1-1-1968

Bedrock Geology of Western Connecticut

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by

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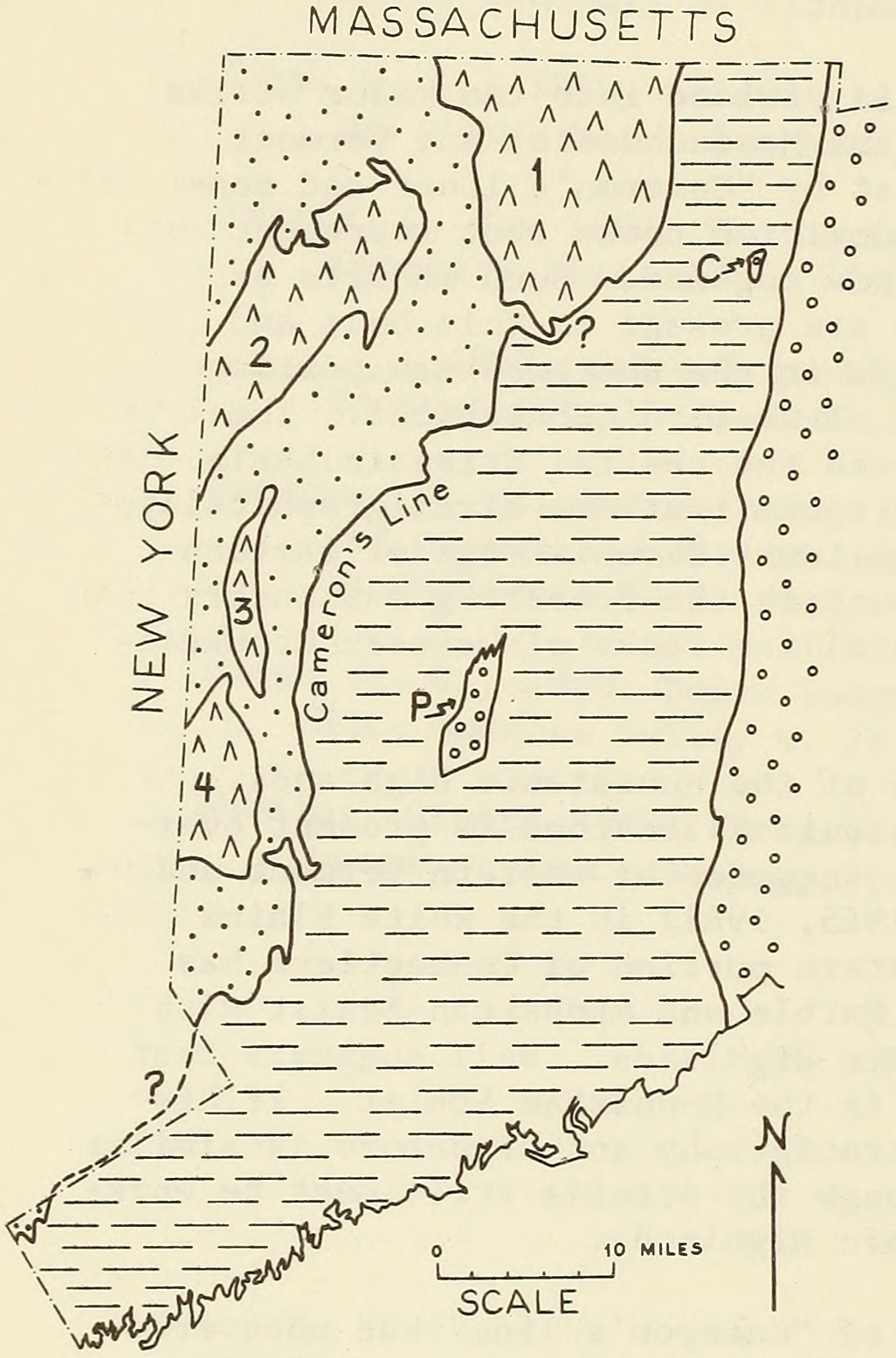
Geologically western Connecticut is divided into two major strike belts which extend northward into western Massachusetts and Vermont. The western belt is bordered on the east by "Cameron's line" and consists of metamorphosed Cambrian and Ordovician rocks that represent the miogeosynclinal facies of western New England. Such massifs as the Housatonic and Berkshire Highlands are present in this belt and represent, along with the Fordham Gneiss in the southwestern portion of the state, the Precambrian basement of western Connecticut. The eastern belt between "Cameron's line" and the central Triassic basin of Connecticut contains eugeosynclinal rocks that are stratigraphically equivalent to rocks of Cambrian through Lower Devonian age of eastern Vermont. Rocks of Triassic age are found in the Pomperaug and Cherry Brook valleys and also border the crystalline rocks of western Connecticut on the east.

