

antediluvian themes? Why no references to Jewish history? Most conservative Bible scholars consider the Germanic peoples to be descendants of Japheth. Could it be that remnants of the story of the creation, the flood and the early earth with its giants and dinosaurs were preserved among these northward migrating peoples even before the coming of Christianity? Cut off from the influence of Judaism to the south, such stories undoubtedly were embellished through continual retelling. Yet, as they were set down in the at least partly historical poem, they are amazingly accurate, as judged by the Scriptural account.

If we adopt the earliest dated name that can reasonably be identified with one in the poem, the epic must have been written about 520 A.D., or a little earlier, when Chochilaicus, identified with Hygelac in the poem, raided the Frisian coast,¹⁰ leading a huge plundering expedition up the Rhine. The battles of the hero Beowulf are historically identified with these raids.¹¹ But the legends that form its background and framework are much, much earlier.

Whether *Beowulf* was brought from Jutland by Saxon invaders and then Anglicized, or whether it was com-

posed in England itself, *Beowulf* is intriguing as an early linguistic document, as a rare archaeological relic, and as a testimony to the preservation of the creation and flood accounts among our Germanic ancestors.

References

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¹²*Ibid.*
¹³Donaldson, E. Talbot, 1966. *Beowulf*. New York: W. W. Norton & Co., p. vii.
¹⁴Raffel, *op. cit.*, p. ix.
¹⁵Fry, Donald K., Ed., 1968. *The Beowulf poet. A collection of critical essays*, Englewood Cliffs, New Jersey: Prentice Hall, p. 75, Essay by Bloomfield, Morton W., "Beowulf and Christian allegory"
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¹⁷Long, *op. cit.*, p. 17.
¹⁸Fry, *op. cit.* p. 69.
¹⁹Saintsbury, George, 1912. *A short history of English literature*, New York: Macmillan Company, p. 3.
²⁰Long, *op. cit.*, p. 17.

EVIDENCE OF GLACIATION IN WISCONSIN

CLIFFORD L. BURDICK*

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Some Creationists have doubted whether there ever was a glacial age, since they find it hard to see how it could fit in with an Earth as young as Scripture would indicate. On the other hand, there is certainly evidence which would seem to point to a former glaciation. Here some of that evidence, as it is found in Wisconsin, is described.

In this article, I shall for the most part present the usual glacial interpretations of various features, without stopping to try to justify them. The matter is one in which I feel an interest, having been born and brought up near the southern terminal moraine of the Green Bay lobe, which crosses between Milton and Janesville.

Figure 1 shows a general picture of the motion of the glaciers over North America. Figures 2 and 3 show, to larger scales, the features peculiar to Wisconsin. The directions of flow of the ice, as shown by arrows, have been deduced from striations on the rock, and from the orientation of drumlins. The latter are oval hills, of which there are several thousand in Wisconsin. They are ascribed to the glaciers, their long axes indicating the direction in which the ice was moving.

The ice, which was an extension of the Labrador ice sheet, completely covered the Eastern Ridges and Lowlands. Near its borders, the sheet broke up into lobes, as determined by broad valleys and lowlands. See Figures 2 and 3. The Lake Michigan lobe advanced southward down the shallow river valley which was then where the lake is now, and westward across the Niagra upland. The Green Bay lobe, a branch of the Lake Michigan glacier, advanced down the Green Bay—Lake Winnebago—Rock River lowland.

Effects on Topography

Not only did the glaciers carve out the basins of the Great Lakes, as has been held for a long time; but they also sculptured eastern Wisconsin, greatly modifying the topography. The contrast between the glaciated and driftless, i.e. unglaciated, parts of Wisconsin is indeed striking. But even greater glacial sculpture is known to have occurred in Alaska, Greenland, Norway, the Alps, and elsewhere.

Lake Michigan, with its broad, flat bottom and abrupt walls, descending to a depth of 500 to 800 feet, appears to be a basin excavated by ice, not a river valley formed by erosion. The lowland, no doubt, was occupied by a master stream, which probably flowed southward.

Green Bay, which looks like a thumb on Lake Michigan, is comparable with a hanging valley in any glaciated mountains. It is shallow compared with the lake, and where it joins the lake the bottom falls off rapidly.

Differences in Surface Materials

In the driftless portion of Iowa and southwestern Wisconsin the Richmond shale is about 200 feet thick. In eastern Wisconsin it is missing, except only on the slope at the base of the Niagra escarpment, evidently having been eroded away by the glaciers.

*Clifford L. Burdick, D.Sc., is an exploration geologist. He lives at 924 North 6th Avenue, Tucson, Arizona 85705.



