BURIED, ANOMALOUSLY DEEP V-SHAPED VALLEY IN BEDROCK SURFACE, NEW HAVEN HARBOR, CONNECTICUT

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In the subbottom beneath the shallow water of the inner part of New Haven Harbor, CT (Fig. 1), continuous seismic-reflection profiles (made in 1964 and 1965 along track lines shown in Fig. 2) demonstrate that West, Quinnipiac, and Farm River valleys

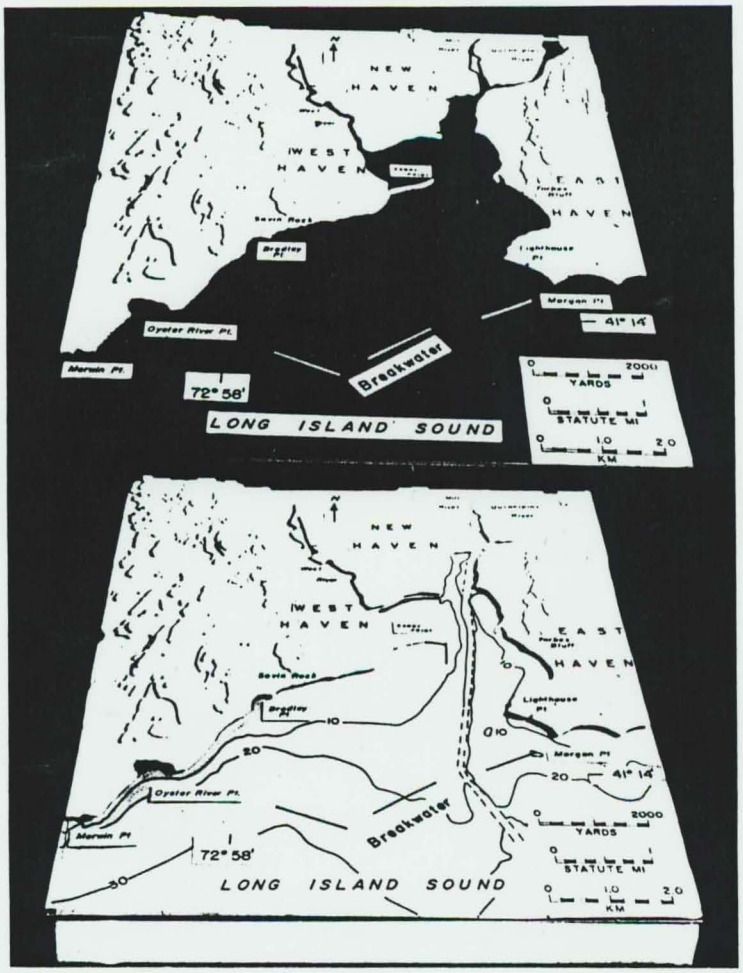

Figure 1. Views looking northward- and down on New Haven harbor three-dimensional model built by Topofoam, Inc., New York City. Vertical exaggeration = 4X.

Upper view: land and water surface only. Land configurations shown by 50-ft steps, with first 50 feet arbitrarily shown at the shoreline.

Lower view: Land- and bathymetric contours showing water depths (from U. S. Geological Survey 7 1/2-minute topographic quadrangles maps of New Haven and Woodmont). (J. E. Sanders, 1981, fig. 19.13, p. 487-487.)

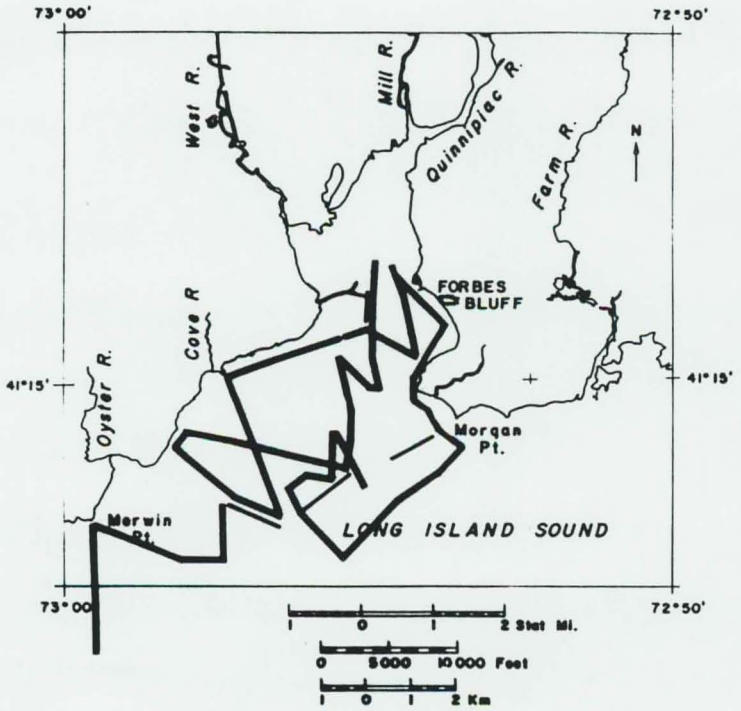

Figure 2. Index map of New Haven harbor, CT showing track lines followed in continuous seismic-reflection surveys.