In the miogeosynclinal belt north of the Housatonic Highlands, Zen (1966, 1967) has shown that the Taconic allochthon is present overlying the characteristic autochthonous sequence of western Vermont and Massachusetts. Recent work by Hall (1965, 1968) in the White Plains area just west of the extreme southwestern portion of Connecticut has correlated subdivisions of the Inwood Marble and Manhattan Schist with the stratigraphy north of the Housatonic Highlands. Hall suggests that the Taconic allochthon may be present in the Manhattan Schist. If his interpretation is correct, then the stratigraphy and structure is similar through the miogeosynclinal belt although the details still must be worked out between the Hudson and Housatonic Highlands.

Detailed mapping since 1956 east of "Cameron's line" has uncovered a variety of major structures whose configuration and sequential history is best understood, at present, along the eastern portion of the eugeosynclinal belt where elliptical domes expose several regionally persistant formations (for example, The Straits Schist). The studies of Crowley (1968) and Dieterich (1968, Trip D-2) in south-central Connecticut, Gates and Martin (1967, Trip D-5) in central Connecticut and Stanley (1964, Trip D-4) in north-central Connecticut, suggest that The Straits Schist and the Collinsville Formation outline a series of east-facing,, stacked nappes which have been redeformed by the upward movement of the lighter, metavolcanic core in the lowest nappe. This configuration is further complicated by post-metamorphic, high angle faults which are known to be of Upper Triassic age where they border the arkose and basalt in the Pomeraug and Cherry Brook valleys and along the eastern border of the crystalline rocks of western Connecticut.



EXPLANATION

Upper Triassic
P = Pomeraug C = Cherry Brook

Miogeosynclinal facies
Cambrian through
Middle Ordovician

Eugeosynclinal facies
Cambrian through
L. Devonian

Precambrian of the
1 Berkshire Highlands
2 Housatonic Highlands
3 New Milford Highlands
4 Hudson Highlands

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Figure 1. Geologic map of western Connecticut.

The origin and significance of "Cameron's line" is unknown, although it has been recognized for some time (Agar, 1927, and Cameron, 1951) as a convenient boundary separating the miogeosyncline facies and the eugeosynclinal facies. Clarke (1958) interpreted "Cameron's line" in the Danbury and Bethel quadrangles as a thrust along which the Manhattan was displaced eastward over the Hartland. Gates and Christensen (1965) in the West Torrington quadrangle showed that some of their units of the Hartland were truncated by Cameron's line and thus support a fault interpretation. Rodgers (1965) suggests that the line may represent a zone of intense downward movement that may have once contained the Taconic slate and, hence, may be the root zone for the allochthon. Whatever interpretation one may favor, "Cameron's line" is a fundamentally important feature of western Connecticut and its significance presents one of the more important problems to be solved in the future.

The post-Precambrian geological history of western Connecticut begins with deposition during the Cambrian and the Lower Ordovician of quartz sandstones, dolostones and limestones in the miogeosyncline west of Cameron's line and shales, graywackes and volcanics in the eugeosyncline to the east. The unconformity at the base of the Walloomsac Formation in northwestern Connecticut (Zen, 1966,1967) and the Manhattan Schist in the Manhattan Prong (Hall, 1965, 1968) indicates that the miogeosyncline was structurally active during the Middle Ordovician How far this activity extended eastward into the eugeosyncline is uncertain as convincing evidence for the Middle Ordovician unconformity has not been discovered as yet. The Taconic Orogeny, which is well documented in western New England, certainly affected the eugeosyncline in western Connecticut, but the unconformity that separates the Cambrian - Ordovician rocks from the Silurian - Devonian rocks in Massachusetts, Vermont and New Hampshire has not been demonstrated to date.

In western Connecticut the most intense deformation and metamorphism occurred during the Acadian Orogeny, when the lower and middle Paleozoic rocks were deformed into regionally persistent folds and nappes which, in places, were redeformed into domes. Metamorphism attained the sillimanite and kyanite zones over much of the area except in the southeastern part of western Connecticut where the garnet and biotite zones are present.

The structural history of the area closes with high-angle faulting in the Upper Triassic and broad uplift during the remaining portion of Mesozoic and, possibly, Cenozoic time.

The field trips are designed to sample the diverse geology of western Connecticut. Trip D-6 in the southwesternmost portion of Connecticut will study both the miogeosynclinal and eugeosynclinal sequence adjacent to "Cameron's line", whereas all the other trips will concentrate on the eastern portion of the eugeosynclinal belt. Trip D-1, will cover the progressive metamorphism in the southeastern

part of western Connecticut where rocks of the Wepawaug Schist, supposedly the youngest metasedimentary unit in western Connecticut, are found in a complexly deformed north-plunging synform. Trips D-4 and D-5 will cover the Collinsville, Bristol, and Waterbury domes and include parts of the folds west of the domes. Trip D-2 will cover the area to the south along the strike of the gneiss domes where similar rocks are involved in several generations of folds.

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