Geology of the Proud Lake area

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The story of the Proud Lake area goes back about 1,000,000 years (some glaciologists now believe perhaps 600,000 to 700,000 years ago) when climatic changes in the northern part of the continent caused winters to lengthen, snowfall to increase and not melt in the short, cool summers. (Many theories have been advanced to account for the climatic change). Great masses of ice accumulated—a continental glacier, similar to the icecaps now on Greenland and Antarctica. In fact, the Greenland icecap is a remnant of the great glacier of the Ice Age. Four times the continental glacier advanced and retreated. Each time of retreat was long enough for a soil to form—one of Nature's ways of writing her book. But in Michigan records of the early invasions have been obliterated or buried and we know about the retreat of the last, or Wisconsin glacier. The Wisconsin glacier fanned out from its main centers of accumulation, the Laurentian Highlands east of the present Hudson's Bay, and pushed southward to central Illinois, Indiana and Ohio. (The first glacier had pushed as far south as the Ohio River). As it slowly moved, it picked up the soils and surface materials in its path. In many places it actually secured more rocky material by scouring and grooving the underlying solid bedrock. (If you visit Cranbrook you can see some of the grooves cut from the rock and mounted in the Institute of Science). By the time the glacier reached Michigan, the ice had picked up and freighted south an enormous amount of debris which we call glacial drift, from an early idea that the debris—boulders, sand, clay, pebbles, had been brought from the north by drifting icebergs.

Prior to glaciation, great river systems carved the basins now occupied by Lake Huron, Saginaw Bay, and Lake Erie. As the great Labrador ice sheet (the name given to the last continental glacier) entered the Michigan area from the northeast, it took the course of least resistance and moved into these valleys and thus divided into two major lobes or ice tongues—the Saginaw Lobe which advanced southwesterly through Saginaw Bay, and the Huron Lobe which advanced southerly through Lake Huron and joined the westward-moving Lake Erie Lobe and both shoved westward as the Huron-Erie Lobe.

When the glacier had pushed over Michigan it was halted in southern Ohio and Indiana because again the climate changed—cold gave way to warmth. As the ice gradually melted the earth materials picked up by the glacier were dumped in a rather orderly disorder. From a close study of these deposits, the glacial drift, the geologist has been able to work out the sequence of events of continental glaciation.

The melt-back or retreat of the glacier was not continuous or a steady process. Many temporary periods of resurgence, or readvance, were followed by short retreat, then advance when the glacier became re-activated and pushed over areas where it had already retreated once or twice—bulldozing the early deposis into higher hills and piling drift irregularly on the older surfaces. In detail—it's a complicated history.

Now a detail—the Milford area. It is interesting to note the area (called the interlobate area) between the Saginaw and Huron-Erie lobes runs northeast-southwest through Oakland County on a line passing through the Milford area. So as the main direction of advance of the lobes was westerly the direction of movement of the ice at the edge of the Saginaw Lobe was southeastward in Oakland County, while the Erie Lobe's northern edge pushed northward. Thus both lobes contributed to the formation of earth features and the material of the drift. The Saginaw Lobe moved in from the north and the Huron-Erie Lobe moved in from the southeast. Where the lobes came together probably a valley-like depression or re-entrant on the ice surface led northeast from the merged ice fronts. Dr. Frank Leverett stated that when ice in the re-entrant melted the glacial debris was sorted and carried by swirling waters into cracks in the ice or over the edge as waterfalls and built

conical hills or kames, and so accounted for the high irregular conical hills of the county.

The moraines deposited at the ice front of the Saginaw Lobe are some 6 or 7 miles north of Milford—outside the area in which you are interested. Most of the scattered patches of moraines in the immediate vicinity of Milford are cross-moraines typically found in an interlobate area having formed at the front of the joined lobes at each halt in the slow retreat of the re-entrant between lobes.

On the map note the prominent moraine running southwest-northeast through the area (Walled Lake and Orchard Lake are within it). This is called the Fort Wayne Moraine and was deposited at the front of the Huron-Erie Lobe. Meltwaters from this glacial front met meltwaters from the Saginaw Lobe and flowed southwest—washing, shorting, and depositing glacial drift in broad areas known as outwash (shown in yellow-ocher color on the mpa). The first outwash formed was in the vicinity of Commerce and is called Commerce Plains. The maximum elevation here is about 960 feet above sea level. The moraines bordering the outwash are 20-45 feet higher. The outwash plain slopes gently to the southwest. In the vicinity of Drayton Plains a later outwash plain attains an elevation of about 1,000 feet a.s.l. The drainage, of course, took a southwesterly course.

The ice front of the Erie Lobe receded several miles eastward from its position on the Fort Wayne Moraine, halted and dumped another paralleling moraine called the Outer Defiance Moraine, but so closely allied with the Fort Wayne Moraine that the boundary is not clearly defined.

The next recession and halt of the ice front resulted in the formation of the Inner Defiance Moraine—the narrow, hilly moraine running between eastern Northville and Franklin. It is lower and less rugged than its predecessor. Meltwaters were confined to a rather narrow channel between the ice border and the Outer Defiance Moraine. This marginal drainage created a rather prominent outwash spillway of sand and gravel (shown in lemon-yellow on the map).

The Defiance Moraines are so high that after the next withdrawal of the Huron-Erie Lobe the meltwaters could not escape but ponded between moraine and glacier and brought on the succession of glacial great lakes which carved and deposited shores and beaches and left lacustrine (or lake) deposits to show where they had been (olive green on the map). But the story of the lakes is not a part of the history of the Milford area.

One of the characteristics of glacial topography is an erratic drainage pattern. In an interlobate area this condition is intensified which explains the many lakes in this area. Many isolated lakes in outwash plains are pit lakes. The pits were formed by burial of large blocks of ice which eventually melted leaving a pit which filled with groundwater. The basin of Proud Lake may have been such a pit in the valley that later became the channel of the Huron River. Damming of the river by natural or artificial means ponded the river into a lake deep enough not to be drained as the Huron lowered and the swampy valley was uncovered.

The glacial deposits are approximately 250 to 300 feet thick in the Milford-Proud Lake region. Beneath the drift are the gray shales of the Coldwater formation of late Mississippian times. To date several dry holes have been drilled into the bedrock of the area, but the producing oil and gas fields are mostly in Wayne and Washtenaw Counties and only overlap to a minor extent in the southernmost fringes of Oakland County.

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