

A NEW GLACIAL DRIFT SHEET IN SOUTH DAKOTA? ¹

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The glacial drift in the Big Sioux River Valley of South Dakota between Sioux Falls and Watertown has been previously mapped as deposits of one glacial age or subage. Chamberlain (1883), Rothrock and Newcomb (1926), Leverett (1932), and Rothrock and Otton (1947) mapped the drift as Kansan (table 1), but Flint (1955) mapped it as Iowan. On the basis of topographic evidence discovered last summer in this area, it is believed that two drifts rather than one are present (fig. 1). The northern part of the area is believed to be Iowan (?) in age, and the southern part Illinoian (?).

TABLE I
AGES OF DRIFT MENTIONED IN TEXT

Cary (youngest)
Tazewell
Iowan
Farmdale
Illinoian
Kansan (oldest)

The topographic difference between the two areas is easily seen on air photos, and can also be distinguished on topographic maps. The Illinoian (?) drift surface is very well drained and deeply dissected. Although the Iowan (?) drift surface is also well drained, it is less dissected; in fact, the surface of the latter drift is almost flat in places.

Probably the most important topographic evidence of the presence of two drifts is the occurrence at the southern border of the Iowan (?) deposits of what appear to be end moraine remnants. The remnant end moraines are broad, high, nearly continuous ridges that can be traced across the entire southern border of the Iowan (?) drift area. The summits of the ridges are nearly 50 feet above the surrounding land surface. Stratified drift in the form of kames is found near these moraines. This is the only occurrence of kames

¹Publication authorized by the State Geologist.

