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## Relation of the Wisconsin Drift to the Iowan Drift as Revealed in Worth County

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## RELATION OF THE WISCONSIN DRIFT TO THE IOWAN DRIFT AS REVEALED IN WORTH COUNTY.

E. J. CABLE.

This paper is the result of an attempt to determine, if possible, the relation of the Wisconsin drift to the Iowan drift, not only along the immediate border of the Wisconsin drift, as outlined in the Iowa State Geological Survey Reports, but within the Wisconsin drift plain itself. A careful and detailed investigation was made along the eastern border of the Wisconsin drift from the northern boundary of Worth county, where the eastern edge of the Wisconsin drift enters the state, as far south as Hardin county. Examination of drift cuts, well logs, and a recently excavated coal shaft, located in Hardin county on the border of the Wisconsin drift, failed to reveal, in any positive way, the

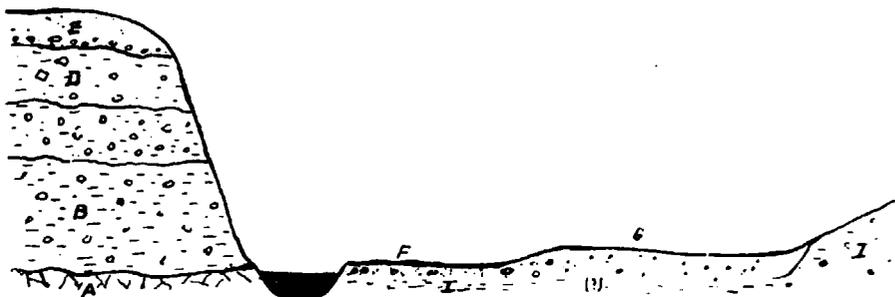


Fig. 170

presence of Iowan drift beneath Wisconsin drift. Many instances could be cited where unquestioned Wisconsin drift was found superimposed upon, (a) Yarmouth deposits and, (b) Kansan till. One of the best exposures along the Wisconsin drift border showing the relation of the Wisconsin drift to the underlying drift, is found along the south bluff of Lime creek, southeast quarter, section 35, and south one-half of section 36, Fertile township, Worth county. Lime creek, in this particular locality, is cutting on its southern bank into a high bluff of Wisconsin drift and affords the following section:

### SECTION ALONG THE SOUTH BANK OF LIME CREEK, FERTILE TOWNSHIP, WORTH COUNTY.

	FEET
E. Sand and gravel, largely sand near the top and more gravelly near the base, many of the included pebbles are covered with a coating of iron oxide .....	16

- D. Grayish brown calcareous clay, somewhat jointed, highly iron stained along the joints; grading into (B) rather sharply.... 20
- C. Yellowish gray clay, highly calcareous; contains small bowlders, and grades gradually into (D) ..... 20
- B. Yellowish gray clay grading into bluish black jointed clay beneath; highly calcareous ..... 30
- A. Dense, fine-grained bluish black, jointed clay; contains small quartz pebbles and pieces of wood; is highly fossiliferous; to the water's edge..... 2

Horizons B, C, D, E are Wisconsin drift lying on what is unquestionably Yarmouth interglacial deposits. North of the river