extend seaward as deep sediment-filled V-shaped, bedrock-walled valleys. In the inner harbor, these three buried valleys coalesce to form a single linear buried valley, here named the West Haven buried valley (Fig. 3). This valley is about 2 km wide and its narrow talweg lies as much as 260 m below sea level (Fig. 4). It extends WSW from Savin Rock, West Haven, at least to Charles Island, off Milford, a distance of 13 km. The West Haven buried valley, projects not only to the WSW but also to the north beneath West Haven. Existing borings are not deep enough to reach bedrock and thus to define its course inland (Fig. 5).

The outwash plains of the West, Quinnipiac, and Farm River valleys (Fig. 6) coalesce to form a single smooth-topped body of sediment that is overlain by the shallow water of Long Island Sound (depths 1 to 10 m; See lower part of Fig. 1.). Borings indicate that in the outer parts of the harbor, the top 35 m of valley-fill sediments consist of Pleistocene sand, mostly outwash, whereas in the inner harbor, a narrow elongate lens of organic silt up to 13 m thick is present. Where the thickness of this organic silt exceeds 6 m, no sub-bottom acoustic reflections were recorded.

I infer that the buried bedrock valleys follow faults of Late Triassic- to Middle Jurassic ages. I infer that the West Haven buried valley follows a major fault postdepositional fault of mid-Jurassic age whose displacement may include several kilometers of left-lateral strike-slip movement. The major basin-marginal fault along the E side of the Hartford basin