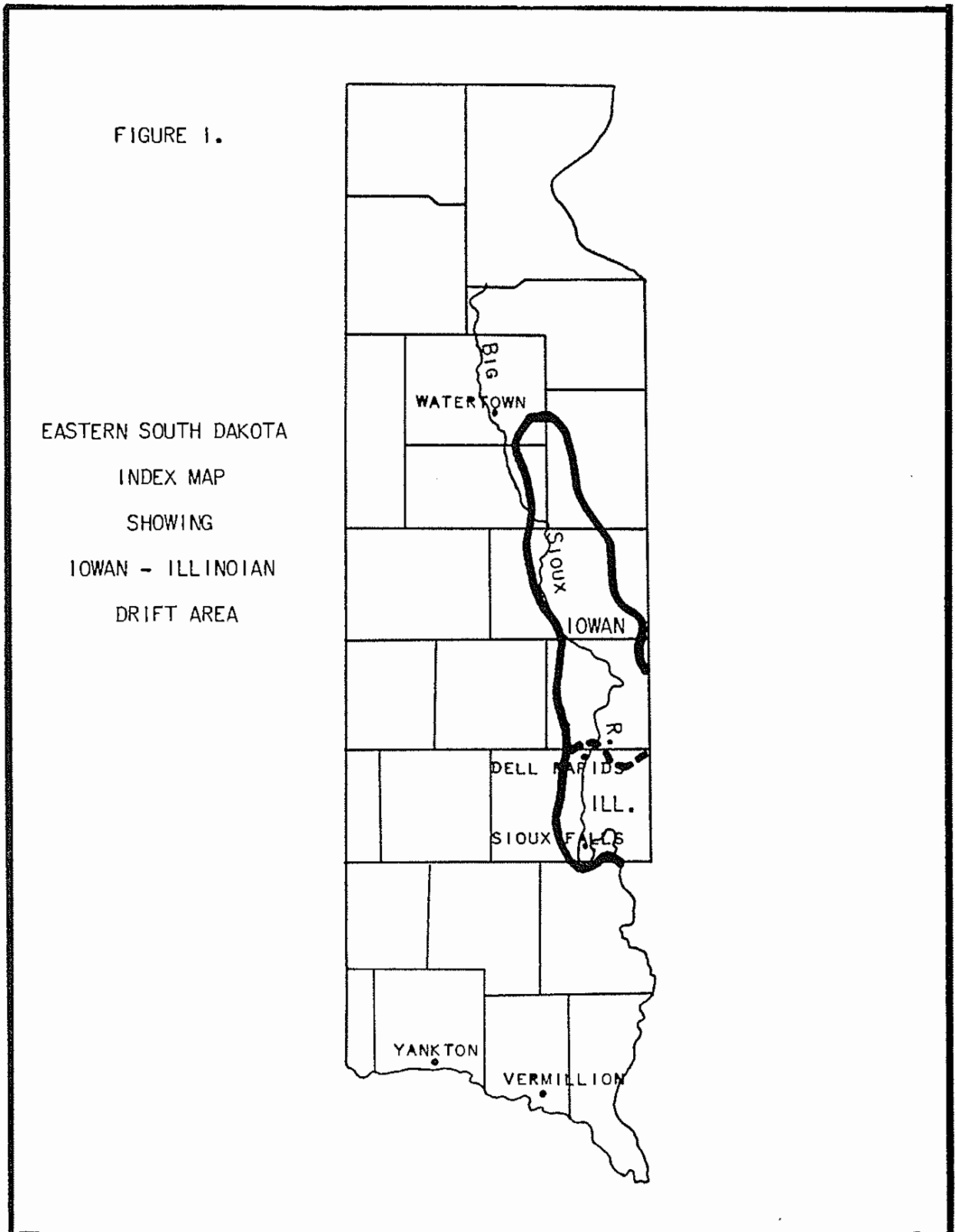


Figure 1. Eastern South Dakota Index Map Showing Iowan-Illinoian Drift Area

in the Iowan (?) drift in the Big Sioux Valley; because stratified drift is commonly associated with end moraines, its presence in this area therefore lends evidence that the ridges are end moraines. Remnant moraines of this type, also associated with kames, are reported along the Iowan drift border in northeastern Iowa by Alden and Leighton (1917, p. 171-181).

A possible argument against the presence of two drifts in this area is the fact that the Sioux quartzite is very near the surface in the Illinoian (?) drift area, but is deeply buried under the Iowan (?) drift. The influence of this bedrock could cause the difference in topography. However, this is thought to be not the case, for two reasons: (1) an area in southwest Minnesota has the Sioux quartzite outcropping in the Iowan (?) drift, and there it does not change the topography; (2) the presence of the Sioux outcrops at the border between the two drifts suggests the Sioux ridge was an obstacle large enough to halt the flow of the Iowan ice, thus explaining why the Illinoian (?) drift is found only where the Sioux quartzite is near the surface.

An unusual northwest-southeast lineation can be seen on the air photos of the Illinoian (?) drift area. Because of its regional scale, this lineation is not apparent on the ground, and was first thought to be due possibly to loess distribution, as the prevailing wind was in approximately the same direction (Flint, 1955, p. 131). However, further investigation showed that some of the linear elements are free of loess. A few of these linear elements are as much as five miles long and very straight, suggesting linear drumlins (Flint, 1947, p. 124; Lemke, 1958; Gravenor and Meneley, 1958). This suggestion is supported by the fact that the ice in this area moved from northwest to southeast, based on bedrock striations and orientation of end moraines. A few of the linear drumlins contain at least 90 feet of till as drilled with a jeep-mounted auger.

The relationship of these linear drumlins to the question of two drifts in this area is not known. The drumlins are confined mainly to the Illinoian (?) deposits, but a few are found in the extreme southern part of the adjacent Iowan (?) drift area.

The above evidence, although not conclusive, suggests the presence of glacial drift of two ages in the Big Sioux Valley between Sioux Falls and Watertown. It is not yet definitely known which ages they are, and further regional studies are needed to determine this. Steece (1959) in his study of the Illinoian (?) drift near Sioux Falls, presents paleontological evidence that this drift is no older than Illinoian. Both drifts are older than Cary (table 1), based on work in the Dell Rapids area (Tipton, 1959). Beyond this, no definite age can be assigned to either of the glacial deposits in question.

However, the purpose of this paper is not to show the ages of the deposits but rather to point out the existence of two drift sheets in this area rather than one, as had been previously shown.

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