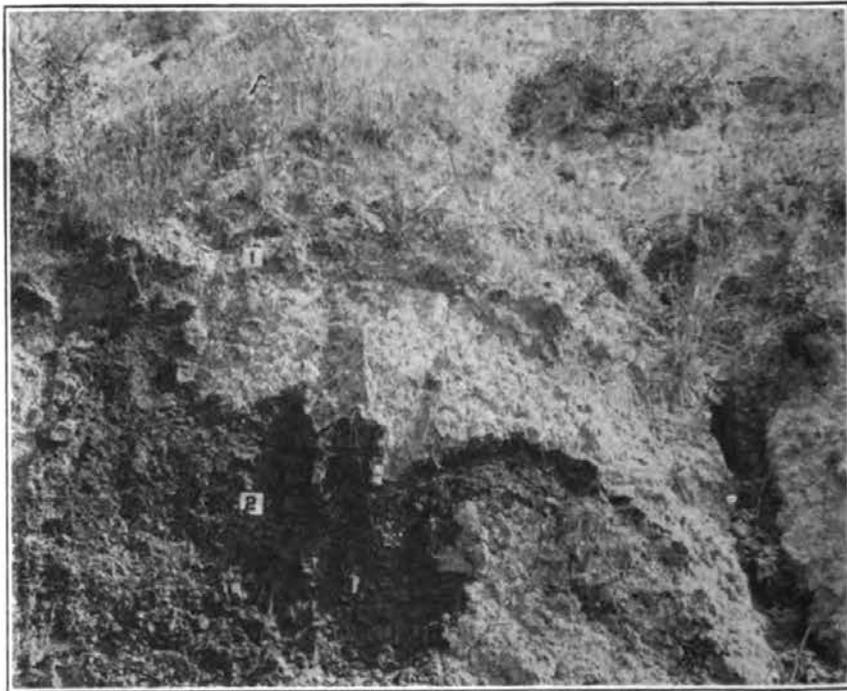


Fig. 171

at this point, figure 170, are two terraces, F and G. A section in the drift material of the upper terrace revealed a thick deposit of peaty soil, filled with shells. The material of the upper terrace is unquestionably Wisconsin in age and was deposited in a lake which filled this valley during the retreat or advance of the Wisconsin ice. Following the valley of Lime creek eastward, it was found that the peaty material disappears and a thin covering of drift is visible. An examination of the drift shows it to be very much like Iowan drift. Light colored bowlders may be seen similar to those so common on the Iowan drift. If Iowan drift is present in the valley where the section in figure 170 is given, it is impossible to tell it. It may be that the

### RELATION OF WISCONSIN AND IOWAN DRIFT

material marked I in figure 170 is Iowan. Another section along this same stream a quarter of a mile to the west of the section shown in figure 170 affords the following:

#### SECTION ALONG LIME CREEK, FERTILE TOWNSHIP, WORTH COUNTY.

1. Wisconsin drift composed of sand and gravel in the upper portion while the lower thirty feet is a bluish gray clay filled with bowlders and limestone pebbles..... 50
2. Black, compact, fine-grained jointed clay, containing quartz pebbles; the upper part is highly fossiliferous and contains pieces of wood.

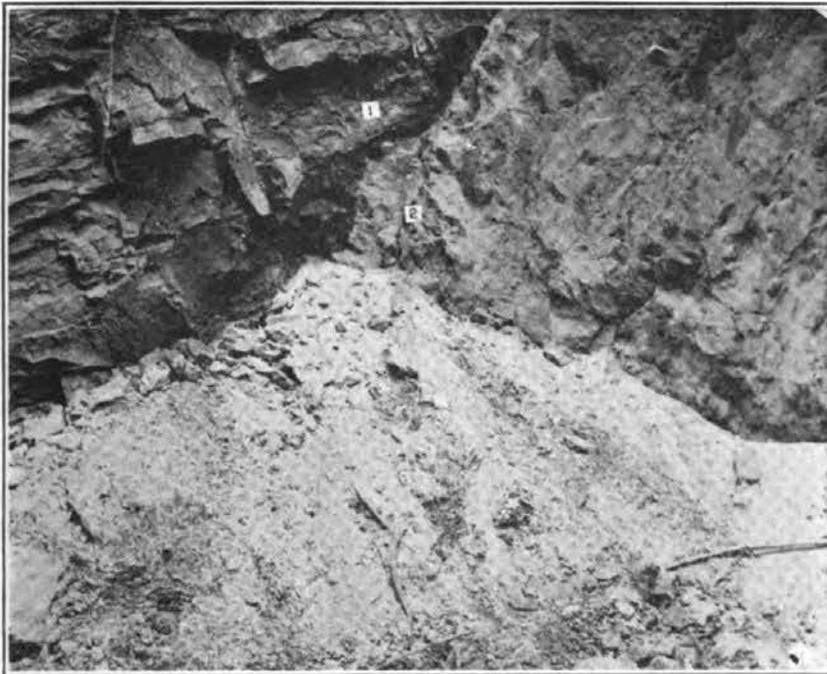


Fig. 172

The upper portion of horizon (2), figure 171, is undoubtedly Yarmouth interglacial deposits. It has about the same elevation with reference to the stream as horizon A in figure 170. Here, as in the previous section, Wisconsin drift rests upon Yarmouth deposits. A few rods to the west of the section shown in figure 171, is a very narrow, steep-sided gully. The depth at its lower end just where it enters the river is about thirty feet. This gully is of such recent origin that little weathering of the drift has taken place, and since it is deep enough to cut through the Wisconsin drift into the underlying drift, it affords an interesting study.

SECTION OF A GULLY WALL, FERTILE TOWNSHIP, WORTH COUNTY.

