

FERNS OF ROCK RIVER VALLEY IN ILLINOIS*

EGBERT W. FELL AND GEORGE B. FELL
Rockford, Illinois

The purpose of this paper is to give some account of the fern habitats and of the present fern population of the drainage basin of Rock River from the Wisconsin state line to Dixon, a distance of fifty miles. The area includes Boone, Winnebago, eastern Stephenson, western Ogle and a part of Lee Counties. This is a glaciated, partly wooded but mostly prairie area where the streams have cut hills, cliffs and ravines which with their bordering woods, the sandy area in northeastern Winnebago County and the sandstone area in Ogle County, provide the diversification of soil and terrain necessary for the formation of differing fern habitats. The woods are mostly an oak-hickory association. The rock outcrops are small and infrequent except along Kishwaukee and Rock Rivers. They are of Galena dolomite and Plattville limestone except in Ogle County where there is a considerable exposure of St. Peter sandstone along Rock River. In northern Boone County there are peaty bog areas, and in the sand area in Winnebago County there are boggy areas with Sphagnum and northern plants that are not found elsewhere in this region.

The fern habitats in the area are: sandstone outcrops and ravines, exposed and shaded; limestone outcrops and ravines, exposed and

shaded; slough marshes and bog areas; bottomland woods and upland woods. The species growing typically on sandstone are *Woodsia obtusa*, *Woodsia ilvensis*, *Polypodium virginianum*, *Dryopteris disjuncta* and *Dryopteris phegopteris*. Those growing typically on limestone are *Cystopteris bulbifera*, *Camptosorus rhizophyllus*, *Cryptogramma stelleri* and *Pellaea glabella*. Typically inhabiting marshes and other wet places are *Osmunda regalis*, *Osmunda cinnamomea*, *Osmunda claytoniana*, *Onoclea sensibilis*, *Pteretis struthiopteris*, *Dryopteris thelypteris* and *Dryopteris cristata*. Typical of woods are *Botrychium dissectum*, *Botrychium obliquum*, *Botrychium multifidum*, *Botrychium virginianum*, *Cystopteris fragilis*, *Polystichum acrostichoides*, *Dryopteris hexagonoptera*, *Dryopteris marginalis*, *Dryopteris intermedia*, *Dryopteris spinulosa*, *Asplenium platyneuron*, *Athyrium angustum*, *Athyrium thelypteroides*, *Adiantum pedatum* and *Pteridium latiusculum*. This list of species known to grow in this area does not account for all the ferns found in Northern Illinois, because the unglaciated area in Jo Daviess County with its Fee fern and the Lake County bog with the Virginia chain fern are not included. Few of our species are common and there are only a few areas where ferns are abundant. Specimens of each species are deposited in the herbarium of the Illinois State Mu-

* The field work was done by the authors over the past five years with collaboration of George D. Fuller whose help is greatly appreciated.

seum. The nomenclature is that of Jones.¹

Botrychium dissectum Spreng. The cut-leaved grape fern is known in only one station in this area. It grows in an upland black oak woods on the Winnebago-Boone County line where there is a colony of considerable size in close association with the next species. The plants of both species in this colony are all small, equally fertile, equally bronzed, and look much alike except for the leaf cutting. In *B. dissectum* the leaf segments are lacinate but there is some variation in this.

Botrychium obliquum Muhl. The oblique grape fern is generally distributed over this area but is found less frequently than the next species. It is most frequent in the sand area of northern Winnebago County and in the sandstone area in Ogle County. It is usually found as an individual but occasionally there are several plants in a small area. It is at times found in unusual situations, as an open pasture, a roadside, the middle of a parking space in a forest preserve. It is of thinner texture and the stem is more slender than in *B. multifidum*. The leaf segments are few and the serrations are acute.

Botrychium multifidum (S. G. Gmel.) Rupr. The leathery grape fern seems to be more frequent in this area than the preceding but is of the same distribution preferring the sandy areas. The ultimate leaf segments are crowded and are obtuse.

The above three species have much in common. They inhabit woods, starting to grow in late June. The

blade is fully developed by September. The sporophyll ripens and withers quickly but the blade persists over winter, often staying green and fresh until after the second year's blade is well developed. We have had a number of grape ferns under observation for several years. Some of them are large, some small, and they seem to remain so although individual plants vary somewhat in size from year to year. The size of the plant has little to do with whether it has spores. There seems to be no difference as to size, bronzing, or other growth habits. They are practically identical except for the cutting of the leaf blades.

