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FERNS OF THE HURON MOUNTAINS, MARQUETTE COUNTY, MICHIGAN

The Huron Mountains are a group of granitic hills in the extreme northern part of Marquette County. (Slide 1) These hills occupy most of the country to the northwest of the town of Big Bay to a little beyond the Baraga County line. They are isolated from the rock knob country to the south by a sand plain area which was once forested with large jack pines. Geographically the region is a part of the Superior Upland, the term applied by Fenneman to the portion of the great Laurentian Upland where it extends into Michigan, Wisconsin, and Minnesota. The rocks, chiefly granites and syenites, with occasional small dikes of trap and other rocks, are classed as Laurentian and are among the oldest rocks exposed in Michigan. Even the sandstones which lie between the hills and Lake Superior are at least of Cambrian age.

Although actually lower in elevation than much of the high plateau to the south, the Huron Mountains are more mountainous in appearance. When seen from off shore in Lake Superior (Slide 2), as the early explorers saw them, it is easy to see why these hills were called mountains. They rise steeply above the low-lying plain which borders the lake, the north flank of Mt. Huron rising nearly 900 feet in about one-half mile. Within the interior (Slide 3), the scenery has a mountainous look which belies the relatively low elevation. Among the range of hills are several inland lakes. One of them, Mountain Lake, is about three miles in length and is nearly surrounded by hills whose summits are from 250 to 650 feet above the lake. (Slide 4). This shows a view from about the center of the lake, with the south face of Mt. Huron in the distance.

Forestwise this area is a part of the Hemlock-White Pine-Northern

Hardwoods Region, as classified by Dr. Lucy Braun. Most of the pine stands were lumbered off prior to 1900. However, thanks to the fact that, beginning in the 1890's, a large acreage in the area was acquired by the Huron Mountain Club and that the central portion of this property has been protected from lumbering, there are still some good stands of virgin hemlocks and hardwoods.

In 1957 and 1958 Mrs. Hagenah and I spent a total of six weeks in the Huron Mountain area, studying the pteridophyte flora of the region. This work was made possible by the Huron Mountain Wildlife Foundation, organized to promote and support research in the natural history of that region.

Time will not permit discussion of all of the varied habitats there but I will discuss the old-age forests and a few of the more interesting species.

Where hemlock occurs in nearly solid stands there are almost no ferns. Ground vegetation is quite sparse although an occasional plant of Dryopteris spinulosa intermedia occurs on the decaying remains of old logs and there are a few straggling Lycopodiums. Similarly, ferns are not common in localities where sugar maple is the only dominant species in the tree layer. Here the situation is that maple seedlings so dominate the herb layer that there is little opportunity for other species except where there are decaying logs or moist spots which permit a few ferns like Dryopteris spinulosa intermedia to gain a foothold. On moist slopes where there is a mixture of deciduous species such as maple, basswood, and yellow birch, with a sprinkling of hemlock, ferns are much more plentiful and from a distance may appear to dominate the herb layer. Dryopteris spinulosa intermedia, plus Dryopteris marginalis and Dryopteris disjuncta (the Oak Fern) are the common species. Occasional plants of Athyrium filix-femina and, where there are boulders, there may be some Cystopteris fragilis. On the floors of moist valleys with a similar tree layer these species may be augmented by Dryopteris

phegopteris, Polystichum Braunii, and Adiantum pedatum, the last two being very local. The most luxuriant fern populations were found in the hardwood forests along the flood-plain of the Salmon Trout River. Here the number of plants and their size combine to dominate the vegetation in some places. For example, in an area showing evidence of yearly flooding and supporting a tree layer of sugar maple, yellow birch, elm and ash, the ferns included Dryopteris spinulosa, its variety intermedia, Dryopteris marginalis, Matteucia pensylvanica, Athyrium filix-femina, Athyrium thelypterioides, Onoclea sensibilis and Botrychium virginianum. Upstream in a locality where the tree layer included white cedar the complement of species included Polystichum Braunii. In both places the larger species were growing waist high or even taller. The richness of flood plain floras is shown by that of a small island in Mountain Stream. Although not much larger than this room, its flora included eleven different pteridophytes. In the flood plain and moist hillside areas where ferns were plentiful many young plants are found and a little searching will yield gametophytes.

By contrast with the moist woods, the upper slopes of the mountains support a thin cover of oak, pine and various shrubs with very few ferns. An exception are rocky bluffs above Pine Lake where Dryopteris marginalis and Polypodium virginianum are abundant in open sunny places. Most open rocky places have only Woodsia ilvensis and Selaginella rupestris.

Among the interesting species of the Huron Mountains is Dryopteris fragrans, found on cliffs in both sun and shade, and on sandstones as well as igneous rocks. Although Woodsia ilvensis was common, no other Woodsias were found except on one south-facing cliff where there were some colonies of Woodsia oregana and at least one which has been identified as Woodsia Abbeae. This bluff had Dryopteris fragrans near the top and on one ledge

there was a colony of Juniperus horizontalis, the only place where we saw it in the entire area. A deep gorge in the side of one mountain contained a colony of Dryopteris spinulosa americana, the Mountain Woodfern, which has seldom been collected in Michigan.

The Ophioglossacea provided several interesting finds, including the first known record of Ophioglossum in Marquette County. Botrychium dissectum was found in two places and its form obliquum in one. This is the farthest north in Michigan for the dissected form. Two colonies of Botrychium multifidum were found in which careful digging disclosed gametophytes still attached to some of the small plants. Other Botrychia included lanceolatum, simplex, and matricariefolium, the last being quite frequent.

In the fern allies, the region was especially interesting because of the abundance of Isoetes. The Quillworts were found in six of the lakes and in Pine River. In the pine plains region they were found in two partially dried out ponds. This was the only place in which I have found any of the Quillworts growing out of water. Apparently our species cannot tolerate this condition as no plants were found there the next summer. In one part of Pine Lake the Quillworts made a nearly solid carpet for a considerable number are in water about five feet deep. In general they were found in more shallow water. At one location in Mountain Lake associated species included Eriocaulon septangulare and Lobelia Dortmanna.

I will close with a picture of an unusual association, a rocky slope on which Woodsia ilvensis was found growing with Opuntia fragilis, a species not known elsewhere in Michigan.

Thank you.