

Figure 2.

with those conceived by Davis. The slope B,  $D_n$ ,  $C_n$  is a smooth, concave curve. The break of slope in the valley side occurs only at the junction between the cliff (Steilwand) and the uppermost segment of the denudational slope (Haldenhang), along the line  $C_5$ ,  $C_n$ , where there is a change in transportational process from free fall to creep, sliding and rainwash. The denudational slope below the cliff is a smooth curve, since a. the inclination of each segment of the denudational slope is determined by the mobile size of the debris, which shows a smooth gradation; b. as soon as the Haldenhang appears beneath the receding cliff, processes of denudation would operate to produce a gentler subjacent slope segment. In Fig. 2, on the other hand, a slope segment of gentler inclination than the Haldenhang is assumed to appear only after five units of time have elapsed. The Haldenhang is thus drawn as a straight line that meets lower and gentler slope segments, also represented as straight lines, at distinct breaks. This departure from logical rigor is inherent in the graphic method of analyzing continuous and simultaneous processes.

Davis's diagram further stresses the contrast between the Penckian and Davisian concepts of slope retreat by his presentation of their views on the development of the crests of the interfluves. According to Davis, the crests of the interfluves become broadly convex in the late stages of the cycle (Fig. 1). Penck, on the other hand, argued for the prevalence of concave slopes in waning development. But he did not conclude that the residual hill should be a sharp peak as Davis depicted it in his diagram. Penck recognized and attempted to explain the rounding of hill-tops independent of his premise on rates of uplift (6). Hence the difference in viewpoint between Penck and Davis regarding the curvature of interfluves in waning development narrows down to a difference in the length of the convex arcs when the valley slopes are seen in profile. Recent observations by King and Sharp suggest that Davis has exaggerated the length of the convex arc in a region of waning development (7).

The convolute prose of Penck's treatise, "Morphological Analysis of Land Forms," is well known. His arguments are not always complete and are invalid in places. Some of Penck's statements regarding slope development have been expanded and lucidly re-stated by J. E. Kesseli (8). A careful reading of Penck's works shows that his concept of slope retreat in waning development differs less from the view expressed by Davis than is sometimes supposed. Thus in a paper on "The Piedmont Benches of the Southern Black Forest," published posthumously in 1925, Penck (9) has a simple sketch (Fig. 3) that

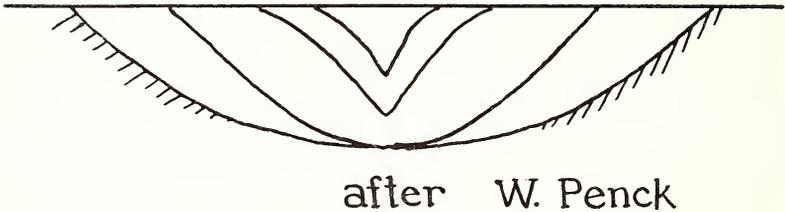


Fig. 3

illustrates the gradual flattening of a valley slope in the true Davisian manner. Davis, on his part, has modified his stand on slope flattening as a universal principle. He realized that the boulder-clad cliff or Felswand is a common slope element in arid regions, and admitted that such a cliff may undergo parallel retreat, in distinction to the basal slope which flattens (10).

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