Botrychium virginianum (L.) S. M. The rattlesnake fern is generally distributed and is common over the area, growing especially on sandy hillsides in woods, shade being the primary requirement, moisture secondary. It starts to grow about April 20th in the average spring and is very sensitive to frost. There is a material difference in the size of plants, the small ones sporulating about as often as the large. In our area the difference in the fineness of leaf cutting is not marked enough to justify separation into varieties.

Osmunda regalis L. The royal fern grows in the sandy area of northern Winnebago County but we have not found it elsewhere in this area. Though usually found with the two other osmundas in typical situations it is not uncommon for the two others to be plentiful and this fern absent. It does not cover a large area anywhere. Growth starts in late March. It sporulates better in the sun. In the field the brown sporophylls are conspicuous

¹ Jones, G. N. "An Enumeration of Illinois Pteridophyta." *Am. Mid. Nat.*, Vol 38, No. 1, pp. 76-126, July 1947.

but at a distance are easily mistaken for the fruiting panicles of *Rumex*.

Osmunda cinnamomea L. The cinnamon fern is found in the north Winnebago County sand area but is much more plentiful and grows more robustly in shaded ravines in the Ogle County sandstone area where it is associated with *O. claytoniana*. It is much less plentiful than the latter. It grows on the east face of Castle Rock in a dry exposed situation where it is plentiful but the plants are small. Growth begins the latter part of March though it is quite sensitive to frost. The sporophylls grow, ripen and disappear quickly before the leaves are fully grown; not all plants have spores every year.

Osmunda claytoniana L. The interrupted fern is our most common *osmunda*. It grows preferably in wet sandy situations but it is also found on the wooded bank of Kishwaukee River in a limestone region. Its moisture requirement is less than that of the other *osmundas* but it does not grow as robustly in dry places. Growth starts about April 1st in an average season.

Noctlea sensibilis L. The sensitive fern is found all over this area, and although a weed so far as looks and use are concerned it is nowhere common enough to be a nuisance. It prefers wet open places but is also found in woods that are not particularly wet. Growth starts about April 15th and being very sensitive to frost it often has to make several starts.

Pteris struthiopteris (Michx.) Nieuw. The ostrich fern is quite uncommon here. In a ravine in the sandstone area in Ogle county are three colonies growing in the shade

in a floodplain situation. It is not known to occur elsewhere in the area. It seems to sporulate better in the sun. It is readily found in winter by the stiffly erect sporophylls which form in late summer.

Cystopteris fragilis (L.) Bernh. The brittle fern is common over the area. It is usually found in moist woods but also on shaded limestone and to a lesser extent on shaded sandstone. With the lady fern it is the first to appear in the spring and it is not very sensitive to frost. It does not stand our dry summers well and often dries up, starting again when rain and cooler weather come. There is an extreme variation in vegetative features in different situations. Plants growing in loose soil in woods have long branching rhizomes and the growing point protrudes and is naked; on rock the growth is less luxuriant, the rhizome is short as is the growing point which is more or less covered with scales. Much sun causes prolific sporulation.

Cystopteris bulbifera (L.) Bernh. The bulblet fern grows in this area wherever its favorite habitat, moist shaded limestone, occurs. It is also found on shaded stream banks, especially in Kishwaukee River gorge. It grows less well on sandstone. Growth begins about April 1st. The young plants have red stipes which separate it in early infancy from *C. fragilis*. It is not subject to vegetative variations except that, its moisture requirement being high, drought causes depauperate plants.

Woodsia obtusa (Spreng.) Torr. The common woodsia is not common in this area. It is seldom found on limestone and here it does not grow on wooded hillsides to nearly the

extent that it does in more southern counties. It grows on a high sandy slough bank in Boone County and on limestone in White Pines State Park, but otherwise it is confined to the sandstone area of Ogle County. It is not uncommon on partly shaded cliffs but grows larger when in humus in woods. It is our only fern that grows throughout the winter. In the dry weather of late summer the plants may become dormant, the leaves turning yellowish and the edges curling back.

Woodsia ilvensis (L.) R. Br. The rusty woodsia is found in a number of stations in the sandstone area of Ogle County but it does not occur elsewhere in this region. It is often accompanied by *W. obtusa* which it does not resemble enough to be confusing. It grows about four inches tall in compact mats on the top edge of exposed outcrops so that it is not difficult to find. In one place in the sandstone area it grows on a shaded sandy hillside and here it is larger than in its typical situation. It can be found in winter by its characteristic stubble. It is sensitive to late frosts but quickly starts growing again. In dry weather it tends to curl but is quickly rejuvenated by rain.

