thick undergrowth on the back of the mountain, until the clearings on the lower slopes of the mountain near Kemmererville were reached.

Near Fox Gap, as already described, the main moraine crosses the Kittatinny Mountain, but another belt of morainic topography extends northeast from the Gap along the foot of the mountain for a distance of three miles, reaching to within about a mile of the Delaware. This morainic belt is in the nature of an interlobate moraine, formed between the lobes of ice which occupied this part of the Kittatinny Valley and valleys of Cherry Creek and Pocono Creek on the further side of Kittatinny Mountain. From the map it will be seen that the ice projected about six miles further southwest along the axis of Kittatinny Valley than it did upon the high ridges on either side.

The length of the moraine, as thus traced, is about twenty miles. Its elevation varies from something less than 300 feet where it crosses the Delaware River to something more than 1800 feet on the crest of Kittatinny Mountain. For about fourteen miles of the twenty, it crosses the rolling slate hills of Kittatinny Valley, a much dissected peneplane with a general elevation of from 600 to 700 feet, but trenching by narrow valleys sunk 200 to 350 feet below the older denudation surface. The vertical range of the moraine within the area described is over 1000 feet, and it ascends hills and descends valleys almost independently of the topography.

The breadth of the moraine belt varies from but little more than a quarter of a mile to a mile and a half. Between Martin's Creek and the Delaware River the average width is a little over one-half mile. From Ackermanville north to Kittatinny Mountain its breadth averages more than a mile.

The topography. The characteristic morainic topography is on the whole well developed and in general the morainic belt is strongly marked and sharply distinct. Locally, however, this is not the case. On the low ground near the Delaware the morainic topography is strongly marked along the inner margin, where knobs and short winding ridges, surrounding and more or less completely enclosing irregular shaped boulders, rise fifteen to twenty feet above their surroundings. Here the moraine rises 100 feet above the level of the Delaware gravel terraces to the north, but only twenty feet above the overwash valley-train to the southward and forms a predominant topographic feature when viewed from the north. Towards the outer margin the morainic topography is gradually lost as the moraine passes into the river deposits. A fine view of the morainic topography in the valley can be had from the Gravel Hill school-house, halfway up the slate hill to the north.

On the slope from the valley bottom to the general slate upland, the morainic topography is not strong, but it is again well marked upon the broad upland surface. Westward to Nazareth Junction it is in general easily recognizable even where the belt is narrowest. The knobs although not as large and massive are well marked and their association with shallow undrained depressions is typical.

West and northwest of Bangor as far as Fox Gap, the moraine is developed in great strength. The vertical relief is not infrequently thirty or forty or even sixty feet and the confused assemblage of conical hills, ridges, and hollows is finely shown. Large boulders are common upon the surface. Due west of Bangor the moraine is locally bordered by a small overwash plain. Viewed from this plain the outer margin of the moraine appears as a ridge rising abruptly forty to sixty feet above the plain level. The moraine is probably nowhere better developed; nowhere more massive, nor characterized by more sharply marked hummocks, ridges and kettles than here. It is the point and where it ascends the mountain face near Fox Gap. A fine view of the wooded knobs of the moraine, as it bounds around the end of Little Offset can be had from the slate hills north of East Bangor.

The material. In the Delaware Valley much of the material of the moraine is poorly assorted sand and gravel, but till is by no means absent. On the higher ground of the slate hills the moraine is composed almost