

1913

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Barbour, Erwin H., "A Minor Phenomenon Of The Glacial Drift In Nebraska" (1913). *Conservation and Survey Division*. 30.
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NEBRASKA GEOLOGICAL SURVEY

ERWIN HINCKLEY BARBOUR, State Geologist

VOLUME 4

PART 9

A MINOR PHENOMENON OF THE GLACIAL DRIFT IN NEBRASKA

BY

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A MINOR PHENOMENON OF THE GLACIAL DRIFT IN NEBRASKA

BY ERWIN HINCKLEY BARBOUR

(Paper read before the Nebraska Academy of Science, 1911.)

The term glacial drift, as used in a restricted local sense, refers to that particular portion of the Kansan drift which is rendered conspicuous by coarse pebbles and boulders of pinkish and reddish Sioux quartzite. This layer is generally recognized, and though it may be but a foot or two in thickness, it is often expedient to speak of it popularly as "the drift." In a broader sense, however, our drift also includes, though less obviously, extensive beds of glacial clay, commonly called joint-clay, which may reach fifty feet in thickness. An older, bottom layer of dark or even black color (sub-Aftonian, Jerseyan, or Nebraskan), and a younger, top layer of a lighter color, generally yellowish or reddish in cast (Kansan), may be easily recognized.

It has long been said facetiously by eastern geologists that "the glacial deposits of Nebraska are buttered on so thin that one cannot tell the buttered side." It is probable, however, that this bit of good humor would not have originated had the Nebraska drift been properly identified and distinguished from the loess.



Fig. 1.—"Sandfrigites." See Fig. 2, 1 and 2, and Plate 1.

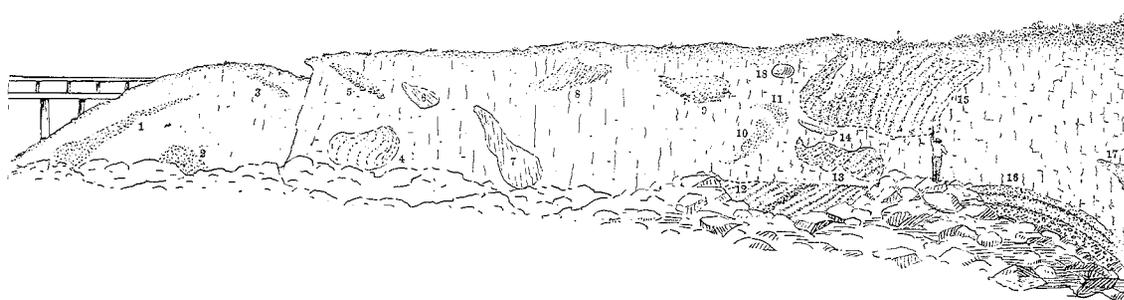


Fig. 2.—Key to Plate 1.

Nos. 1, 2, 3, 4, 8, 10, 11, 12, 13, 14, 15, 17, are "Sandfrigites."

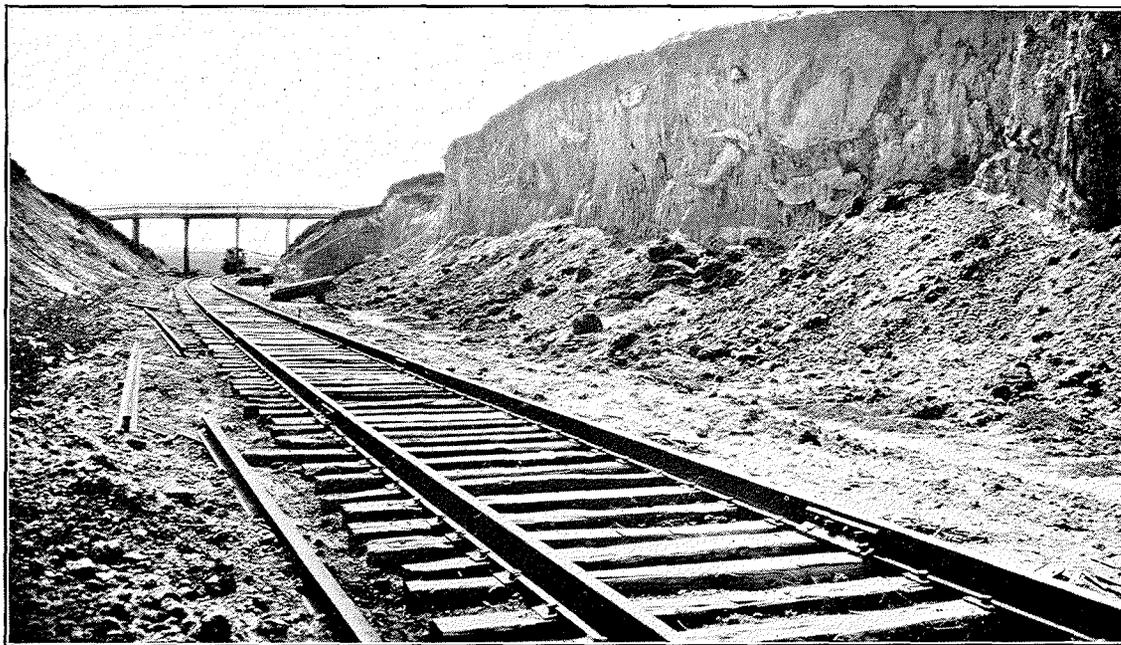
Nos. 5, 9, and 16 "Couleefrigites."

