HOW IT ALL GOT HERE: THE GEOLOGY OF VERMONT’S STONE INDUSTRIES

The complexity of Vermont’s geological landscape can be traced back to tectonic events that began over 650 million years ago, when proto-North America, then a part of a much larger supercontinent, began to split apart from what is today the African continent. The rift basin that formed eventually spread into a sea floor, creating the Iapetus Ocean. Over the next 100 million years, as the oceanic crust on the proto-North American plate collided with another oceanic plate, a volcanic arc developed, called the Taconic island arc. This volcanic activity is likely what formed the granite deposits that we see present-day in northeastern Vermont (“Geologic Units”). As subduction continued and the Iapetus Ocean narrowed, sediments scraped from the downgoing crust built up into an accretionary wedge.

When the Taconic island arc finally collided with the continental crust of North America’s east coast, a collision occurred, forming the Taconic orogeny, the accretionary sediment that ranged from sandstone to deep-water shale folded over itself in a complex geometry that formed the mineral belts we see today (Isachsen 17). This process resulted in what is referred to as the Champlain Thrust. As layers of tiny clay particles and shale were thrust over shallower sedimentary layers, these slices were metamorphosed over time, resulting in the marble deposits (metamorphosed limestone) of the Champlain Valley and the slate (metamorphosed shale) of the Taconic Mountains. Metamorphism of the sedimentary formations may have occurred over several different time periods, as the Taconic Orogeny was just one of three orogenic cycles that formed the whole of the Appalachian range as we know it today. With each tectonic event, the subduction and orogenic processes increased temperatures and pressure and prompted parts of the rock formation to undergo metamorphosis—resulting in the region’s famous marble and slate deposits, which can be found today primarily in the western part of the state (Conrad & Vanacek). Present-day marble belts line the Champlain and Vermont valleys, most likely because glaciers preferentially eroded the marble deposits due to marble’s softness compared to the quartzite of the Green Mountains. Likewise, the Taconic Mountains have significantly less dramatic elevations than the rest of the Green Mountains, since slate is more easily eroded than harder, more intensively metamorphosed shale.

WHERE IT ALL WENT: VERMONT’S STONE QUARRIES & TRANSPORTATION TECHNOLOGY

Marble was the first of Vermont’s stone industries to get off the ground. Though the earliest quarries date back to the 18th century, it wasn’t until the 1800s that the marble industry picked up speed. Dr. Eben Judd first discovered marble deposits in Middlebury in 1802, and he subsequently pioneered a modern quarrying and finishing process andwhat he called the region’s first marble mill (Swift 335). His business, whose quality was said to rival that of Italy, was transported over land and water to Montreal, Boston, New York, and as far south as Georgia (Swit 336). Yet by the 1830s, the Rutland area overtook Middlebury as the center of Vermont’s marble industry, in large part because of the Champlain Canal, which opened in 1823 and connected Lake Champlain directly to the Hudson via Whitehall—nearly as far as from Rutland as it was from Middlebury. A symbol of wealth and elegance, Vermont marble in particular had a particular cultural cachet and was used nationwide in tombs, fireplaces, flooring, and for construction purposes. The slate industry was limited by geological formations to the area between the Poultney and the Metawee Rivers in southwestern Vermont, in towns like Fair Haven, Poultney, and Castleton (Hamblett 102). Unlike marble, slate was not typically used for beautification; rather, its uses were much more banal, from roofing to chalkboards. While Vermont’s slate was of higher quality than many other slate slabs, it was not as highly sought after as marble was during the industry’s peak. The granite industry, too, takes a back seat in scope and in fame to marble, yet much like marble, it was the industry on which an entire town relied—in granite’s case, Barre, Vermont.

When the railroad came to Vermont in 1849, it ushered in a new era of growth for the stone industries. Water transport on Lake Champlain and via the canal could not compare to the ease of shipping that the railroad offered. Greg Pahl writes of the significance of railroad technology, “Railroads not only brought improved transportation to Vermont, they also helped stimulate the national economy, which in turn whetted an appetite for impressive new business structures, many of which were built in stone” (28). It would be almost impossible to overestimate the role the railroads played in Vermont’s stone industries, offering as they did the ability to transport quantities of stone with which horsepower could not compete.