

## THE HYPSONETRIC MAP VERSUS THE PROJECTED PROFILE METHOD IN PROTRAYING AND DETERMINING EROSION SURFACES.

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In the past, two methods have been used to determine erosion levels, the hypsonetric and profile methods. The question arises as to which is the better. In the hypsonetric plan the erosion surfaces are determined by coloring in, on a topographic map, all the points at a definite elevation or approximately that. Various colors are used to differentiate the levels. The disadvantages of using the hypsonetric method are many. A peneplane or erosion surface is not a level one, but rolling, rising toward the divides and descending toward the streams and their outlets. Even in the penultimate stage of the cycle of erosion, a peneplane would vary considerably in elevation; in the case of the Schooley (Kittatinny) surface in eastern Pennsylvania, a difference of more than 300 feet. To attempt to color in an undulating, peneplaned surface, varying several hundred feet in elevation seems impossible. The danger lies in getting too many erosion surfaces. The point is, that one undulating, peneplaned surface might easily be misinterpreted as several.

In the determination of any peneplane surface it is necessary to consider the hardness of the rock, the composition of the rock, distance from major streams, width of rock outcrop, thickness of the formation and temporary base levels. These factors, even in the penultimate stage of the cycle of erosion, should be considered. Sloping surfaces on a peneplane do not show up on a hypsonetric map. Furthermore, it is very difficult, if not impossible, to picture in one's mind's eye the topography as colored in on a series of contour maps. Another serious objection to the hypsonetric map is that when it is completed, even though it covers a comparatively small area, it is too large to be published. When a considerable area is reduced to a size suitable for publication, much of the detail must necessarily be eliminated. It is difficult to gain a proper conception of a peneplane or erosion surface by means of a hypsonetric map.

One of the first to use projected profiles in determining erosion levels was Joseph Barrell<sup>1</sup>. More recently, Douglas Johnson of Columbia, Frank Wright of Dennison and the author have used projected profiles in connection with their work in the Appalachian region. In this method, the area to be projected is outlined on the topographic map. The topography is systematically projected onto cross-section paper with the aid of a T-square. Ordinarily the highest points in any belt of definite width are plotted and a line connecting them gives the profile. The narrower the belt projected, the more accurate the results and the broader the area projected the greater the amount of concealed lowland. Where one wishes to construct profiles of erosion surfaces it is more desirable to have a projection of the entire area than of a limited area, only that covered by the lines along which linear profiles are made.

The major disadvantage of the projected profile is that some of the lower points are concealed by the higher areas. But this can be eliminated to a large degree by projecting a narrower area. Upon the completion of the profiles on cross-section paper they can be transferred to heavy cardboard. It is then possible to cut them out and by means of supports they can be placed in the proper position to be photographed.

A modification of the projected profile method has been used by Miss Cornish<sup>2</sup>. The projected profiles were transferred to glass. The resulting transparencies were then assembled in exact register and viewed by transmitted light. This method provides a test by which it may be determined whether the hidden, lower elevations invalidate any determination based on results obtained by the regular projected profile method. The only difficulty here is that in case of a large number of profiles the result appears to be a confusion of intersecting lines, difficult to interpret. Furthermore, this method does not give perspective, the effect of depth as well as height and breadth. On the whole, the regular projected profile method, in the opinion of the writer, is superior to any yet devised to depict erosion surfaces.

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<sup>1</sup>Barrell, Joseph. "The Piedmont Terraces of the Northern Appalachians," *American Journal of Science*, 4th series, Vol. 49, 1920.

<sup>2</sup>*Journal of Geology*, Vol. 37, No. 2, p. 117.