Nos. 6 and 7 "Clayfrigites."

No. 15 is about 30 feet in length.

Nos. 12 and 16, about 30 feet are exposed, and the balance covered by talus.

No. 18 is a large glacial boulder of Sioux quartzite, small glacial boulders are not indicated.



A BANK OF KANSAN DRIFT IN THE MILFORD CUT-OFF JUST WEST OF PLEASANTDALE, NEBRASKA, SHOWING "FRIGITES"
SEE FIG. 2.

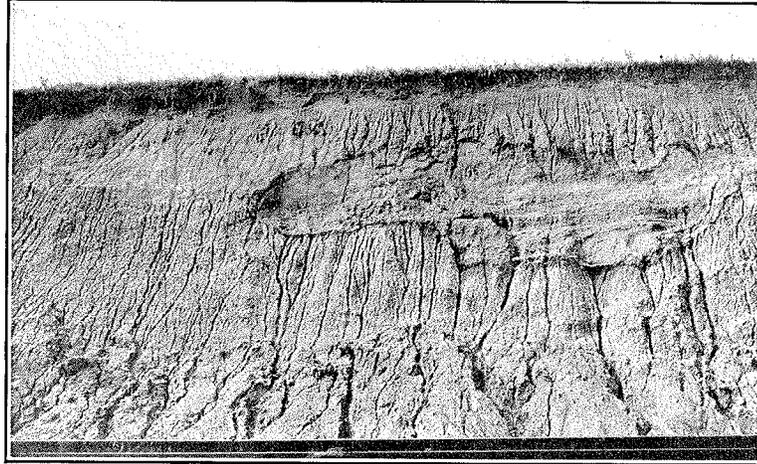


Fig. 1.—A bold "Gravelfrigate," coarse material, possibly a portion of a stream bed.

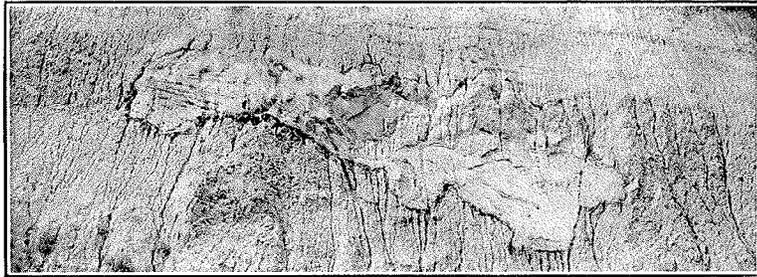


Fig. 2.—A large "Sandfrigate."



Fig. 3.—A large "Couleefrigite" with heavy gravel. Three "Sandfrigites" may be seen above it. The above are from a bank one-half mile east of the one shown in Plate 1.

Continued study renders it increasingly certain that in many places, there are loess-like upper portions of the Kansan drift which too few take into account. It completely imitates loess in color and texture, in its manner of erosion, and resultant soil.