Polystichum acrostichoides (Michx.) Schott. The Christmas fern has not been found by us in the area but there are specimens in the State Museum and University of Illinois herbaria from White Pines State Park in Ogle County. The nearest place outside this area that we have seen it is Starved Rock State Park in LaSalle County.

Dryopteris disjuncta (Leleb.) Morton. The oak fern grows on a

moist partly shaded sandstone outcrop near Oregon in Ogle County with *Cornus canadensis*, *Trientalis borealis* and *Pinus strobus*, northern species which are very rare here. This station is probably the same from which M. B. Waite 60 years ago collected his specimens that are now in the University of Illinois herbarium. It is a small patch on a steep cliff, and the plants are healthy so its chances of continuing to survive are good. The nearest outside stations are in Green County, Wisconsin, and in St. Clair County, Illinois.

Dryopteris phegopteris (L.) C. Chr. The long beech fern prefers wet shaded sandstone and is in such a situation in the two stations we have found in Ogle County where it is accompanied by *Viola pallens* which is rare here. Our plants do not look at all like *D. hexagonoptera*. The blade of *D. phegopteris* is definitely smaller and narrower, it has a distinctly yellow cast, and is more hairy. The croziers are very woolly and brown. It starts growing earlier than *D. spinulosa* and *D. intermedia*. The bending of the blade and the deflexion of the inferior pinnae are noticeable very early.

Dryopteris hexagonoptera (Michx.) C. Chr. The broad beech fern is found in one small station in a wooded ravine in the sandstone area of Ogle County. It is a much more robust plant than *D. phegopteris*. The winging of the rachis between the first and second pairs of pinnae is always so definite as to leave no doubt as to the species. The characteristic deflexion and turning forward and inward of the inferior pinnae is not seen in dried plants.

Dryopteris thelypteris (L.) Gray. The marsh fern in this region grows mostly in the bog areas of northern Winnebago and Boone Counties in its proper habitat, but we have also found it in abnormal situations such as a dry sunny sandstone outcrop in Camp Lowden, Ogle County, in a rather dry woods in White Pines State Park, and in Winnebago County, and on a dry railroad bank in Boone County. Under such conditions it sporulates sparingly and the blades are a different shape, the lower pinnae instead of being longer tend to shorten progressively and to become more remote, thus giving the appearance of *D. noveboracensis*; but the veins are forked. Growth begins the latter part of April and the leaves are still very immature in early June. The sporophylls develop the latter part of July, abundantly in open wet places but less so in dry places or in the shade.

Dryopteris marginalis (L.) Gray. The marginal wood fern is found in this area only in White Pines State Park in Ogle County where the plants are large and healthy but are few. It is common at Starved Rock in LaSalle County and also occurs in Apple River Canyon State Park. The leaves stay green and erect all winter. The number of sori varies greatly on different plants without apparent cause.

Dryopteris cristata (L.) Gray. The crested wood fern grows in White Pines State Park and in a ravine near Oregon in Ogle County, in several places in Winnebago County but it is most abundant in the boggy area in northern Boone County. We have found it in woods and in ravines but for the most part it is a

bog plant. There are never more than a few plants in one place. It is the first of the wood ferns to start growing in the spring. The sterile blades and the sterile part of partly fruited blades are evergreen. There is considerable difference in the length and width of the blades on different plants but otherwise there is no important variation.

Dryopteris intermedia (Muhl.) Gray. The common wood fern is not the common one in this region. It is found in all our counties, the distribution being much the same as of *D. spinulosa* but it is much less common than the latter. The gradation with *D. spinulosa* is not apparent in our plants. It tends to grow in drier places; the leaf is more finely divided and is thinner; the shortening of the proximal inferior pinnule on the lowest pinna is definite, and the leaves of this plant do not flop over so quickly after freezing. Spring growth starts after April 15th.

Dryopteris spinulosa (O. F. Muell.) Watt. The spinulose wood fern grows in moist woods and ravines in all our counties. We have found it in a bog in the open in northern Boone County. Robust plants have broad blades and the lower proximal pinnule on the basal pinna is much enlarged and elongated but there is no sharp dividing line between this and the typical form in our area. This fern starts growth the same time as *D. intermedia*. After the first hard frost the plant is inactive until spring, the bases of the stems soften and the leaves lie flat on the ground, staying green all winter. It is a coarser looking plant than *D. intermedia*.

