

northern limit of South Carolina. The ranges are from 10 miles in length to about 350 miles; and their general course is closely parallel to that of the Appalachian Mountains, even to its westward bend in Pennsylvania. They overlie Archæan or Cambro-Silurian rocks. The Connecticut River Range is 120 miles long; and the "Palisade Range," extending from southern New York, on the Hudson, into Virginia, is 350 miles long. See, further, the account of the American Triassic under Historical Geology. The rocks are solely Triassic in age. The depth of the rocks of the ranges varies from 3000 to possibly 8000 feet. Facts prove that they were laid down in each case in an independent, gradually deepening geosyncline.

The strata, through the whole 1000 miles, are alike in their essentially fresh-water or brackish-water formation; in the granitoid origin of the sandstones and shales, as well as in their general system of structure.

The dip of the beds is, with rare exceptions, monoclinical, and mostly between  $5^{\circ}$  and  $25^{\circ}$  in angle. In the Connecticut Valley, it is  $5^{\circ}$  to  $25^{\circ}$  eastward. In the Palisade belt, about the same westward. In two North Carolina belts, the eastern has eastward dip, and the western, westward. Flexures are local, and of rare occurrence. The only marked one that has been reported is a large syncline in the short Richmond basin.

The rocks are much faulted. But this is not evident in large visible displacements along fractures, but in the striated or scratched surfaces over large areas, which indicate the slipping of bed on bed, and along the surfaces of the numerous small fractures; sometimes all sides of blocks, even when they are no larger than the hand, are striated.

All the Triassic areas have their lines of trap-dikes; and the association of the igneous rocks with the stratified is so intimate and so extended that the two must have had in some way a common history. The ejection of some of the trap, moreover, preceded the later depositions of sandstone. The trap-ridges, which consist of a large trap-mass, generally 200 to 300 feet thick, underlaid, and partly overlaid, by sandstone, have usually a bold palisade-like front (page 804), of which the "Palisades" on the Hudson are an example, and the name *Palisade System* is, therefore, an appropriate name for the system of ranges.

The facts indicate (1) a general unanimity of movement in a series of geosynclines or troughs that were wholly separated from one another in their rock-making; and (2) a disturbance that resulted almost everywhere in monoclinical uplifts of low angle, and was accompanied in most parts, now and then, or at the close, with fissure-ejections. There is hence a combination in the Palisade System of eight or ten *individual* mountain ranges. In the nearly total absence of flexures, the ranges differ from the Appalachian Range, while like it in the preparatory geosyncline of deposition and in the occurrence of great faults.

The Sierra Nevada Range is supposed to have been made at the close of the Jurassic, or a period later.