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This is a brief report on an interesting hill occurring on the Cary drift plain in central Story County.

The hill is situated in sections 7 and 8, T. 84 N., R. 22 W., about four miles north of Nevada. It forms a conspicuous, isolated prominence in an area of several square miles of relatively featureless drift plain. The hill is about two miles long, and one-quarter mile wide. The long axis is directed northwest-southeast with an essentially even crest line. The maximum height of the hill above the adjacent plain is about 60 feet as shown on a profile along the road between sections 7 and 8. (See Figure 1)

Our attention was first directed to the hill because of its distinctly lighter color as observed on air photos, its isolated occurrence, and its position with respect to drainage.

The drainage pattern in this part of Story County is perhaps best described as rectangular. The pattern consists of elements having trends essentially at right angles to each other. The major streams flow generally southeastward in directions nearly normal to the trend of the boundry of the Des Moines lobe which lies about 12 miles to the east. Minor streams in general trend northeast-southwest, parallel to the pattern of the minor moraines described by Gwynne (1942). Actually, segments of the major streams may follow the northeast-southwest trend and many minor streams follow the northwest-southeast trend. The hill in question is elongated parallel to the northwest-southeast elements of the drainage pattern and thus occupies a position best described as radial with respect to the configuration of the Des Moines lobe.

The lighter color of the hill on air photos suggested that the hill might be composed of material distinctly more sandy than that of the surrounding drift plain. Preliminary augering indicated that this is indeed true. Hand augering to depths of 15-20 feet at several locations on the hill disclosed a series of complex relationships of till, sand, and fossiliferous silts.

Stratigraphy

A series of 15 auger holes have been drilled across the short

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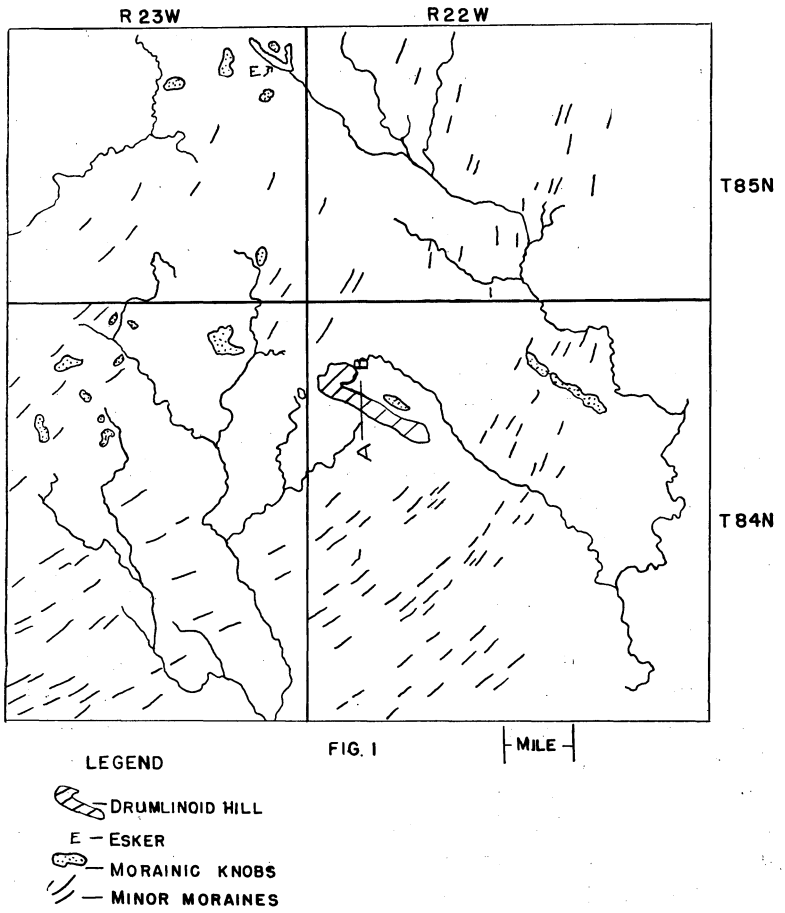

Figure 1. Geographic location of the drumlinoid hill.

axis of the hill along the section line which separates section 7 and 8 (line A-B, Figure 1). Seven of these holes have been drilled by a power auger. These power auger holes are about equally spaced along the traverse, and in every instance the drill has penetrated to sufficient depth so as to enter an oxidized till which is capped with gumbotil (Kansan) which extends beneath the hill. The remaining holes are hand auger holes which were spaced so as to supplement the stratigraphic data, as well as to cross-check the results obtained by means of the power auger.

The logs of three power auger holes are presented, and these will serve to outline the major stratigraphic relationships of the deposits composing the hill.

Hole #1, located at the south end of the traverse, in the southeast corner of section 7 penetrated:

1.	Soil, black, organic	3.0 ft.
2.	Till, (Cary), oxidized, buff, non-calcareous	1.0
3.	Till , oxidized, buff calcareous	5.0
4.	Till , gray unoxidized, calcareous, sandy and silty	15.0
5.	Gumbotil, dark gray, very plastic	8.0
6.	Till (Kansan) sandy, buff, oxidized, non-calcareous, penetrated	4.0
	Total	36.0 ft.

