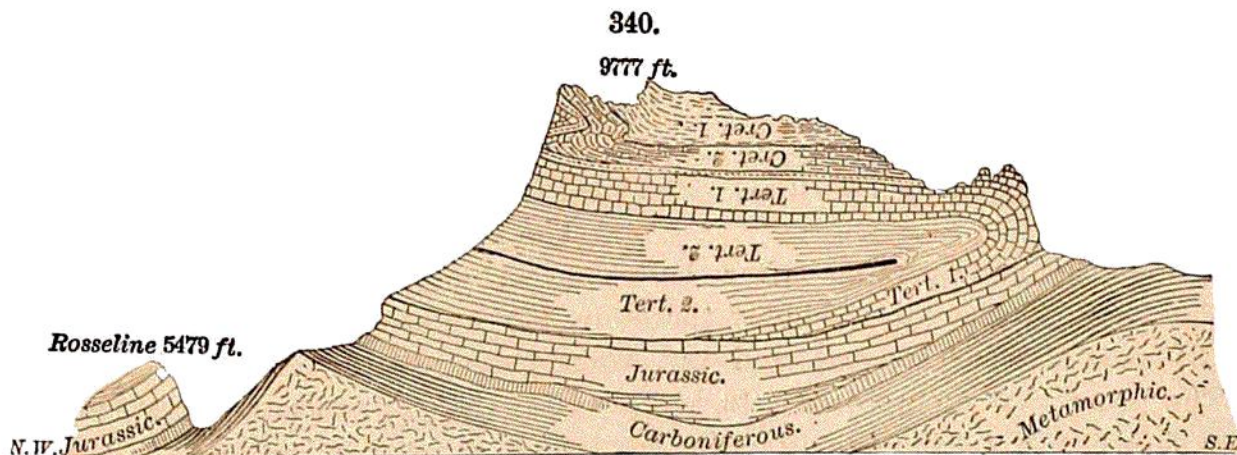


5. Foreign Examples of Tertiary Mountain-making.

1. *The Alps.* — Among foreign mountain regions those of the Jura Mountains and the Alps—the two combined in system—have been most carefully studied. The former are much like the Appalachians in flexures, as first pointed out by H. D. Rogers. The Alps have far greater complexity. The able work of Heim on mountain-making, based on his study of the Tœdi-Windgällen group, gives a full exhibition of the structure in that part of the Alps, and lays down many principles in orography. The section on page 102, showing overturn folds, is reduced from one of Heim's sections. One of the overthrust folds in the region has put the beds upside down over an area of 450 square miles. 50,000 feet of formations of the Jurassic, Cretaceous, Eocene Tertiary and Miocene Tertiary, were upturned at the close of the Miocene period.

Another remarkable section of overturn flexures in the Alps, worked out by Renevier, is represented in Fig. 340. The Dent de Morcles stands between



Profile of the Dent de Morcles. Tert. 1, Nummulitic Eocene Tertiary; Tert. 2, Upper Eocene Tertiary, called the Flysch; Cret. 1, the Neocomian or Lower Cretaceous; Cret. 2, the Urgonian, a higher division of the Lower Cretaceous. Scale, 1:100,000 for height and length. Renevier.

Martigny and Bex on the east side of the Rhone. Cretaceous and Tertiary strata, making the top of the mountain, here lie upside down on Tertiary and older formations. One of the Tertiary formations, the Upper, is folded over on itself. The overturn is indicated in the figure by the lettering. The Cretaceous strata below the plane of the overturn are absent; but above it there are two strata of the Lower Cretaceous. It is probable that Jurassic beds once made the top, and have been removed by denudation.

As stated above, the Jura Mountains, northwest of the Alps, are part of the Alps mountain system. The following section (Fig. 341) illustrates the fact that the flexures are overthrust in a northwest direction, like that in the Dent de Moreles, as if the thrust-force came from the southeastward. This direction is not, like that in the case of the Appalachians, *from* the ocean, but *toward* it.

The thickening or the expanding of the beds in the summit of a steep