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THE IOWAN-WISCONSIN BORDER

E. J. CABLE

Workers of the Pleistocene of Iowa must use several criteria for distinguishing the different drift sheets. The working criteria are, (1) surface topography of the drift, (2) distinctive lithological characteristics, (3) degree and depth of leaching and oxidation, (4) distinctive interglacial deposits and, (5) pronounced erosional and weathered zones. It was formerly thought to be quite an easy matter to distinguish one drift sheet from another by means of criteria (1), (2) and (3), with great emphasis upon (1) and (3). Too much emphasis, however, cannot be placed upon the lithological characters, since a careful study of the drift sheets, with the possible exception of the Wisconsin, has revealed a certain consanguinity existing among them.

The general composition of the drift being indistinctive where two or more drift sheets are contiguous or are overlapping, it is necessary to apply all of the above criteria where possible to discover them.

In attempting to determine the boundary of the Iowan-Wisconsin drift sheets, all of the above evidences should be carefully applied where possible.

The Iowan-Wisconsin border has been located largely upon the basis of topographic evidence. This has been due, no doubt, to, (1) lack of sufficiently deep cuts where the relation of one drift to another may be seen, and, (2) the greater emphasis that was earlier placed upon lithological characters and surface topography.

After having spent some time in studying carefully the Iowan-Wisconsin drift border from where it enters Iowa in northwestern Worth county to northern Hardin county, the writer feels confident that there are many places where changes in the position of the border should be made. Detailed investigation was made to determine, first, if possible, whether the Iowan drift extended westward beneath the Wisconsin drift. Many difficulties are encountered when an attempt is made to secure data to determine the relation of the Iowan drift to the Wisconsin drift, as, (1) the great thickness of the Wisconsin drift at its eastern margin, (2) the absence of

deep road or valley sections where the two drift sheets are contiguous and, (3) the small relative value of well logs. Investigation was carried on some distance back from the Wisconsin border, well within the Wisconsin drift plain. Well logs were examined carefully, where possible to secure them, public road sections, railway cuts and river valley sections were studied, with the result that not a single instance was obtained where it can be affirmed positively that Iowan drift exists beneath Wisconsin drift.

The eastern line of demarcation between the Iowan and Wisconsin drift sheets was studied carefully and, where possible, all evidence was applied to determine any errors. For great distances the margin can be detected by the striking difference in the topography of the two drift sheets. From the northern border of Worth county, to Hanlantown, Danville township, the line between the two drift sheets is not pronounced except to the northwest, west and southwest of Northwood. In this vicinity, the Wisconsin border is characterized by a prominent terminal moraine, which meets the level Iowan drift plain very sharply. This sharpness is emphasized by the absence of any outwash. Elsewhere in the county the Wisconsin drift margin meets the Iowan drift plain in a greatly softened topography so that it becomes more difficult to outline definitely the border of the Wisconsin drift. The lack of reliable well logs and drift sections of sufficient depth, makes the location of the margin difficult. Many well logs were examined, some to the east of the mapped margin, and others to the west of the margin. Many of the wells to the west of the Wisconsin margin are shallow and are of no value. The following well log was secured west of Kensett, Kensett township, and is quite typical of many others examined east of the Wisconsin margin.

	Feet	Inches
1. Black soil	1 to 2	....
2. Clay, yellow, noncalcareous.....	8	....
3. Clay, blue, calcareous.....	23	....
4. Sand and gravel.....	....	4 to 6
5. Clay, blue, highly calcareous.....	30	....
6. Sand and gravel.....	....	6
7. Bed rock.		

The well records reveal two drift sheets to the east of the Wisconsin border. The upper drift sheet is unquestionably Iowan, and the lower is probably Kansan.

In the vicinity of Hanlantown, the Wisconsin border should be extended eastward as shown in figure 117.

Here may be found good evidences of outwash and lake deposits which are unquestionably of Wisconsin age. The upper terrace

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north of Lime creek, Lime creek valley, section 35, Fertile township, and section 36, Danville township, is lake deposit, is highly fossiliferous, and is of Wisconsin age.

The Iowan-Wisconsin border in Cerro Gordo county is everywhere quite well defined. The Altamont moraine within this county presents an area of heterogeneously grouped knobs and undrained basin-like depressions. The margin of the moraine meets the gently

