Michx.) Schott., the Christmas fern, was not common. Several small clumps were observed in the mesophytic forest and in the beech-maple forest.

13. *Athyrium pycnocarpon* (Spreng.) Tidestr., the narrow-leaved spleenwort, was found growing extensively in the higher parts of the beech-maple forest. It was usually found growing in association with the silvery spleenwort.

14. *Athyrium thelypteroides* (Michx.) Desv., the silvery spleenwort, was one of the common ferns in the beech-maple forest, occurring in the higher, better drained parts of the forest.

15. *Athyrium angustum* (Willd.) Presl., the lady fern, was found in moist places in the more open parts of the beech-maple forest and the tamarack bog.

(a). *A.a.* var. *elatus* (Link) Butters. This variety was found growing with the typical form.

(b). *A.a.* var. *rubellum* (Gilbert) Butters. This variety was found growing with the typical form.

16. *Adiantum pedatum* L., the maidenhair fern, was found on the slopes of the pockets and ridges of the moraine in the mesophytic forest, but not observed elsewhere.

17. *Pteridium aquilinum* (L.) Kuhn var. *latiusculum* (Desv.) Underw. ex. Heller, the bracken fern, was very common over much of the

moraine, especially along railroad tracks, country roads, and at the edges of some of the forests.

18. *Equisetum arvense* L. This horsetail was found growing along railroads, beside country roads, and in the wet meadows. It was also found in the tamarack bog.

(a). *E.a.* var. *boreale* (Bong.) Rupr. This variety was found growing in moist places in an oak-hickory forest and in the tamarack bog in sites less exposed to the sun than were the sites in which the typical form was common.

19. *Equisetum hyemale* L. var. *affine* (Engelm.) A. A. Eaton. This plant was found growing along the Pennsylvania railroad just east of Valparaiso and on a road fill several miles south of Valparaiso. The plants from the two areas showed considerable variation in size.

20. *Equisetum fluviatile* L., the water horsetail, was found in a wet place along Sager's Road, just south of Valparaiso University and in the tamarack bog. In neither place was it abundant.

The writer wishes to take this opportunity to acknowledge the help he has received in preparing the present study. Dr. Paul D. Voth and Dr. George D. Fuller, both of the University of Chicago, aided in identifying some of the more difficult specimens and made many helpful suggestions. It was impossible for the writer to visit all the herbaria containing specimens from Porter County in order to check such specimens to determine whether any of them had been collected on the moraine. Dr. Charles C. Deam, Dr. R. M. Tryon Jr., Dr. Winona H. Welch, Dr. Paul Weatherwax and Mr. Paul Holle kindly furnished information on the specimens in question.

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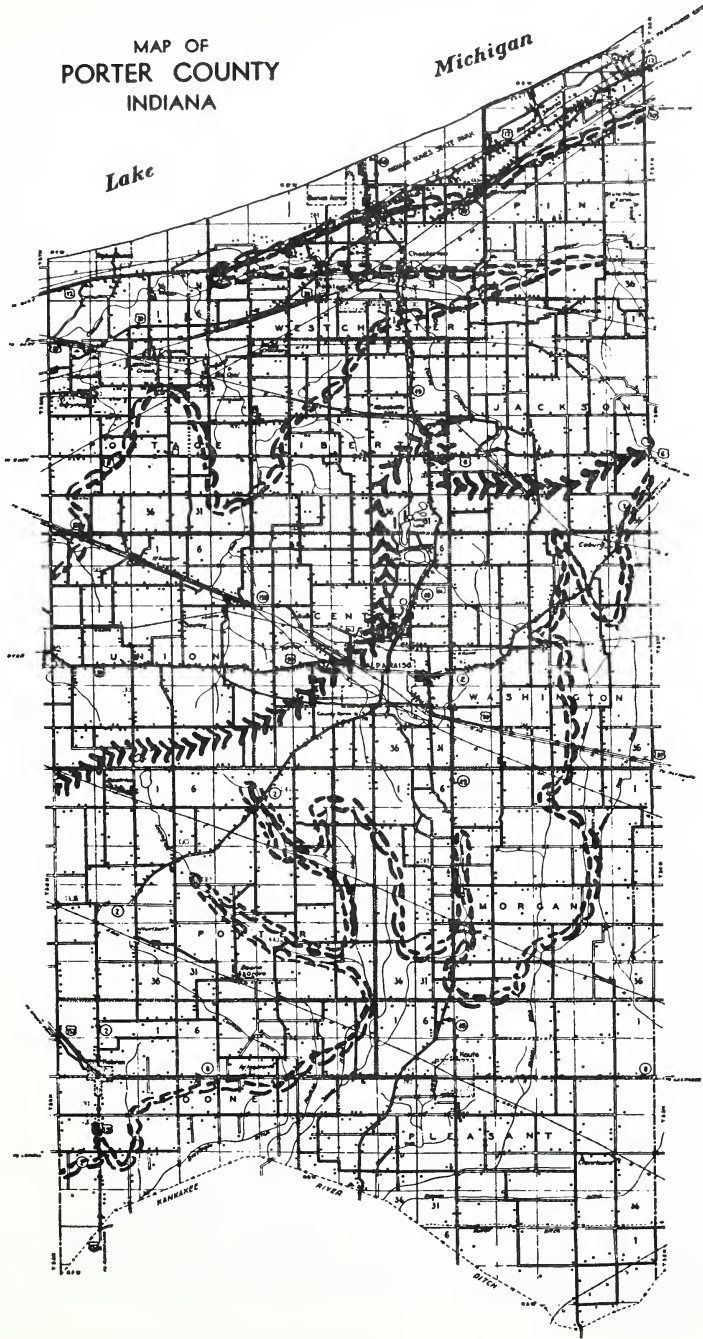


Fig. 1. Map of Porter County, Indiana, showing the borders (dashes) and crest (arrows) of the Valparaiso Moraine.