

## Hollis Rocks! - Part 2

A textbook example of granite intruding into faults of impacted, deformed layers of Massabesic gneiss is seen in cross-section in the walls of rock cut to form the junction of 101A with Route 101 at the Milford - Amherst line. The rock morphology is especially striking when the stone is wet, after a rain. Anyone who never thought of rock as plastic will feel otherwise after pausing to study this location.

One road in Hollis, Federal Hill Road, traverses bedrock representing three sources of rock found in New England. Starting from its east end, south of Silver Lake, you and the lake are on North African Muscovite schist until you pass Wood Lane and the geologic fault which constitutes the west side of the lake. There, the road begins to climb the bedrock formed by an intrusion of Permian granite, and the land is wooded in beech, hemlock, the ground covered by ferns and mountain laurel, until the terrain levels out and opens up to meadowland when you return to a band of North African schist, and return to ash, apple orchard, meadow grass and white pines, over the bedrock which extends northward under Woodmont Orchard, east of Plain Road. Traveling on, the terrain and vegetation reverts back to hemlock, laurel, moss and ferns as you re-enter a world of New England native granite bedrock. As you continue driving north past the intersection with Hayden Road, the road ascends past laurel, blueberry bogs and spruce tangles until you reach an outcropping of granite on the north side of the road and cross a contact fault and the dividing line which represents the western side of the line of tectonic plate fusion between Avalon and Africa. This line extends to the southwest, under Rocky Pond and east of Birch Hill, until it hits Old Milford Road in Brookline.

You're in the little pocket of what I call Celtic Hollis, the part of town over bedrock called Massabesic gneiss, which underlies much of Amherst and Brookline, a chunk of the Avalon tectonic plate which became Newfoundland and the northern British Isles. It's about 5% of the town by area, includes the highest point in Hollis, Birch Hill, but less than 1% of the population of Hollis lives here. You can take an easy afternoon hike up the trail to the top of Birch Hill and enjoy the best view there is to be had of Hollis from Hollis, better than that from the top of Woodmont Orchard, though it's only clear to the south and east. You'll note that the stone outcrops along the trail look unlike the bedrock you see anywhere else in Hollis. From the top, on a clear day with binoculars, you can see people playing golf way across town on the other side of the Nashua River, banging golf balls around the Overlook Golf Course. Geologically you're in Northern Ireland, watching your neighbors playing golf in western Morocco. Who said Hollis was a small town?

Ash, shagbark hickory, white oak, apple trees and meadow grass appear along the roadside as you descend and cross the Milford line. Fine views to the west of the Wapack range are seen. You've entered Massabesic gneiss country, old sea bed sediments, the bedrock of old Avalon. When you get to the west end of Federal Hill Road and a popular restaurant, you're more than "A Mile Away". Geologically, you're a continent away, the home of the original Berkshire Hills. The Alpaca grazing the slopes of Grandview Farm across the road are no less exotic than the bedrock beneath you. In terms of continental origin, you've driven from North Africa to New England, back to North Africa, back again to New England and wound up in the British Isles, all along a single road within the town limits of little old Hollis, NH. Most whole states in this country have less geologic variety than you can find driving around your hometown.

You can experience bedrock zone transitions without changes in elevation when you drive across north Hollis. Starting off on Fletcher Lane from South Merrimack Road, you're in granite country until after it meets Witches Spring Road, where you enter the "Savannah of North Hollis", hay and grazing meadows over the sandy soils of a band of north African white and Muscovite rusty schist bedrock and the Pennichuck aquifer, until it abruptly ends east of the junction of Witches Spring Road and Route 122, where you're in flea market country, back over native granite bedrock and among gregarious Yankee entrepreneurs. Come to think of it, granite is a fair representation of Yankee character - a blend of homegrown magma mixed with what it absorbed from the rocks through which it worked its way to the surface, matured by time and weathered by local conditions.

Truell Road runs parallel to and south of Witches Spring, and two transitions are seen driving up it from Route 122. You start over rusty schist bedrock among maples and white pine and climb until the woods lighten up, the roadside turns to sand, and you're over the yellow African schist, with grasslands bordered by ash, sumac and yellow birch. Farther up, dark woods close in, hemlock, red oak and mountain laurel appear and you're on Permian granite the rest of the way up, on the granite spine under Woodmont Orchard. Each family of rock weathers and is organically modified to form soils of characteristic pH and mineral profile, lending a recognizable look to the terrain and natural vegetation, and directs the agricultural uses to which man may put the land. To a significant degree it determines the wildflowers, birds, fish and game to be found. In general, heights of land are free of glacial overburden and are covered by vegetation more reflecting the underlying bedrock than the cover found in hollows, valleys and plains, whose soil may be derived from layers of rock aggregate hundreds of feet thick which glaciers and meltwater carried there, and thousands of years of erosion have been depositing ever since. Haul in enough topsoil, water and fertilizer and you can golf in the desert. The use to which land is put may be because of or, despite, the qualities of its soil and bedrock. You can smother the richest bottomland loam in Hillsboro county with acres of Arabian asphalt to build a parking lot around a shopping mall, and grow a hundred times more dollars an acre merchandising than farming - in the right location.

Reflecting the extent of subduction of the north African plate under the north American plate, there's a "surprise" island of north African rusty schist bedrock which emerges in southwest Mason, NH, extending into Massachusetts under Townsend, eight miles west of where it disappears in Hollis. Driving down Rt. 31 south from Greenville, NH, through Mason, then Rt. 123 to West Townsend, MA, is like driving from Montreal to Marrakesh. It's like leaving a picnic in Quebec waving at blackflies with Canadians talking hockey to go shopping for rugs in the Casbah in the dusty hubbub of a Moroccan bazaar. Drive this route with an eye on the terrain and land uses and you'll see what I mean.

If you never took geology in college, but wish you had, buy a little book called The Map that Changed the World, written by Simon Winchester, published in 2001 by Harper-Collins. It's the story of the life and times of William Smith, a grade school educated surveyor who systematically collected, analyzed and categorized rock samples for thirty years while working and traveling about the British Isles building canals and surveying coal mines. With incredible intellectual stamina and a deductive genius uncluttered by religious or classical education, he was the first to realize that rock is the product of both organic and physical processes over time. He devised a comprehensive, accurate geologic map of England, the first bedrock map ever produced on this scale, and one which compares favorably in accuracy and sophistication to anything produced since. In his writings and his descriptions explaining his map, though never accepted as a member of the aristocratic scientific community of his time, he single-handedly created the science of geology, delineated its basic principles and established much of its terminology still used today. Described in this book is a rock he found in the north of Ireland and Scotland which also happens to constitute a part of our local New Hampshire bedrock. This fact may intrigue local residents of Celtic descent who, for reasons they cannot explain, feel more at home in Brookline than in Hollis.

Jim Canfield, June 2003