

PALINSPASTIC ANALYSIS OF WEST-CENTRAL NEW ENGLAND *

Stanley, Rolfe S., Department of Geology, University of Vermont, Burlington, VT 05405, U.S. Geological Survey, Reston, VA 22092

Ratcliffe, Nicholas M., U.S. Geological Survey, Reston, VA 22092

A new cross section extending from Albany, N.Y., east to the Bronson Hill anticlinorium in central Massachusetts, derived from a new tectonic map of western New England, has been retrodeformed to produce palinspastic sections that depict the space-time evolution of the Taconic orogeny. Predeformational distances are determined from structural overlap of lithotectonic units, from palinspastic restoration of Taconic allochthons to their continental margin setting, and from removal of structural shortening due to folding. Important results of this analysis are: 1) Approximately 1,000 km of shortening took place during the emplacement of the Taconic allochthons as compressional thrust slices, and during imbrication of Proterozoic Y basement during the latter stages of compression. One third of this value is attributed to multiple generations of folding and cleavage development. 2) The bulk of the structure in pre-Silurian rocks is Taconian. 3) Eugeoclinal rocks above the Whitcomb-Summit thrust zone overrode the root zone of the Taconic allochthons and other major faults in Vermont, resulting in a cryptic suture zone. The complex fault history did not follow a simple east-to-west accretionary sequence. 4) The clastic Taconic allochthon is not a preassembled composite allochthon but was emplaced onto the autochthon during several stages of overthrusting. 5) Taconic medium-high-pressure metamorphic rocks in northern Vermont were transported westward on reactivated surfaces (the Whitcomb-Summit thrust) and remetamorphosed during later Taconic dynamothermal events that transgressed toward the craton with time. 6) The anticlinorial form of the Green Mountain massif and the Middlebury synclinorium to the west may result from fault-end folding on deeply rooted thrusts that formed late in the sequence.

*Published with Abstracts to National Geological Society of America Meeting, GSA Abstracts for the 95th Annual Meeting, New Orleans, 1983.

A PRELIMINARY MODEL OF CHANGING RIVERINE LANDFORMS IN ONE SEGMENT OF THE LOWER MISSISQUOI RIVER VALLEY

Thomas, Peter A., Department of Anthropology, University of Vermont, Burlington, VT 05405

Parker, Ronald, Department of Geology, University of Vermont, Burlington, VT 05405

As part of an archaeological site evaluation program conducted in 1982 along the Missisquoi River in Highgate, Vermont, eleven backhoe trenches were excavated across portions of three flood plains and a higher alluvial terrace to test for deeply buried cultural remains and to describe the underlying stratigraphy. Three structurally and texturally different alluvial sequences have been identified. Definition

of these sequences is based on 2.5-4m stratigraphic profiles and C^{14} dates derived primarily from logs buried in near-bank deposits, in conjunction with temporally diagnostic cultural artifacts and dated features near the surface. Each sequence is topographically and temporally distinct. The oldest sequence is associated with an 8090 ± 100 B.P. date; the middle sequence is partially defined by log samples dating to 6400 ± 70 B.P., 5650 ± 80 B.P., and 5370 ± 70 B.P.; what is probably a younger sequence is undated, but is partially defined temporarily by cultural debris dating to approximately 70 B.P. in the top foot of the profile.

A preliminary model of flood plain genesis hypothesizes that flood plains in this portion of the Missisquoi Valley have resulted from lateral channel migration and overbank accretion. Chute cutoffs and heavy bank slumpage have modified these landforms in some instances. Positive correlations between dated episodes of flood plain accretion and relative stability and variations in regional temperature and precipitation patterns in the past suggest that climatological factors have been prime determinants in flood plain genesis since roughly 8500 B.P. after the rate of isostatic rebound slowed. Comparisons of the preliminary Missisquoi data with the results of more rigorous studies of alluvial sequences from some valleys in the midwest and Tennessee suggest that broad periods of flood plain development and stability can be recognized on a pan-regional scale.

INTERIM REPORT ON THE ON-SITE WASTEWATER RENOVATION PROJECT
White, Christopher M., White Geohydrology, Inc, 52 Seymour St.,
Middlebury, VT 05753
Tarbox, David L., David L. Tarbox and Associates,
52 Seymour St., Middlebury, VT 05753

The purpose of the On-Site Wastewater Renovation Project is to study the renovation capacity of three different designs of leach fields: traditional, mound and wedge. Monitoring arrays installed during the summer and fall of 1982, generally follow a pattern of dosing tank, bed monitor(s), suction lysimeter(s), gypsum blocks, near-field monitors, down-gradient monitors and, if applicable, break-out monitors or stream monitoring sites.

Monitor installation and subsequent hydrologic study have indicated very low mound build-up in the innovative, non-traditional sites. This may be due to low loading, higher-than-expected permeability values or high rates of evapotranspiration. Even in the traditional systems, multi-level monitoring was deemed impractical because of the relatively thin saturated thicknesses and heterogeneous material.

Preliminary chemical sampling has revealed several important trends. In general, a large proportion of phosphorus is removed or complexed in leach field clogging mats. Although no minimum contaminant levels (MCL) have been set for phosphorus, 0.010 mg/l levels can reportedly cause eutrophication. The systems are generally unable to remove phosphorus to this level. Nitrogen sampling generally indicates a low redox condition in the dosing tank. As higher redox levels are met in the beds and the unsaturated zone, nitrification occurs.