Figure 1. This shows the relevant parts of North American during the Glacial Period. The deduced directions of flow of the ice are shown. The Driftless Area is shown on the map as the dark island. (p. 85, slightly adapted to fit here)

Again, the driftless area has from 8 to 13 feet of residual soil. Eastern Wisconsin has none, and no weathered rock to speak of. Evidently the glacier planed all of these away, leaving the firm unaltered rock which had been beneath.

In parts of Rock and Walworth counties, eastern Wisconsin, the older glacial drift is found. There the glacial topography is less rugged, because of erosion by streams. The limestone pebbles at the surface give evidence of weathering; they are leached away until they can be picked apart with the fingers. In later Wisconsin drift, on the other hand, the limestone is still unaltered.

Features Ascribed to the Glaciers

Drumlins have already been mentioned. Their average width is about a quarter mile, their lengths extend up to 2 miles, and some are as much as 140 feet high. They are composed mostly of unstratified glacial drift; but some material in a few is considered to have been deposited by water.

The ground moraine of eastern Wisconsin, having the slightly rolling topography of drift-mantled plains, is made up of till, with stratified sand and gravel. The till itself, which was deposited in a broad sheet by the melting ice, is mostly unstratified. The ground moraines vary in thickness from a few feet on the hilltops to over 400 feet in valley bottoms. They cover a much larger area than the terminal moraines, which lie in long narrow belts.

Boulder trains, composed of quartzite boulders scattered by the glacier, are abundant. One, the Waterloo boulder train, is fan-shaped, increasing in width from 20 miles near Lake Mills to 50 miles wide near Whitewater and Milton; and it is about 60 miles long. The quartzite rocks, called erratics, are unique in a place where the underlying rock is limestone or sandstone.

As well as the boulders, the glacier brought large amounts of soil from Canada, which helps to make Wisconsin fertile. Also there are nuggets of copper, one having weighed 3,000 pounds; and even diamonds, up to 15 carats, some having been found near what is now Green Bay as long ago as 1670 by the Jesuit fathers.

Kettle moraines, as they are called, are found near Whitewater and near Eagle, Waukesha county. They derive their name from the deep round depressions, which remind one of an old-fashioned black iron kettle, and are considered to have been left upon the melting of blocks of ice which had become trapped in the ground moraine.

Eskers, snake-like winding ridges, are found especially in souther Wisconsin. The deposits are usually stratified; and they are ascribed to glacial streams flowing beneath the ice, which deposited sand and gravel along their beds.

The Driftless Area Contrasted

The driftless area, shown in Figure 2, seems not to have been glaciated. Admittedly, it is not clear why it

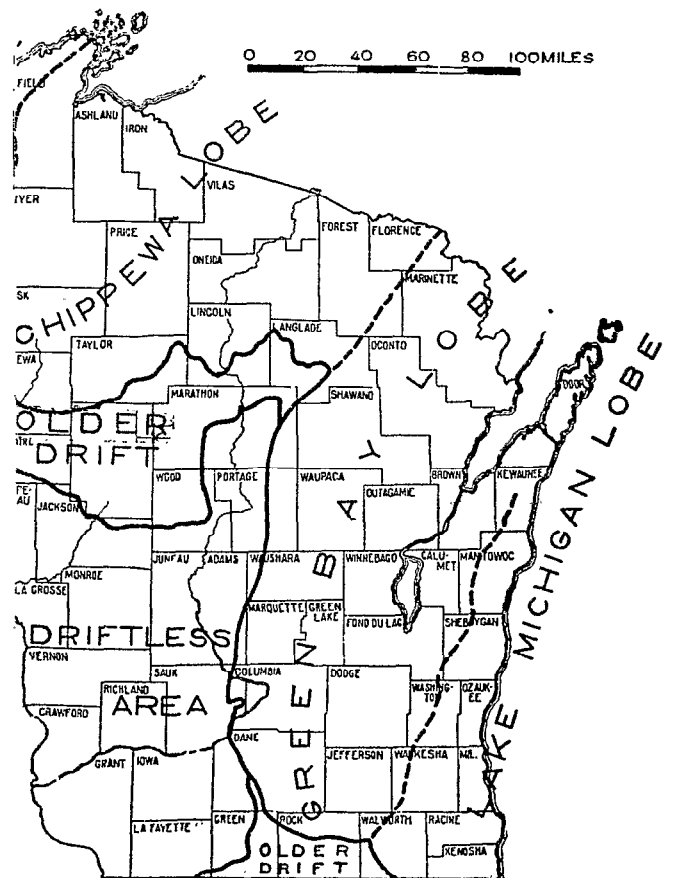


Figure 2. This shows the various glacial lobes, and the Driftless Area, in Wisconsin. (p. 87, slightly adapted to fit here)

