

ART. XIV.—*Note on the Glaciation of Pocono Knob and Mounts Ararat and Sugar Loaf, Pennsylvania*; by HENRY B. KÜMMEI, PH.D.

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DURING the past field-season an opportunity was given me, in connection with my work on the glacial deposits of Northern New Jersey, to visit Pocono Knob, Monroe County, and Mounts Ararat and Sugar Loaf, Wayne County, Pennsylvania. The Pennsylvania State geologists* have held that during the glacial period these peaks were nunataks.

Pocono Knob is an outlier of Pocono Plateau, situated about nine miles northwest of Stroudsburg. The terminal moraine is well developed on its north and south flanks, about two-thirds of the way up the slope. Since this knob was examined by Lewis and Wright, a wagon road has been constructed up the northwest side and along the top of the hill for more than half a mile. This road affords almost continuous exposures to a depth of from one to three feet, along the top of the knob. Here was found a considerable variety of material, chiefly shales and sandstones of different color, texture, and lithological constitution, with some coarse conglomerate. Not a few of these had been worn to subangular form with more or less well marked planation surfaces. Fragments bearing striæ, of whose origin there can be no doubt, are not abundant, but ten or twelve cobbles were found, which bore unmistakable glacial scratches. Some of these occurred not more than thirty feet below the summit. The evidence is conclusive that the ice covered the western part of the hill to within at least thirty feet of the highest point. That it also covered the crest is very probable.

When one leaves the road and examines the weathered material on the surface, hidden, as it is, by vegetation, it is next to impossible to convince oneself, that there is any glacial debris on the knob, and during the earlier part of my investigation, before I had examined the exposures along the road, I held the same opinion as those who had earlier studied the ground.

On the highest point of the hill, the surface is strewn with large boulders of disintegration, and the ledges show no signs of glacial action. No evidence of glaciation could be found on that part of the hill which lies east of the summit, where there are no exposures, but in view of what was found along the road, where the opportunity for observation is good, there can

* Lewis, Second Geological Survey of Pennsylvania, Terminal Moraine, Z, pp. 75, 271. White, idem., Susquehanna and Wayne, G5, pp. 25, 159.

hardly be any doubt but that the whole knob was covered by the ice. The amount of material left by it was, however, small.

North of Dry Gap, as the col connecting the knob with the plateau is called, the characteristic topography of the terminal moraine is strongly developed. Fresh cuts along the recently constructed line of the Wilkesbarre and Eastern railroad give fine exposures of the glacial deposits. Since the data now at hand prove that the ice covered the knob, the connection between these two parts of the moraine is probably through Dry Gap,* but the typical morainic topography is not developed at that point.

Sugar Loaf and Ararat, in the northwestern part of the State, are 2475 and 2650 feet high,† respectively, and rise about 500 and 700 feet above the general level of the surrounding plateau. Both are thickly covered with underbrush and timber, and exposures are almost entirely wanting. On the north face of Sugar Loaf, glacial material was found along an old wood road, two-thirds of the way up (as far as the road extended). Above that height nothing definite could be made out for lack of exposures. The surface, however, was not radically unlike that of the lower part of the hill. The few rock ledges which occur do not bear striæ, nor have they *roche moutonnée* surfaces. However, ledges of sandstone so exposed to the weather could hardly be expected long to retain glacial markings.

On Ararat the facts are much the same. From want of opportunity for critical examination I was unable to prove that the ice covered the highest points, nor was I able to satisfy myself that it did not.

Although in the present state of things, it is impossible to obtain conclusive data, there are certain considerations which indicate that the excepted view is probably not the correct one. At the Delaware Water Gap, the ice filled the gorge and overrode, with very little deflection, the crest of Kittatinny mountain, which rises 1300 feet above the river and 600 to 700 feet above the general level of Kittatinny valley. If the ice was of sufficient thickness to accomplish this at points less than seven miles from its margin, it seems improbable that the ice-sheet was not thick enough to override hills such as Ararat and Sugar Loaf, which rise less than 700 feet above the surrounding plateau, and which are seventy miles north of the margin of the ice. There can be no doubt but that, were the crests of these hills cleared and excavations made, traces of glacial drift would be found here as at Pocono Knob.

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* This was suggested by Lewis in a supplementary note to his report (l. c., p. 271), although in the report he had mapped the moraine as extending around the eastern end of the knob.

† White, l. c., p. 17.