

6. *Waterfalls.* — The facts reviewed show that *waterfalls* are often a consequence of the alternation of hard and soft strata in the course of flowing waters. The hard strata resist downward wear; the soft yield easily. Down the waters go, working with new force from the fall; hence they undermine the hard bed and thereby steepen the descent often to a vertical or even an overhanging front. The columns made by drops (page 178) partly illustrate the principle.

The waterfalls about the head waters of rivers in the mountains have a different origin; for the lofty precipices may be cut out of a single block of rock, as in the case of the central portion of Tahiti. These precipitous walls are a consequence of the prolonged erosion of a region until a larger part of the vertical descent of the stream is made at or near its head.

Waterfalls far down the courses of rivers, like that of Niagara, are looked upon as evidence of the recency of that part of the channel which contains the fall (Powell). But those about the source in the mountains may be, on the contrary, a final result after a long era of erosion; not the ultimate result, for the last end of the work would be the degradation and removal of the crested heights.

7. *Features of mountains; Forms made by water-sculpture.* — Elevations of all kinds have derived their existing features largely through water-sculpture. Tahiti was originally a lofty mountain, probably twice its present height, with low, nearly even, downward slopes in all directions, and only small unevennesses from the piling here and there of lavas through localized eruptions. It now is a mountain of peaks, crested ridges with lofty precipices, and vertical lines in all the features. But water has no need of a mountain mass to make the grandest of so-called mountains. It will work an elevated plateau, horizontal in surface, into mountain forms, and so make mountains without any upturning or uplifting except that of the plateau.

The chief part of the features produced come from the alternation of hard and soft strata among the stratified rocks; and these are greatly varied by the positions of the strata. The elements of this system of architecture are well illustrated in the figures on page 186 by Lesley, taken from his work on Coal and its Topography (1856), in which the author has given the results of extensive personal observation in the Appalachian region. The harder strata may be hard sandstone or limestone, and the softer, shale or crumbling sandstone. The first figure (165) illustrates the origin of a "table mountain" or "mesa" (Spanish for *table*), a hard layer making the top, and, by resisting wear, protecting the softer beds directly below it. The other figures illustrate other effects, under the same principle, in rocks having various positions. Figs. 166 to 172 are synclines, and 173 to 176, anticlines, of different forms, in three of which a valley has the place of the upward bend — a common fact in the Appalachian Mountains.

Monument Park in Colorado is a region of Tertiary sandstone carved into monumental forms by denuding processes, the winds having given finishing touches. As the view shows, the thin, harder layers in the sandstone make the caps and moldings of the monuments.