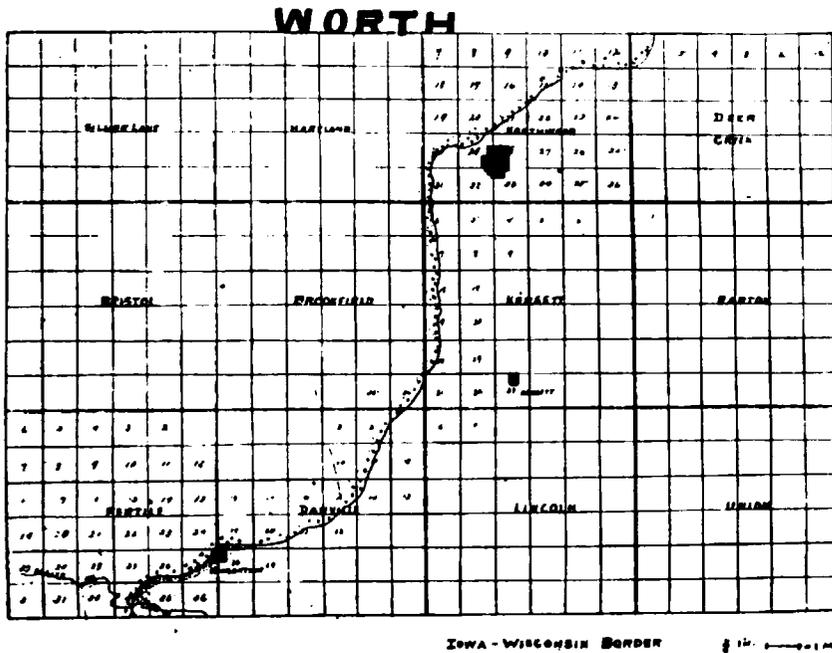


FIG. 104. Map of the Iowan-Wisconsin border in Worth county.

undulating Iowan drift plain with a rather sharp line of demarcation. In the northwest part of the county, where the Altamont moraine enters the county, its surface irregularities are very pronounced, while in the central and southern parts the surface irregularities are less marked. Little or no outwash material is to be seen. Drainage from the ice margin was along stream courses that were determined previous to the Wisconsin ice invasion. Gravel trains are prominent along many of these streams leading eastward from the Wisconsin margin.

In Franklin county the boundary line between the Iowan and Wisconsin drift sheets is quite conspicuous, except locally. There are local areas where the marginal front of the Altamont moraine shows pronounced outwash. Such an area is to be found in sections 5, 8, 9, 15 and 16 of Reeve township. Here the Wisconsin border should be extended eastward as shown in figure 118.

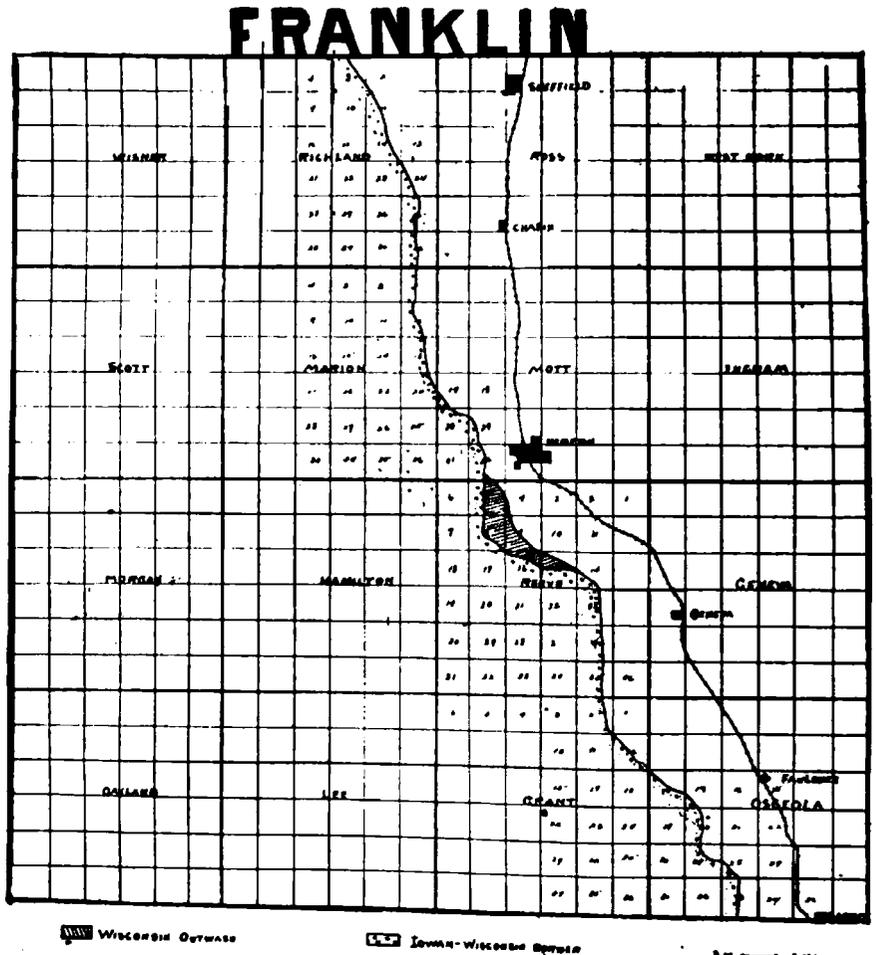


FIG. 105. Map of the Iowan-Wisconsin drift border in Franklin county.

A careful study of the drift in this area was made through borings, valley sections and tile ditch sections. The following two sections are typical of the drift in this vicinity.