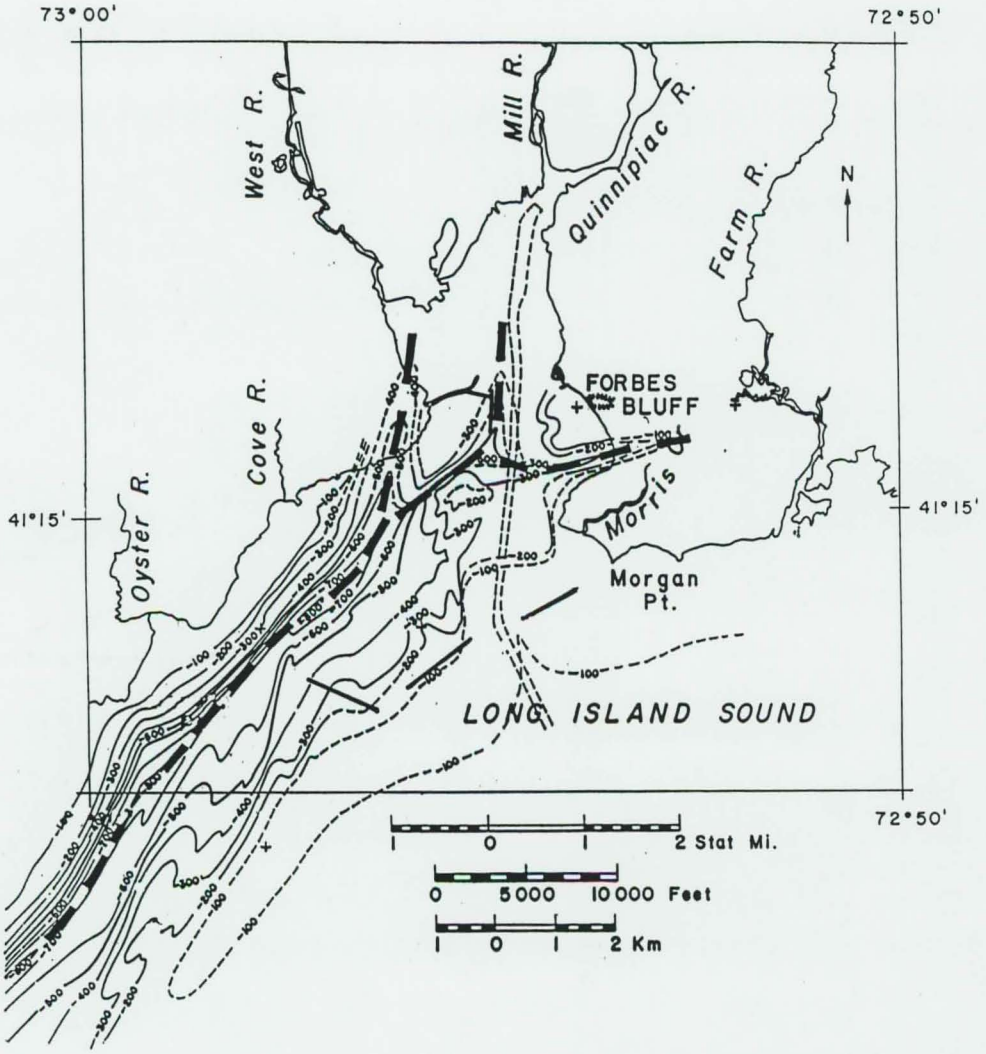

Figure 3. Contour map of buried bedrock surface, New Haven harbor and vicinity, CT. Contour interval, 100 ft. Based on data from continuous seismic-reflection profiles. Datum, mean high water.

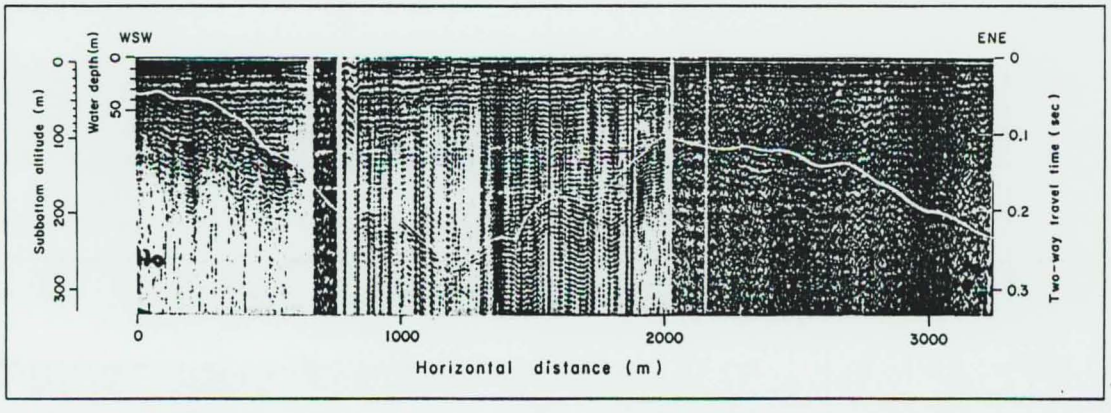

Figure 4. Continuous seismic-reflection profile from air-gun sound source shows deep V-shaped transverse profile of buried West Haven valley. White line shows inferred top of bedrock.

Figure 5. View of three-dimensional model of New Haven harbor, CT, as in Fig. 1, but showing configuration of buried valleys. Valley shown as ending at entrance of Quinnipiac River is arbitrary. This valley doubtless continues farther northward, but no seismic reflections were recorded in this area because of the thick organic silt. (J. E. Sanders, 1981, fig. 19.13, p. 487.)

