

## The Walpole Landscape

We can trace the geologic history of Walpole back to the beginning of the Paleozoic Era, over 600 million years ago, when after a long period of erosion a shallow sea spread over eastern Massachusetts. There may be hidden remnants yet to be discovered of the metamorphic rocks from that era when sand and clay were deposited in that ancient sea. These would be the oldest rocks in Walpole.

The granitic rocks of Walpole were formed under the surface as a molten mass that destroyed most of the older rocks. Dedham Grandodiorite and Newburyport Quartz Diorite were intruded about 550 million years ago. Somewhat later Noon Hill Diorite and Sharon Syenite were formed. After a long interval of erosion, there was volcanic activity north of Walpole. Although there is no evidence of such activity in Walpole, the rocks of the Blue Hills were injected as a batholith during this time.

Faults appeared in eastern Massachusetts in the late Paleozoic, and the crustal adjustments that followed created the Boston and Narragansett Basins. The Norfolk Basin of Norfolk and Walpole is a northern extension of the Narragansett, and into this trough were deposited gravel, sand and clay during the Carboniferous Period, c. 300 million years ago. The large rocks in the mix tell us that they were carried to the trough by short rivers with steep gradients, and so there were high mountains to the west of Walpole at that time. These deposits became the Pondville Conglomerate. This terrain had been reduced by erosion by the time the red sand and mud of the Wamsatta Formation were deposited in the Norfolk Basin.

The great earth stresses of the late Paleozoic which resulted in the upheaval of the Appalachian Mountains created the faults, folds and shear zones in the rocks of Walpole. Geologists think that the Walpole area has been subject to almost continuous erosion, with no significant crustal activity, since the Carboniferous orogeny over 200 million years ago.

By the Tertiary Period, the Walpole landscape had been reduced to sea level. The Neponset and Charles Rivers flowed across a gently rolling landscape filled with sediment and thick soils that supported a dense forest of conifers. That landscape is today buried by the glacial deposits of the Pleistocene Period.

The Pleistocene (Ice Age) began about one million years ago. For reasons still not understood, the climate of North America grew colder. Great snowfields in Canada turned to ice, and its weight forced the ice to flow south to New England. The continental ice sheet was miles thick; its leading edge was splintered and dirty with debris. Fresh snowfalls masked the deep crevasses of its surface. As it crept southward, the ice bulldozed rocks, soils, and forest before it. There were intervals of warming, but the ice sheet advanced four times over New England.

It was after the climate had warmed again and the ice had melted back, about 12,000 years ago, when Walpole's landscape began to look as it does now. Meltwaters flowed in great torrents, carrying sand and gravel which were deposited in huge, quiet lakes. The great pile of debris known as the terminal moraine had been pushed and deposited far south of Walpole in what is now Rhode Island, and what ocean currents would eventually shape into Cape Cod and the offshore Islands. Walpole was buried by glacial drift: an uneven blanket of sand, gravel, and boulders which almost covered the ancient bedrock surface underneath.

The evidence of glacial deposition is everywhere. The gravel pit off West Street, and Powderhouse Hill which once stood where Swan Pond Village is today, were probably kame

terraces formed at the edge of the retreating ice by streams pouring off the melting surface. The esker opposite the intersection of Stone and Washington Streets (now reshaped into Allen Dike) was a serpentine ridge of unstratified sand and gravel deposited by a stream in a cavern beneath the ice. Remains of another one may be seen behind the high school in the Town Forest. The "swell and swale" terrain south of New Pond and in Walpole Heights is the result of deposits settling around chunks of ice. Even the course of the Neponset River and its tributary brooks and ponds are the result of glacial deposition.

The rivers had to find new routes to the sea and begin the cycle of erosion anew. A glacial lake would fill until it overflowed the barriers which impounded it. Water would flow around an esker or over a rock outcrop and fill another low place. That depression would fill, and its waters flow into still another low place, and so on until the water drained to the sea. In this manner, the Neponset River system was again established. A main channel became evident, and the Neponset began again eroding away the land. Many barriers remain in its path; today the river has almost filled Cedar Swamp with sediment, and is converting ponds into swamps.

Along its main course through Walpole, the Neponset falls 170 feet. Entering South Walpole at an elevation of 234 feet, the river falls to 180 feet at Cedar Swamp, 140 feet at the West Street crossing, 100 feet at the Bird site in East Walpole, and crosses into Norwood at sixty-four feet. At several sites the river must tumble over obstacles and at these falls and rapids were located the early manufacturing enterprises that required year-round falling water to operate waterwheels. Entrepreneurs improved upon these sites by constructing dams and impounding ponds, but these works of man are but temporary impediments to the more efficient drainage of the land. It will require countless millennia for the river to achieve a mature stage of development; at that time the waterfalls will have been eroded away, the ponds and swamps filled and drained, and the landscape leveled once again.

The Ice Age ended 10,000 years ago. The geologic epoch we live in today is called the Holocene, a time of great changes in New England's climate and landscape. As the ice wasted away and before the glacial tundra was established, a thin layer of windblown silt covered the bleak landscape. This silt, and the peat that accumulated on the bottom of glacial lakes comprise the occasional patches of loam found in Walpole. As the climate warmed, the frozen soil thawed, and a forest of spruce and white pine replaced the tundra. By 7000 years ago, the hardwoods including chestnuts and hickories, and especially the oaks became dominant species. At the edge of the bogs, the Atlantic White Cedars (*Lat. *chamaecyparis thyoides**) thrived and grew to great size because the wetlands precluded systematic burning by the Indians.

The Walpole landscape today is a well-watered, forest-covered, temperate environment for humankind. It has been dramatically altered, however. The aborigines cut selected tree species in the forest and burned the undergrowth, resulting in a park-like open woodland, but they used only renewable resources for their subsistence. The European colonizers came to exploit the stands of cedar and other timber. For those who came to farm, the prospects were never bright. The legacy of the glacial invasion was all too evident to the farmer who had to cope with sandy, stony soils often strewn with boulders that were useful only for stone fences. Today the "best" soils for agriculture are long gone because those areas were also best for house construction. Bog iron ore was used in local furnaces quite extensively in the 19<sup>th</sup> century, requiring the stripping of wetland soils and the harvest of trees for charcoal fuel. Mining sand and gravel leveled the high ground and residential construction filled the low places. The landscape has been flattened and the environment domesticated.

Great wealth has been generated by the entrepreneurs who found Walpole's resources ideal. The river was a source of power; there were building materials and a dependable water supply. Walpole is close to the sea and the markets of the world. Merchantmen were anxious to invest their capital, and it was profitable to bring raw materials to Walpole for manufacture.

Manufacturing is less important today, but the landscape of Walpole has become valuable for residences. Green, well-watered, protected from floods by acres of wetlands, and without extremes of climate and terrain, Walpole is a good place to live.

This essay was excerpted from the *Atlas of Walpole* by Charles W. Hardy and Robert Coviello, (Walpole School Department, 1975). The complete work is available at the Walpole Public Library (REF 912.744 A). Revised by Charles W. Hardy in 2007.

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