The west wall of the gully shows a dense, bluish black jointed clay, (1) of figures 172, beneath Wisconsin; the clay is highly jointed, the upper portion showing rather marked contortion; no bowlders are present, but numerous small pieces of quartz are visible. The material marked (2), in figure 172, is fine sand with highly distorted laminae.

A section of the west bank of the north-south gully, is shown in figure 173.

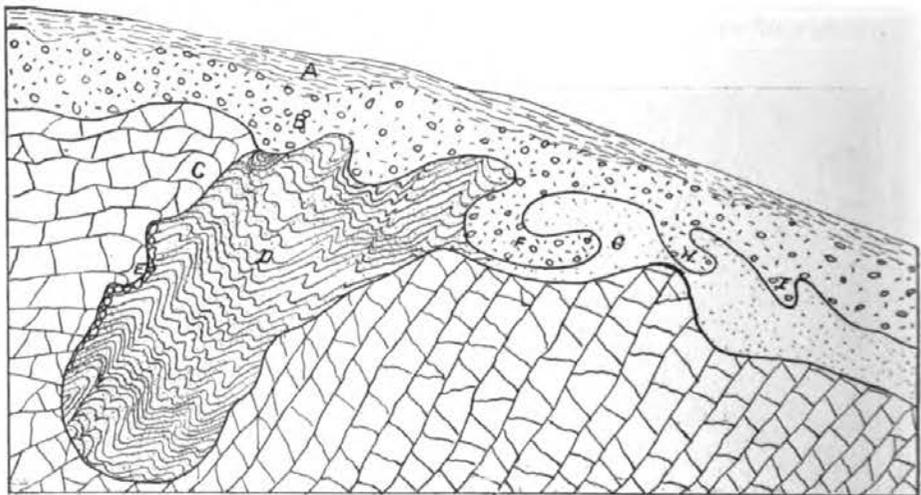


Fig. 173

SECTION OF A GULLY WALL IN FERTILE TOWNSHIP, WORTH COUNTY.

	FEET
A. Soil filled with roots .....	1½
B. A grayish clay, highly calcareous, showing distortion, (Wisconsin drift) .....	2
C. Dense bluish black, jointed clay, calcareous, the upper part showing contortion, and containing fossil shells and pieces of petrified wood. Exposed to the base of the gully.....	15
D. Large sand inclusion, 8 feet wide, and extending from immediately beneath the Wisconsin drift to the bottom of the gully; sand laminated and highly distorted and having the edges of the laminae iron stained.	
E. Pebbles and gravel along contact of the sand with the Kansan drift; the pebbles range in size from one-half inch to two inches in diameter and are cemented together by iron oxide.	

The age of the drift here beneath the Wisconsin is Kansan. To the south of the sand pocket the joints of the Kansan drift in the upper portion, instead of being vertical, dip to the south and show some distortion which suggests strongly shearing planes resulting from the pressure of the overriding Wisconsin ice. To the north end of this same exposure, figure 173, Wisconsin

sin drift is found resting upon sand. Here the Wisconsin drift is disturbed by small synclines projecting into the sand beneath F, H, I, figure 173, and shown also in figure 174.

The contact line between the sand and the Wisconsin drift is well defined. The sand has a fresh appearance, shows little weathering, and is probably of Wisconsin age. It seems probable that the sand pocket is not an inclusion of sand in the Kansan drift, but was, previous to the advance of the Wisconsin ice, a gully cut into the Kansan drift. With the coming of the Wisconsin ice, the outwash from the edge of the ice filled



Fig. 174. View showing the folded Wisconsin drift projecting into the sand below.

the gully. In the filling of the gully, the structure now seen in the sand was effected, while the distortion of the laminae has resulted from the pressure of the overriding Wisconsin ice.

Many other instances could be given, not only in Worth county, but in Franklin and Hardin counties as well, where Wisconsin drift is found superimposed upon what appears to be unquestionably Kansan drift. From a careful study of the two drifts in the previously mentioned counties, the following conclusions would seem warranted: (1) if Iowan drift is present beneath Wisconsin drift, it is so thin that the vigorous Wis-

consin ice ploughed it up and mixed it so thoroughly with the Wisconsin drift as to destroy all its identity; (2) the Iowan ice sheet may have extended no further west than the east margin of the Wisconsin drift; (3) the time interval between the retreat of the Iowan ice sheet and the advance of the Wisconsin ice sheet may have been of sufficient length to permit of the removal by erosion of the Iowan drift before the advance of the Wisconsin ice, or (4) the Iowan drift does exist beneath the Wisconsin, but as yet has not been discovered.

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