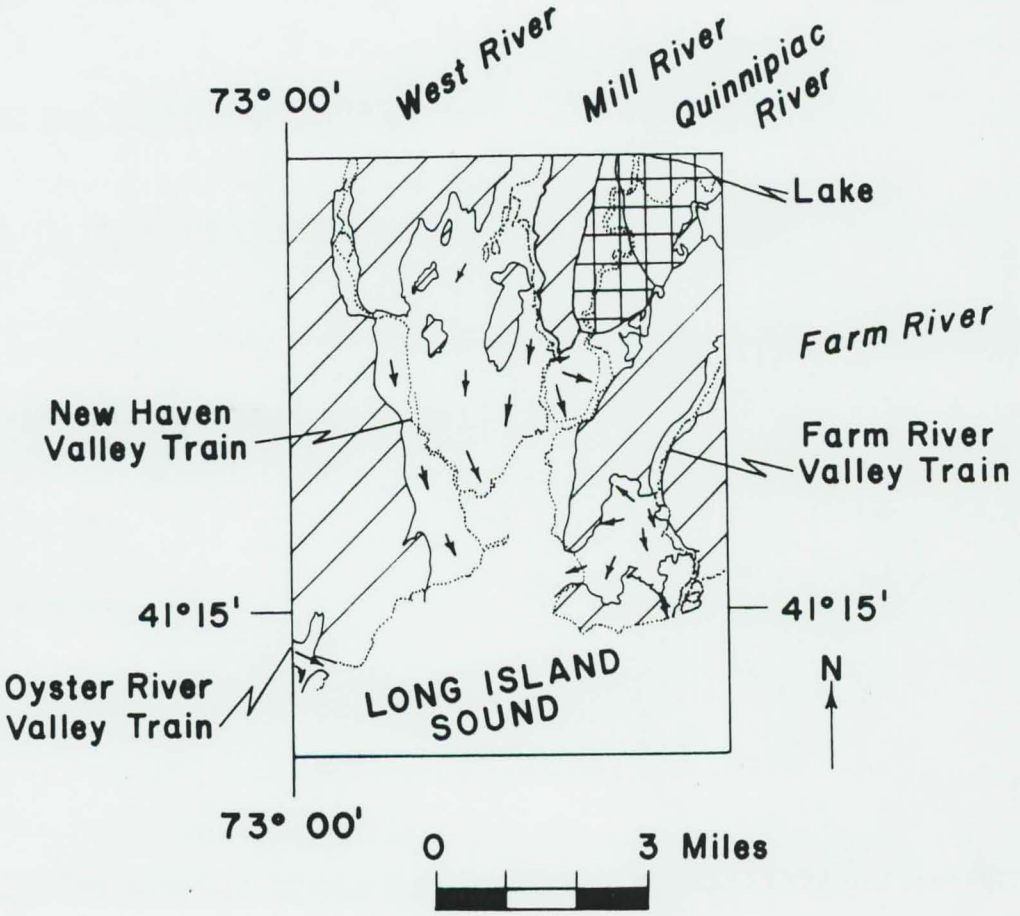

Figure 6. Outwash trains and modern rivers in New Haven and vicinity. (R. F. Flint, 1965).

strikes into the harbor at Morris Cove S of Forbes Bluff. A geophysical profile made to cross this fault shows a valley having a thalweg depth of only about 150 m subbottom (Fig. 7).

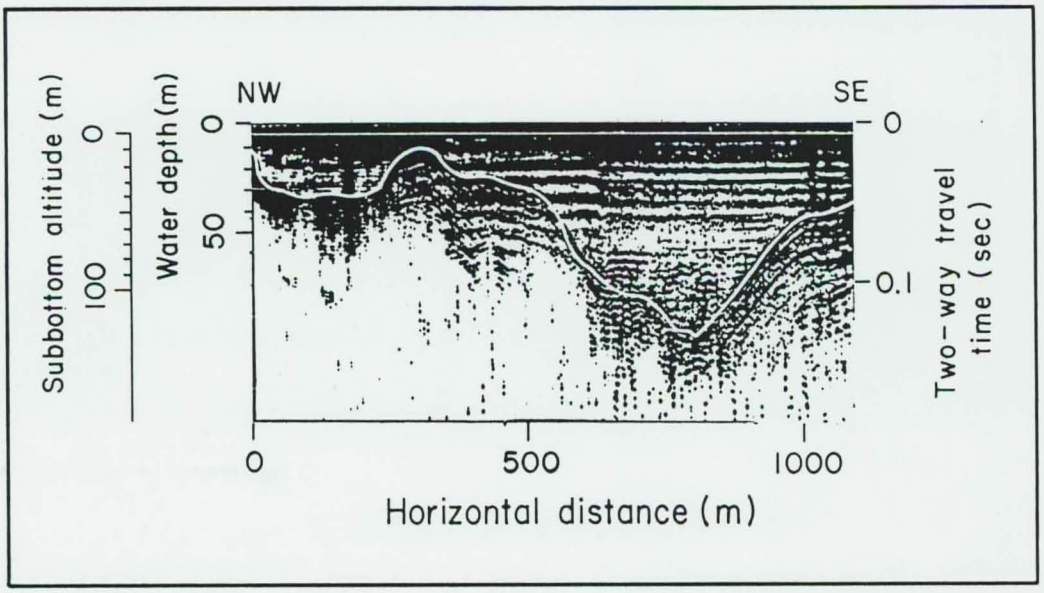

Figure 7. Continuous seismic-reflection profile using a sparker source along a track offshore from Morris Cove. The V-shaped valley coincides with offshore projection of basin-marginal fault. White line marks inferred top of bedrock surface.

Although the valleys were undoubtedly modified during the Pleistocene Epoch, their distinct V-shaped transverse profiles and the great subbottom depths of their thalwegs indicate that they are probably of pre-glacial fluvial origin. Based on comparison with subsurface results showing pre-Cretaceous relief beneath Cape Cod and local seismic indications that the lower parts of the fill consist of semi-consolidated sediments, I infer that these valleys were first eroded prior to Late Cretaceous time and that the West Haven buried valley disappears to the SW by passing beneath the Upper Cretaceous strata underlying western Long Island Sound and Long Island itself.

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