Polypodium virginianum L. The common polypody in this area is abundant on the sandstone in Ogle County but otherwise we have found it in only one small station, in a limestone situation in Kishwaukee River gorge in Winnebago County. Its vegetative characters are not subject to variation. Growth starts about April 1st, the fronds being well uncoiled when still quite small.

Camptosorus rhizophyllus (L.) Link. The walking fern is found in all the counties of this area on moist shaded limestone. We have found it growing on sandstone on Franklin Creek in Lee County. In one of our largest stations in a Kishwaukee River ravine where the environment seems correct it is of a depauperate type, the plant having a juvenile appearance with blunt blades. In dry situations the edges of the blades are wavy and irregular. We have found but few blades lacking auricles. It is evergreen and spring growth starts about April 1st.

Asplenium platyneuron (L.) Oakes. The ebony spleenwort is quite uncommon in this area. We have found it in several places in Ogle County and in Boone County. Many years ago we found it in Winnebago County but we are now unable to locate it. Its favorite habitat here is shaded sandstone, but on Castle Rock in what looks like a favorable situation it is small compared with those growing in woods in a limestone area in White Pines State Park.

Athyrium angustum (Willd.) Presl. The lady fern is a common fern here, growing in practically all moist woods, in ravines, at the edge of open marshy places, and by acci-

dent on cliffs. There is a great variation in the size of the plants, the color of the stipes, cutting of the blades, size and shape of the sori, etc., which seems to depend on environmental conditions. Though the first with *Cystopteris fragilis* to start growing in the spring, it is very tender to fall frosts. It does not withstand hot dry weather.

Athyrium thelypteroides (Michx.) Desv. The silvery glade fern is known in our area from Winnebago and Ogle Counties. The nearest outside station that we know is Mississippi Palisades State Park. In our plants the lower surface of the pubescent. This and the silvery streaks the sori make very early in their development are the most noticeable field points.

Cryptogramma stelleri (S. G. Gmel.) Prantl. The slender cliff brake is found across northern Illinois wherever its habitat, moist shaded limestone, occurs. It is in all our counties. We have not found it in Kishwaukee River gorge in places that look favorable. It is our smallest and most fragile fern. It is difficult to find, for though it starts to grow early in April, the sterile blades have begun to turn yellow by late May and soon disappear. The sporophylls are a little more persistent but by the last of July they are very hard to find. In a mild wet fall a second growth of sterile leaves appears in October.

Pellaea glabella Mett. The smooth cliff brake is found in this area on practically all exposed limestone outcrops. It also grows on small rocks on hillsides, in railroad cuts, in old quarries and on bridge abutments. It is evergreen in the sense that it

retains its peculiar bluish green color well into the second year. After the pinnules are shed the old stipes persist stiffly erect for years. It prefers a dry exposed situation but if the cliff is excessively dry the plants though plentiful are small. When it grows in a moist shady place the plants are larger and more abundant. We have found it growing on sandstone only once, on the river side of Castle Rock in Ogle County where it is of a depauperate type. Growth starts about April 1st, the leaves developing slowly.

Adiantum pedatum L. The Maidenhair fern grows in large or small patches in most of the moist rich woods in this area but it is strangely absent from some woods that seem suitable. It occurs by accident on moist cliffs. Growth starts early in April and it is the last of our deciduous ferns to be killed by frost in the fall. It is not subject to variations except as to size.

Pteridium latiusculum (Desv.) Hieron. The bracken is another common fern which is generally distributed over this area, growing preferably in sandy oak woods but also

along roadsides, railroads, and in brushy pastures. It spreads rapidly and forms large patches. It is a stately plant that starts to grow about April 1 by the appearance of three greenish balls on a stem which are very sensitive to frost, so it is not uncommon in a late spring for several starts to be made. This does not seem to retard the later development of the plant. The cutting of the leaves varies from plant to plant and even on the same rhizome. Variations are not sufficient to justify separation into varieties. It is our one fern that is truly a weed.

SUMMARY

The geography and topography of a well defined area in northern Illinois, the drainage basin of Rock River, is described and some account of the habitats and fern inhabitants of the area is given.

The frequency of occurrence and distribution of each of the 31 species that we know to grow in the area are given.

Some comments are made about the growth habits and the local peculiarities of each of the species as observed in the field.