

# Late Triassic tectonic history of northeastern United States

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## Abstract

The Upper Triassic rocks of the New York-New Jersey-Pennsylvania and Connecticut Valley belts, generally considered to be deposits of isolated basins, are inferred to represent remnants of the filling of an elongate rift valley that was 50 to 70 mi wide. In addition, the stratigraphic thickness of the Triassic rocks is held to be approximately 30,000 ft. If these 2 conclusions are correct, then Late Triassic tectonic history is considerably more complex than previously thought and can be subdivided into 4 episodes. Episode 1: Initial graben subsidence without folds; deposition of 30,000 ft of nonmarine sediments; extrusive and intrusive igneous activity. Episode 2: Longitudinal crustal arching in center of initial graben; uplift, inversion of topography, and reversal of drainage; erosion; central parts of pre-Triassic graben floor ultimately elevated more than 30,000 ft; no igneous activity or transverse folds. Episode 3: Second-generation graben subsidence, development of transverse folds NE. of Hunterdon Plateau, New Jersey, with maximum structural relief exceeding 30,000 ft; no igneous activity. Episode 4: Offsetting of transverse folds by faults, some with strike-slip displacement of up to 12 mi; development of longitudinal Valley-and-Ridge type folds SW. of Hunterdon Plateau during strike-slip faulting; injection of porphyritic dolerite dikes into faults; formation of mineral deposits along faults. Extensive erosion took place after episode 4 until the transgressive Coastal Plain marine overlap in the Late Cretaceous, which buried some Triassic rocks. The Triassic structures are inferred to have involved the entire thickness of the crust and to have been controlled by subcrustal processes, the Triassic rocks themselves merely reacting passively. If the magnitude and complexity of Triassic tectonic history advocated here are correct, then the following regional geologic implications are also suggested: 1) Much of the high structural position and uncovering of Precambrian basement rocks in the medial Appalachians took place in the Late Triassic. 2) Large Triassic faults probably extend well beyond the limits of Triassic outcrop belts, as, for example, along the straight western boundary of the Taconic allochthon in the Hudson Valley. 3) The southward disappearance of the Taconic allochthon in the Hudson Valley may be due to uplift on the Late Triassic transverse Danbury anticline and subsequent erosion. 4) Many rocks now at the surface have been deeply buried. 5) Triassic igneous rocks were emplaced at different ages which bracket the tectonic episodes. If different radiometric ages could be detected between syndepositional and late postdepositional igneous rocks, then some estimate might be made of the time required for deformation. 6) Some Appalachian drainage may have originated on the flanks of the Late Triassic longitudinal crustal arch.

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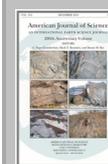
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