

## MOUNTAIN-MAKING IN NORTH AMERICA.

The various steps in the making of the Appalachian Mountain Range, or Synclinorium, and the events of the prolonged catastrophe, have been reviewed at length on pages 353-357. It is there stated that general quiet prevailed over the continent throughout the Paleozoic eras, with the exception of the interval of Taconic upturning, and those gentle oscillations of level in the earth's crust that seem to have been always in progress. The extent and steps of progress in the geanticline of deposition, which began in the early Cambrian, has also been explained, and particulars mentioned as to its variations in eastern and western limits, as shown by the limits of the several formations; and its inequalities in rate of subsidence over its different parts and in successive periods, as indicated (1) by the varying thickness of the formations from nothing to thousands of feet, and also (2) in the varying kinds of rocks from shales to conglomerates and limestones.

The review of the facts relating to the history of the successive formations from the Cambrian onward has given greater definiteness and reality to the events. Moreover, it has derived new illustrations of the changes from the remains which the rocks contain of the life of the world. The varying conditions of the preparatory geosyncline during its progress have thus become strongly apparent; and they will be much more so when the limits of the successive formations, now so well understood over New York, shall have been as thoroughly investigated by the paleontologist and geologist over Pennsylvania, the Virginias, and beyond.

The general facts connected with the upturning of strata, 30,000 to 40,000 feet thick, which the geosyncline at the end contained, have also been reviewed; and an account given of the flexures of the beds in many long lines, and the general parallelism of the flexures, but with interruptions and overlappings, and of upthrust faults of 10,000 feet and more. Mention has also been made of curves in the course of the finished mountain range; one bending from north-by-east in the northern or Catskill portion to east-northeast in Pennsylvania, the whole nearly parallel with the eastern and southern outline of the nucleal Archæan mass; the other, from Pennsylvania to Alabama and Mississippi, and becoming at the south nearly parallel with the Mexican Gulf.

The courses and character of the flexures in the nearly east-and-west portion of the range in Pennsylvania are well shown on Lesley's topographic map of the state, although greatly disguised in consequence of the denudation that has taken place since the time of mountain-making. A copy of the map (Fig. 1153) is here introduced, exhibiting the courses of the multitudes of ridges, and their bends and terminations either side of the channel of the Susquehanna River. The map is here reduced to too small a scale to show all the minor flexures, and a diagram is added (Fig. 1154) giving in simple lines the courses, positions, and bends of the various ridges over the center of the state.