Among the minor phenomena of the glacial drift in Nebraska, there is one, which, though rarely observed by the public, is of interest, and should be commended to the attention of every local naturalist. Attention is called to certain large, well-defined masses or blocks of such materials as soil, sand, gravel, and coarse pebbles, which occur imbedded in the drift clays along with glacial boulders, and which

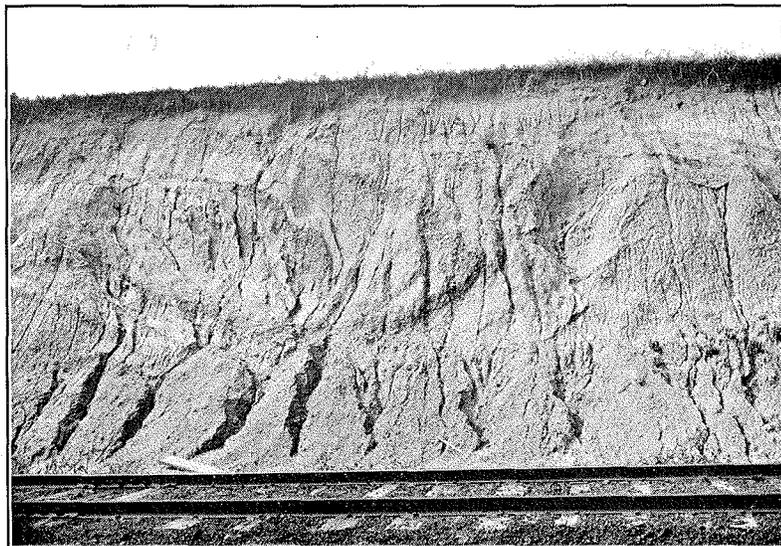


Fig. 3.—A large "Couleefrigite," a half mile east of bank shown in Plate 1.

presumably have been similarly transported and deposited. These masses or blocks vary widely in color, texture and kind. They differ noticeably from the glacial matrix in which they are found, and are the more striking by virtue of contrast. They are not numerous, but may be seen in some places in fresh exposures, especially in deep railroad cuts. Unfortunately, they are quickly effaced by weathering and by growing vegetation.

The most notable examples are found in the Milford cut-off of the Burlington railroad at Pleasantdale. For a mile or so west of the

station, especially on the right bank, there are fine examples in almost continuous succession. (See the accompanying sketch and photographs.) The drift at this place is a jointed, sandy clay of a rusty gray color, fairly compact in texture, and about 25 feet in thickness. It is somewhat startling to find in it large stray masses of various materials. These masses are generally large and angular, or rounded bodies of incoherent soil, sand, and gravel, more or less stratified, cross-bedded, and tipped at all angles.

It is still more surprising to find sections of small stream beds and channel deposits tilted and overturned. The dense quartzitic and occasional granitic boulders, characteristic of the Nebraska drift, and these incoherent sand and gravel blocks occur together. Perhaps the arenaceous blocks were likewise dense and coherent at the time of transportation and deposition, the assumption being that they were rigid because in a frozen condition. We have coined, and for a long time used as a convenient generic field name for these, the word "Frigites," and have used as specific terms, the additional names "Soilfrigites," "Clayfrigites," "Sandfrigites," "Gravelfrigites," "Coulee-frigites," and the like, according to the component materials. These frigites are counted Aftonian. They are confined to the Kansan drift.

The facts of glaciology are so commonly mentioned by the press, by physical geographies, and geologies, that knowledge of that subject seems well diffused. Suffice it to suggest very briefly, that incident to the protracted frigidity of a glacial period, the soils, sands, and gravels were frozen into solid masses (frigites). Any natural force which could rend and transport rock, could rend and transport the rock-like soils and sands. Continental glaciers are powerful graders and levelers. They act resistlessly upon rock, and frozen soils and sands, breaking them into blocks, and transporting them long distances southward. The load of rocks and frozen blocks would finally be dropped by the melting ice, would be buried in glacial mud, and thus preserved in their integrity. A stream bed, or coulee could in a like manner be frozen, subsequently broken, into sections, transported, and deposited.

Frozen sand blocks have been observed in the drift of Iowa as well as in Nebraska, but as far as can be learned, none of them surpass those in the Milford cut-off, either in point of size, variety, or numbers.

The University of Nebraska
Lincoln, Nebraska
June, 1911

Distributed March, 1913.