	Feet	Inches
NORTHEAST QUARTER, SECTION 8, REEVE TOWNSHIP.		
1. Peat, compact, uneven and ridgy.....	2 to 4	....
2. Limelike clay, finely pulverized, white in color		6 to 10
3. Gravel, evenly bedded, limestone pebbles predominant	2	....
4. Sand and clay, bluish green in color... ..		2 to 4
5. Sand, white, even-grained, horizontally bedded		4
WEST HALF, SECTION 9, REEVE TOWNSHIP.		
1. Peat, compact, highly fossiliferous....	2 to 4	....
2. Gravel, one-fourth to one-half inch in diameter, chiefly limestone.....		2 to 6
3. Sand and clay, greenish blue in color		2
4. Sand, fine-grained, evenly bedded, white in color.....	2	....

From a study of the sections, it would seem that during the time that the Wisconsin ice sheet margin was in a halting state, a lake was formed immediately to the east of the ice margin in which the above materials were deposited by the glacio-fluvial waters.

That the Iowan drift is overlapped by the Wisconsin drift in certain areas within the township is suggested by the fact that in sections 8 and 9 of Osceola township, and section 12 of Grant township, loess was observed mantling the hills of presumably Iowan drift, but when traced westward to the Wisconsin drift margin, it was observed to disappear rather sharply. The lack of sufficiently deep cuts and reliable well logs, together with the great thickness of the Wisconsin drift where the supposed overlapping takes place, make positive statements impossible.

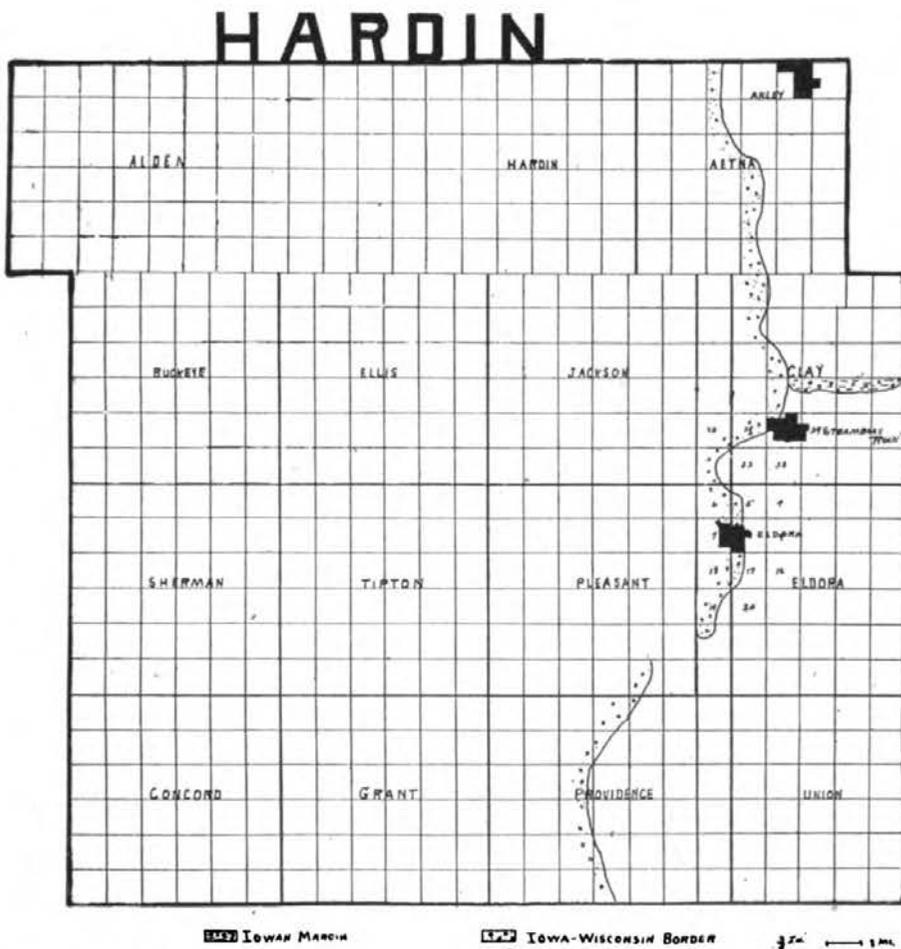


FIG. 106.—Map showing the Iowan-Wisconsin border in Hardin county.

The Iowan-Wisconsin border in northern Hardin county is well defined though the relief of the Altamont moraine is not so pro-

nounced as farther to the north. In Clay township, the Iowan border, figure 106, according to earlier workers of the drift, has been drawn to the east. After some detailed study of the Iowan border in this vicinity, the writer is convinced that it extends much farther to the south. From investigation in the vicinity of Eldora, it would seem as if a tongue of the Iowan extends as far south as the new bridge across Iowa river, south of the city. Further study will be necessary before any definite line can be drawn. There are many difficulties in the way of fixing positively the Iowan border. The Iowan drift thins out gradually so that it becomes difficult to distinguish, (1) its topography, in many places its surface features being determined by the topography of the underlying drift, (2) its complete state of oxidation, owing to its thinness, and, (3) its great similarity in lithological characters to the Kansan. Much more detailed work must be done before the boundary of the Iowan can be drawn definitely.