Easy Going - Wisconsin's Northwoods

by Michael J. Dunn, III

Geology - Geography

Vilas and Oneida counties are located in what is called the Northern Highland. That is the name that geographers and geologists give to Wisconsin's and Upper Michigan's portion of the gigantic rock "shield" that extends northward to Hudson Bay and eastward to Labrador. The shield has variously been called the Precambrian Shield for one of the important geological periods of its formation, or the Canadian Shield for the area of its greatest extent, but the Canadian adjective took on new significance in the 1970's as mining company geologists made the same sort of discoveries in the shield's Wisconsin Highland that their predecessors had made in Ontario and Quebec years before. Important new mineral discoveries had been made in Oneida and adjacent Forest counties, and as this book went to press, exploratory drilling on promising Vilas County sites was in the negotiating stages.

The Northern Highland covers most of northern Wisconsin from Douglas County to Marinette County, except for a narrow coastal belt known as the Lake Superior Lowlands. From southern Douglas County it would be roughly delineated by a line drawn through Hayward, Chippewa Falls, Owen, Marshfield, Wisconsin Rapids, Stevens Point, Waupaca, Shawano, and Wausaukee.

The highland is arched along its backbone, or very gently domed, sloping, for example, from a height of 1,708 feet at Land O' Lakes to 1,500 near Merrill, 1,400 near Wausau, and 1,000 at Wisconsin Rapids. The shield is a region of igneous and metamorphic rocks that range in age from 600 million to almost 4,000 million years and is almost entirely buried, in its Wisconsin form, by glacial deposits of sand and gravel.

The history of the formation of the Northern Highland can be simplified for casual and vacation-minded readers by dividing into six periods the four-billion-year history since the hardening of the earth.

The first period was the 3,500-million-year Precambrian era, which saw the rocks deposited and folded in great earth-crust disturbances, forming mountains not unlike alps. In the second stage these mountains were eroded almost to a low plain, or peneplain.

Third in the stages was a time of sea submersion, perhaps several submersions, when the sea waters deposited layers of sediment (limestone and sandstone, for instance) upon future Wisconsin; this ended perhaps 200 million years ago. Fourth was another period of erosion by water, wind, and weather. The fifth epoch, the Pleistocene or glacial period, gave the Northern Highland most of its present distinctive terrain.

The glaciers grew from long accretions of unmelted snow thickening into ice in three centers in Canada. When these were thousands of feet thick, they became a plastic mass that spread out in all directions, especially southward, at a rate of anywhere from a few feet to a few hundred feet per year.

Some idea of the terrain-changing pressure of the moving glacier may be gleaned from the fact that a mile-thick glacier exerted a pressure of 1,250 tons per square yard, just standing still; complete the thought by considering its grinding movement over thousand of years and the volume of all that glacial water melting off in sheets. Then the surface transformation of a vast area is not at all surprising.

The Ice Age occurred in four distinct stages, separated by interglacial epochs totaling 700,000 years. The stages were named for the states where their differing effects were first significantly analyzed: Nebraska, Kansas, Illinois, and Wisconsin.

The important glacial stage in Vilas and Oneida counties was the Wisconsin stage, which overran and rearranged some of the earlier stages' contributions. Theorists now are not sure whether there were three complete and separate glacial stages in the Wisconsin period, or just three related advance-and-recession cycles over the period from 50,000 years ago to less than 10,000 years ago.

What they do know, though, is that the ice movement took the form of five important tongues of ice, or lobes, which slid side by side into Wisconsin, the Chippewa lobe overrunning the Vilas and Oneida area; just to its east was the smaller Langlade or Wisconsin Valley lobe. The glacier would pick up material in one area and drop it later in its movement or melting. Much of the sands deposited in Vilas and northern Oneida counties, scientists theorize, was brought in from the sandstone areas of northern Michigan, for hill forms tell us that the last glacier moved in the direction of south southwest.

The sixth period in the formation of today's Northern Highland has been the few thousand years-maybe as many as 9,000 or as few as 5,000 -- of glacial melting, natural erosion, drainage system development, and revegetation of the highland. This period has not obscured the basic glacial features that make the highland so interesting, so often attractive.