Hole #2, located at the crest of the hill, at the center of the east line, Sec. 7, penetrated:

1.	Till (Wisconsin) oxidized, sandy and rocky, non-calcareous	3.0 ft.
2.	Till, oxidized, sandy, silty, calcareous	9.0
3.	Sand, buff, medium-grained, angular, occasional gravel, non-calcareous	2.5
4.	Silt, sandy, oxidized, light gray, calcareous, fragments of gastropods	3.5
5.	Sand, silty, dark gray, medium to coarse-grained	6.0
6.	Sand, dark gray, medium to coarse-grained, calcareous	4.0
7.	Silt, blue-gray, calcareous, carbonaceous spots and plant fragments. Drilling suggests the occurrence of thin (½′) layers of sand	8.0
8.	Sand, gray, calcareous, medium to coarse-grained	4.0
9.	Zone of predominantly calcareous silt, near the middle and bottom of which are sandy interbeds	8.0
10.	Sand, silty, dark gray, medium to coarse-grained, slightly calcareous, wood fragments	8.0
11.	Gumbotil (Kansan) blue to light gray, sandy, non-calcareous—penetrated—	3.0
	Total	59.0 ft.

Hole #3, located at the north end of the traverse, in the NE. NE. Sec. 7, penetrated:

1.	Till (Wisconsin) calcareous, oxidized, sandy, pebbly	6.0 ft.
2.	Sand and sandy silt, oxidized, calcareous	1.0
3.	Silt, blue gray, calcareous, fossiliferous, very rare pebble, slightly sandy in top portion	11.0

4. Gumbotil, blue gray, non-calcareous	8.0
5. Till (Kansan) oxidized, calcareous, sandy, penetrated	34.0
Total	59.0 ft.

The study of the cuttings from all of the holes along the traverse allows us to interpret the stratigraphic relationships of the deposits within the hill as shown in Figure 2. In this cross-section it is to be observed that the till cover is not shown extending across part of the south slope of the hill. About two feet of oxidized, non-calcareous, rusty-colored silty sand covers this surface. This material does not have the appearance of most till of this region, therefore, the interpretation that this is translocated debris is postulated. It is to be observed also that the gumbotil surface rises slightly from the south end of the traverse only to become slightly lower under the crest of the hill, but then rises again toward the north end of the traverse. There is no indication that a Kansan nucleus has controlled the deposition of the material in the hill. The sand and silt are shown grading laterally into the Wisconsin till. This graduational zone has not been penetrated by the auger, but it can be demonstrated that the silt is thinning to the south, and that it is completely absent at the south end of the traverse. This body has, therefore, a lenticular shape. Elsewhere within the confines of the Des Moines lobe, till-capped lenticular bodies of silt have been observed, and in most instances the silts grade laterally into the Wisconsin till, thus the gradational relationship between the silt and the till within the hill seem justified.

Paleontology

Fossil remains distributed through many of the silts penetrated are wood, gastropods, ostracods, and beetles. These fossil remains, at this time, can be obtained only by fairly deep boring, which is unfortunate because the augering process tends to break the specimens. In spite of the poor state of preservation of the specimens obtained, some general conclusions can be reached. The collection contains such gastropod genera as *Succinea, Columella, Vertigo, Discus, Lymnaea,* and *Deroceras.* Most specimens observed were broken; however, *Columella alticola,* or its closely related form, *C. edentula* is known to be present. According to Leonard's (1952) biostratigraphic zonation, this occurrence suggests that these deposits cannot be older than Tazewell.

The ostracods include such species as *Cypridopsis vidua,* and *Candona candida* which are species that inhabit slightly alkaline,

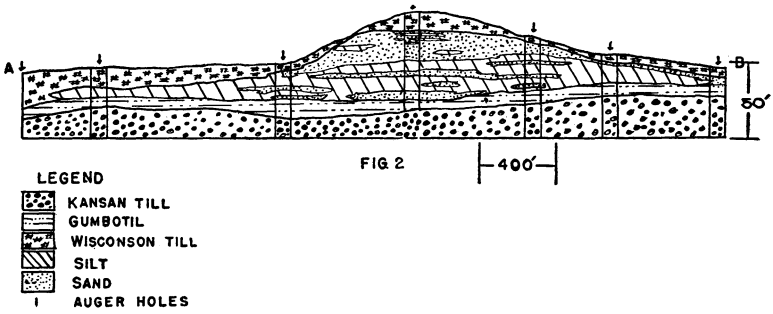

Figure 2. Stratigraphy of the drumlinoid hill.

shallow, temporary or perennial bodies of water. Ostracod assemblages containing these species are known to range from the present through the Mankato (late Cary?) of western Indiana into the Illinoian of the Peoria, Illinois region.

Similar gastropod and ostracod faunas have been recovered from the loess of one paha in Benton County, from the loess of the "Mitchelville cut" of Polk County, and from other silts within the confines of the Des Moines lobe.

An analysis of the environmental requirements of this fauna indicates that water was an important element within the depositional site. Modern representatives of some of these species are known to be abundant in Arctic areas and cold, high mountain regions. It is not beyond the realm of possibility that some Pleistocene snails lived in close proximity to the stagnating glacier front, or even upon the debris-laden terminus.

Discussion and Conclusion

There is nothing about the hill that leads us to believe that its alignment or shape is primarily related to post-glacial erosion.

The geomorphic expressions as well as the character of the deposits composing the hill have certain features in common with both drumlins and paha. At this time we do not have enough evidence available to determine what name should be applied to this hill. Neither do we feel justified in saying whether the deposits within the hill are to be assigned to the Tazewell or Cary subage of the Wisconsin.

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