

Banningwood Preserve's Geological History Tied To Recent Earthquakes In Eastern Connecticut

By Ralph Lewis

The trails of the Banningwood Preserve offer a wonderful chance to enjoy the woodlands, meadows and streams that have developed on the variable topography of this beautiful setting in Hadlyme.

The shape of the bedrock surface controls much of the upland topography covered by the northern portion of the Banningwood's red trail loop. The "ups" encountered along the trail represent the noses of small north-south trending ridges, and the "downs" are formed by intervening valleys that drain southward to Roaring Brook.

Roaring Brook follows a valley that has formed along the east-west "Honey Hill Fault," which marks the bedrock juncture of the remnants of the Iapetos Ocean (to the north) and an ancient island arc called Avalonia (to the south).

The story behind this combination of oceanic affinity rocks and Avalonian bedrock began about 500 million years ago.

At that time, Avalonia was an island archipelago in the middle of the Iapetos Ocean, which predated the Atlantic Ocean.

The Iapetos Ocean was bordered on the east by Africa and on the west by North

America, and these two huge land masses were gradually converging.

Between about 460 and 270 million years ago, remnants of ocean bottom sediments of the Iapetos Ocean and the Avalonian island arc were crushed between Africa and North America when they collided and formed the supercontinent of Pangea.

This continental collision is when the Taconic, Acadian and Appalachian Mountains were formed. The compression of bedrock creating the mountains heated it, making it pliable and susceptible to folding. As the Appalachian Mountains were forming (310-270 million years ago), east-west compression rumbled the bedrock of New England into a series of north-south folds.

As a result, the topography of New England now resembles a corrugated roof. Most hills were aligned north-south, separated by north-south valleys.

Then as Africa began to separate from North America about 225 million years ago, the compression associated with the formation of Pangea was replaced by tension as the Atlantic Ocean began to form.

The bedrock was relatively cool so it tended to break rather than stretch like taffy.

Faulting and fracturing of the bedrock occurred along pre-existing weakness zones. Stream erosion and glaciers over the intervening 200 million years enhanced the north-south grain of the New England landscape.

Locally, this north-south grain is broken by the east-west influence of the Iapetos-Avalonian contact along the Honey Hill Fault, which creates the valley through which Roaring Brook runs down to Whalebone Cove.

The Honey Hill Fault runs east to about the current location of the Mohegan Sun Casino, and then runs north roughly along what today is I-395. It is along this north-south portion of the fault in the Plainfield area where a dozen or more earthquakes shook up local residents in early January.

At least four glaciers are known to have overridden Connecticut. As the last of these glaciers melted, it left two types of deposits.

In upland areas, deposits melted directly from the ice, which is not a good sorting agent, so these "till" deposits are a mixture of all the material the glacier was carrying; boulders down to fine clay all mixed up.

The upland portion of Banningwood's red trail traverses an upland glacial setting: thin till soils, vernal pools, bedrock outcrops, and boulders that glaciers "plucked" from the south sides of the bedrock hills.

The southern half of the red trail loop and the yellow trail traverse a different type of glacial deposit left by water issuing from the melting glacier. Since the meltwater was an effective sorting agent, large boulders were left behind and very fine sediment was washed away. This left layered sands and gravels to fill the valley.

The gently rolling, glacial topography surrounding Roaring Brook is often called "eggs in a basket." Blocks of ice that fell off the glacial front were surrounded by meltwater deposits and subsequently melted forming "kettle holes" that help form this topography. In contrast to the upland till setting, there are no bedrock outcrops or large boulders visible along the southern red and yellow trails.



Retired State Geologist Ralph Lewis of Hadlyme shows where superheated bedrock was folded like bread dough 300 million years ago when the African continent collided with North America in what is now Banningwood Preserve . Photo by Humphrey Tyler