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TRIP F

STRUCTURAL GEOLOGY, BEAVERTAIL, CONANICUT ISLAND

William M. Chapple, Brown University

Introduction

Well-developed shoreline exposures of the Pennsylvanian Rhode Island Formation exhibit a variety of structural features and provide an opportunity for studying the relations between different types of structures. Schistosity and stretched pebbles in the Rhode Island Formation were developed before the forceful intrusion of the Narragansett Pier Granite (Nichols, 1956, GQ 91), so that evidence of two periods of deformation is to be expected. Bedding and schistosity dip to the east over the whole of Conanicut Island, and it is probable that the island is located on the west limb of a major syncline (Nichols, 1956).

Itinerary

Miles

0.0 East end of Jamestown Bridge. Turn left on Beach Ave. (just beyond the Jamestown Shores Motel). Go past Nautilus St. and turn left on Spindrift St. Proceed to the foot of the hill and turn left; park under bridge.

STOP 1 - Schistose conglomerate and sandstone; garnet-staurolite schist. Bedding and schistosity are roughly parallel, and both dip 35° eastward. Conglomerate pebbles show flattening in the plane of the schistosity with the long axis of the pebbles parallel to the strike of the beds. Flattened cross-beds in some of the sandy layers make an angle of 5° with the bedding; this amount of flattening is roughly consistent with the stretching of the pebbles. Just north of the bridge a one inch thick quartz vein which cuts across the bedding is both folded and boudinaged. The folding and the boudinage are both consistent with the orientation of the flattening of the conglomerate beds, although the amount of shortening indicated by the folding is much less than that indicated by the flattening of the pebbles. Return to Rt. 138 and turn left.

0.7 Junction: turn left.

Miles

- 2.8 Flashing red light; church on left, Post Office on right. Proceed straight ahead.
- 3.4 Spit connecting Beaver Neck with Conanicut Island.
- 3.8 Turn right; sign to Ft. Getty. Follow road to pier, turn left, and park.
- 4.7 STOP 2 - Schistose conglomerate and sandstone.
Bedding and bedding schistosity are gently folded and crumpled. A few sharper folds show an axial plane cleavage, which is due to sharp flexing and some offsetting of the bedding schistosity. Farther to the southwest along the shore two styles of folding are present. (1) Sharp chevron and "half-chevron" folds with wave lengths ranging from less than an inch to a couple of feet depending on the thickness of the layers involved. These folds have approximately horizontal axes which trend N 70° W. (2) Isoclinal folds with rounded crests which plunge gently to the N 50° E. Smooth bending of bedding laminae in the competent members and an "anti-fanning" pattern of the cleavage in the incompetent beds outside fold crests indicates that these folds are of flexural origin. Return to Beavertail Road.
- 5.6 Beavertail Road; turn right.
- 8.2 Beavertail Lighthouse.

STOP 3 - Fine-grained garnetiferous phyllite with some thin quartzite beds. Cleavage in the phyllite is due to alignment of platy minerals and elongation of quartz grains. Sandstone beds are folded and some are boudinaged and brecciated. A normal fault striking N 70° E and dipping 60° to the northwest passes under the bronze plaque. Half a mile north the fault offsets a minette dike; the offset and vertical slickensides indicate vertical movement of about 30 feet (Nichols, 1956). Return northward on Beavertail Road.

- 8.6 Microwave tower: turn left, park, and walk to shoreline outcrops.

STOP 4 - Fine-grained phyllite with thin quartzite beds. Well-developed "kink bands" which offset the schistosity are present. Folds of quartzite layers in the phyllite illustrate the relationship of the cleavage to the folding.

REFERENCE

Nichols, D. R., 1956, Bedrock geology of the Narragansett Pier quadrangle, R. I.: U. S. Geological Survey, Geol. Quad. Map GQ-91.