As the ice growled across the land, it left beneath it varying thicknesses of earth material. If the ice melted quietly, a veneer of more of this material, previously suspended in the ice, was deposited. This is called *ground moraine*. Twenty feet is a good average figure for the thickness of this sort of deposit, though in places it is over 100 feet thick and in others only inches thick. Bare bedrock appears where it is especially thin, but such out crops -- bits of the primeval mountains perhaps -- are rare in Vilas County and only a little more common in Oneida County.

The leading edge of the glacier bore a heavy load of earthy debris and often pushed more ahead of it. Where it stopped advancing, it left ridges sometimes designated *shove moraines*.

Where the glacier halted, its nose melting at the same rate as the movement of the glacier mass behind it, large ridges would form from debris that moved to the front of the glacier and was then dropped. These are *recessional* or *end moraines*.

The heavy debris made up the end moraine. The lightest materials at the melting nose would be swept away by the torrential sheets -- of meltwater running from the glacier and washing across the landscape. When this floodtide of fine material had dried, there remained a smooth plain, called an *outwash plain*. Often huge chunks of ice were orphaned and buried in this flood, and where they melted, hollows and pits were formed. Much of Vilas and Oneida counties is designated as this sort of pitted outwash.

Buried blocks of ice melted in the end moraines too, forming the kettles that are so common there; in places in Vilas and Oneida the kettles and separating ridges are so steep that farmers could never work them, even if the soil were good, and loggers left them till the last. The two counties' outstanding end moraine, I think, is the massive Winegar moraine, from Winchester and Presque Isle almost to Land O'Lakes. Also interesting is the Muskellunge moraine near Sayner. An extensive moraine makes up much of the town Lac du Flambeau, and Highway 51 traverses extensive end moraine from Minocqua almost to Heafford Junction.

The glacier in Oneida and Vilas counties scooped out few lake beds or none at all from solid rock, but it did make possible the area's numerous lakes by accounting for floodable kettles and depressions in end and ground moraines. Depressions not completely evened out during outwash plain formation explain some lakes, and the kettle melting explains others.

Lakes cover about one sixth of the two counties' surface area. The soil map of Oneida shows 800 lakes, while county publicity claims 1,200. Claims for Vilas run as high as 1,300 lakes. While the statistics may vary, experts agree that nowhere else on earth, except the Minnesota-Ontario boundary waters and in southern Finland east of the Gulf of Bothnia, are there equal concentrations of lakes.

Finally the glacier left some special treats for people who are willing to go to the trouble of learning to identify and locate them, treats with the unusual names of drumlins, kames, glacial spillways, and eskers.

Drumlins resemble an inverted spoon with its tip toward the south. Their direction usually parallels the ice flow direction (south southwest), and they can be up to half a mile long and 150 feet high. There is a small drumlin school or swarm north and west of Trout Lake, near Boulder Junction, while east of Monico and Pelican Lake there is a series of parallel ridges that seem to be an extension of a drumlin swarm that begins across in Forest and Langlade counties.

Kames are rounded or conical hills formed by debris either washed through shaftlike holes in the glacier, held till melting in hollows atop the ice, or poured down in cone form by streams running off the ice edge in chute fashion. Muskellunge Hill, at 1,860 feet Vilas County's highest point, is considered to be a kame.

A *glacial spillway* looks like a big stream bed across a moraine or outwash plain, now dry or containing a stream too tiny to have eroded so large a valley. A remarkable hollow in the Partridge Lake Wilderness just west of Camp 2 Road -- the only landmark of its kind I've seen in the two counties -- appears to be such a spillway.

Eskers, however, are the biggest treat of all. When streams formed and flowed in tunnels within or under the ice, they dropped some of their debris. Melting of the glacier left those former stream courses as snaky ridges, sometimes very steep and narrow at the top. Local old-timers often referred to these as hogsbacks or razorbacks. The Willow Region of Oneida County has a concentration of these, some in contiguous or very closely related strings as long as four miles.

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