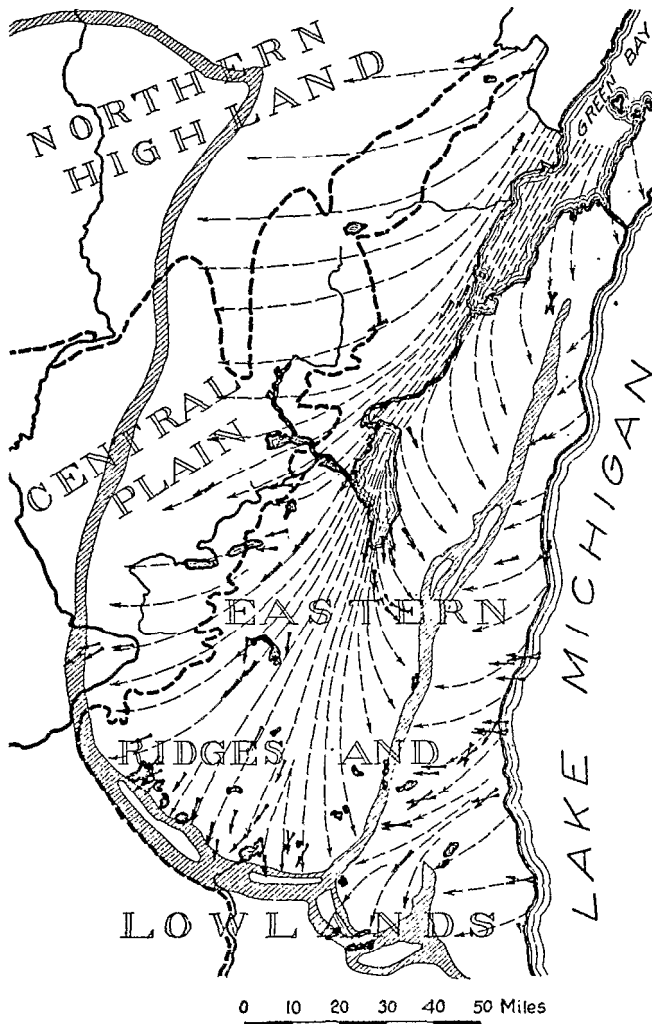


Figure 3. This shows the Green Bay lobe and the Lake Michigan lobe of the continental glacier. The arrows show the directions of striations on the rock, which are considered to be the directions of flow of the ice. (p. 234)

should have remained an island in a sea of ice. But certainly it differs from the glaciated part.

In the driftless area, as already mentioned, is a deep mantle of residual soil, which presumably existed before the glaciation. In the glaciated parts that soil was scraped away, and some transported soil left. It is believed that the removal of 100 feet of limestone by weathering leaves about 10 feet of residual soil, consisting chiefly of fine brown or reddish clay, containing numerous fragments of flint or chert.

In the driftless region caves and sink-holes are abundant, going down maybe 50 or 75 feet to the limit of ground-water. They are common in the Galena-Black River and Lower Magnesian limestone. Also natural bridges, and picturesque rocks, crags, and pinnacles are found in the driftless region. See Figure 4. These contrast with the rounded kames and drumlines in the glaciated parts.

It seems likely that at one time caves, etc., were common all over Wisconsin. But in the glaciated parts the ice removed the rock containing these features.

In the driftless area the normal dendritic drainage pattern is found. In the glaciated part the system was obliterated, the multitude of glacial lakes having been formed by dammed-up drainage systems.

Finally, the erratics, drumlins, and such signs of glaciation are not found in the driftless part.

Conclusion

Some Creationists have doubted whether there ever was a glacial age, thinking that Scripture does not leave time for one. Of course, they are right in trying to follow Scripture. Yet, I suggest that in places like Wisconsin, the evidence of glaciation is so strong as to convince one that there must have been something of the sort. I suggest that the solution may be that the glacial age was very short, and that in places like Wisconsin it ended much more recently than has usually been thought.

Acknowledgements

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The illustrations in this article are from the book *The Physical Geography of Wisconsin*, by Lawrence Martin, published by the University of Wisconsin Press, Madison, Wisconsin, 1966, and are used here by permission. Page or plate numbers with illustrations refer to this book.



Figure 4. This is a crag in the Driftless Area, near Readstown, Kickapoo valley. The columns are of sandstone, the cap, limestone. Presumably this form is due to weathering and erosion by wind. Such features are not found at all in the glaciated parts. (Plate VII)