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Polymetamorphism in the Richmond Area, Vermont

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POLYMETAMORPHISM IN THE RICHMOND AREA, VERMONT

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SUMMARY

Rocks in the Richmond Area, Vermont consist mainly of wackes and phyllites with minor slates, quartzites, and amphibolites. These lithologies are divided into the Richmond Pond Phyllite and the Huckelberry Hill Wacke of the Pinnacle Formation, the Verdis Montis Amphibolite, and the Preston Pond Phyllite and the Duck Brook Wacke of the Underhill Formation. These units are correlated with the previously undivided Pinnacle and Underhill Formations in adjacent areas.

Graded bedding was used to indicate the way up in the section, which was preserved, along with evidence of six deformations. The sequence of deformations, as deduced by comparing the offsetting relationships of structures in single outcrops containing more than one structure, indicates that the area was folded, refolded, cleaved, the cleavage folded, kinked, and jointed, in order of decreasing relative age. The outcrop pattern is primarily second fold generation. The regional schistosity and the cleavage are the most commonly recognized structures. The folding of the cleavage and the kinking were minor events which were recorded only in the western part of the area, an area in which some of the joint planes are filled with basic igneous dikes. The first folding is believed to be Taconian, the second Acadian, and the kinking related to the Hinesburg thrust to the west of the area.

Recrystallization was associated with periods of folding and cleavage formation. The rocks were metamorphosed at the greenschist facies level each time, with the formation of biotite associated with the second period of folding being the highest level attained. A correlation of structure and metamorphism is combined to produce a tectonic sequence of deformational events for the Richmond area.

The purpose of this trip is to examine polymetamorphic assemblages in the Huckelberry Hill Wacke. Since many of the relationships between structure and metamorphism can be seen in hand specimens of this unit, it is suitable for field analysis. The wacke is dark green or drak gray in color depending upon whether pyrite + magnetite or magnetite along is present as an accessory phase. This difference governed the mineral assemblages associated with the fourth and final recrystallization. The three earlier recrystallizations, however, appear to have produced similar mineral assemblages throughout this unit.