GENERAL GEOLOGY OF THE TRIASSIC ROCKS OF CENTRAL AND SOUTHERN CONNECTICUT

by

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The Triassic rocks of the Connecticut Valley fill a large half-graben in the states of Connecticut and Massachusetts; their present outcrop area is 167 kilometers (103 miles) in length and 33 kilometers (21 miles) in greatest width. They are a typical member of a series of such half-graben fillings exposed from Nova Scotia to the Carolinas and, along with the larger Newark basin, the best known.

The thick Triassic deposits of eastern North America were specifically cited by Dana when he first coined the word "geosynclinal" and were taken by Kay as types of the taphrogeosyncline. In all the half-grabens, one border is a fault that was active during deposition, and the deposits next it include fanglomerate derived from highlands that lay beyond it. Nevertheless most of the strata dip toward that border, although near it at least they must originally have sloped away. In the Connecticut Valley, the active border fault was along the east side; the western border is also a fault for at least half its extent, but there is no evidence that that fault was active during deposition. Neither apparently were the faults in western Connecticut that downdrop the Triassic outliers in the Pomperaug River and Cherry Brook valleys; doubtless these outliers were originally part of the Connecticut Valley Triassic basin, since isolated by erosion. Additional faults cut and offset the strata in the main basin, but again the faults we see at the surface do not appear to have affected deposition.

Because of the fairly regular east dip, calculation of the total thickness of the Triassic strata in Connecticut would seem to be a simple matter, requiring only estimates of the throws of the faults within the basin; such a calculation gives a thickness of nearly 5 km (3 miles), and if the materials in the basin were mostly derived from the erosion of uplifted highlands of crystalline rock just east of the border fault, the total displacement on that fault could be twice that much. The situation along the eastern border fault turns out not to be that simple, however; first in Massachusetts (and Pennsylvania) and now in Connecticut, evidence has accumulated that with time the sediments lapped over the border fault and the active fault itself shifted eastward (in Pennsylvania northwestward), so that blocks between earlier and later active faults received only the upper part of the sedimentary sequence. In other words, the bottom of the basin probably does not slope regularly eastward; its actual slope can presumably be worked out by detailed mapping or by geophysics.

The Triassic deposits in all the half-grabens are dominated by red beds, ranging from fanglomerate through arkosic and micaceous sandstone to red siltstone and silty shale. Subordinate sedimentary rock types include pale sandstone and conglomerate, gray argillite and shale, local limestone, and coal. All the sediments are continental; the coarser and redder deposits are fluvial, the darker finer ones lacustrine or paludal.

The mineralogy of these deposits is turning out to be very complex, commonly involving zeolites and related minerals that suggest a considerable alteration bordering on metamorphism.

Interlayered with the sedimentary strata of the northern basins are mappable units of basaltic lava — three in the Connecticut Valley and New Jersey, fewer in Nova Scotia and Pennsylvania. In several areas, these units are demonstrably compound, consisting of several individual flows, with or without intervening sediments. Intrusive masses of similar chemistry, mainly saucer-shaped sills within the Triassic strata, dikes in the underlying and surrounding rocks, are known from Nova Scotia to Georgia and Alabama.

Defining the middle one by the lava units, Krynine divided the Connecticut Triassic into three formations; since then, the three lava units and the two groups of sedimentary strata between have each been mapped as a formation. The intrusives have also been divided into two groups: a possibly older group forming the sills and probably contemporaneous with the lava flows, and a possibly younger group including the dikes. The present stratigraphic scheme is as follows:

Newark Group

Intrusive	Extrusive	Sedimentary
Buttress Dolerite		
		Portland Formation
	Hampden Basalt	
		East Berlin Formation
West Rock Dolerite?	Holyoke Basalt	Meriden Formation
		Shuttle Meadow Formation
	Talcott Basalt	
		New Haven Formation

Fossils are not abundant in the Triassic, but they are not completely lacking. Most abundant and conspicuous are tracks of dinosaurs and other reptiles. Other fossils include the dinosaurs themselves, amphibians, fish, estherian crustaceans, fresh-water molluscs, and petrified wood and other plant remains. Judging by these fossils, the age of the Newark Group is Late Triassic, either in the earlier part or extending through most of that epoch; the dikes may well be younger. Radiometrically, the age has generally been given as 195 ±5 m.y., and this date has served indeed as a tie point for some recent time scales. Apparently, however, the number is too low, because of alteration of the dated basalt and related rocks; the true age is probably nearer 225 m.y.