

Local Geology and the Early Development of Pittsburgh

The rocks in the Pittsburgh area consist of Pennsylvanian age sandstones, shales, coals, and limestones. These rocks supplied the early residents of Pittsburgh with valuable natural resources.

Building Stone

As shown on Elias Meyer's map (Figure 9), as early as 1761 there was in the local area: a stone quarry below what is now Arlington Avenue on the South Side and a stone quarry at the foot of Grant's Hill in the area that is now near the Civic Arena (Center right, Figure 10). These quarries were in the Pennsylvanian Morgantown sandstone. This sandstone, and one in the underlying Glenshaw Formation, are the most common units to be quarried for building stone in the area.

Coal

In Pittsburgh, coal outcropping along Saw Mill Run (the Pittsburgh Coal seam) on the south side of Coal Hill (now Mt. Washington) was noted in 1759 and mining began by 1761. The first note of mining is shown on Elias Meyer's 1761 map (Figure 9). This first mine is called Ward's Pit for Major Edward Ward who opened it. It was first worked by British troops to obtain fuel for Fort Pitt. The mine overlooked the Fort, being located on the north side of Mt. Washington, just across from the Point (Wagner and others, 1970).

By 1790, numerous mines had been opened in the Pittsburgh seam. A brewery at the Point was supplied by coal from Schenley Heights as early as 1795. In addition coal was now being produced along Mt. Washington in the vicinity of McCardle Roadway and the Liberty Tunnel north portal. Coal from Ward's pit also supplied coal for the first glass factories in Pittsburgh in 1797.

In 1814, Pittsburgh became a coal exporter when the first shipments were made from Coal Hill to Louisville, KY. By 1816, coal was being shipped regularly by steamboat (Wagner and others, 1970).

Groundwater

According to Cowin (1985), "Early residents could obtain abundant water from wells sunk fifty to seventy feet deep into the [glacial] gravels [at the point]. At this depth, the water was sufficiently filtered by passing through beds of sand and gravel." At the Point, just 54 feet beneath the ground surface is the Wisconsin glacial sediments commonly referred to as "the Fourth River." As pointed out by Harper (1997), there is actually no 'underground river,' but, instead, the water simply flows through pore spaces between the grains of sand and gravel. The groundwater contains less suspended matter, bacterial contaminants and industrial wastes than surface water, all of which are in whole

or part removed during movement through near-surface alluvium during recharge (Wagner and others, 1970). The water in the aquifer comes from the rivers as well as precipitation. The water in this aquifer is 55°F year-round (Cowin, 1985). Today, many of the buildings in the city of Pittsburgh get water from deep wells sunk into these gravels, and use it for circulation in air-conditioning systems. The water from the glacial gravels is also used to supply the fountain at Point State Park.

Sand and Gravel

From as high as 300 feet on the high river terraces above the Allegheny River, to as low as 130 feet below water level, pebbles of granite, diorite, and other igneous rocks from Canada, and deep-red Medina sandstone from New York, are found among sand, silt, and clay (Kussart, 1938). These pebbles, or gravel, were once large rocks and boulders plucked by glaciers traveling south from Canada. Each of the Ice Age glacial advances transported the foreign rocks and boulders, grinding them down through sheer weight and distance into the rounded pebbles that we know as gravel. Much of the gravel was further worn down into sand. Unlike the sand found in the Monongahela, which is derived from sedimentary rocks, the sand of the Allegheny and Ohio valleys comes from the igneous rocks to the north and is, therefore, hard, sharp, and clean. These qualities make it an historically valued resource by the building industry. See also <http://watershedatlas.org/rc/dredging.html>.

During the first three or four decades of the nineteenth century, in seasons of low water, people would go into the riverbed, especially the Allegheny, to collect the large round cobbles to pave their streets and wharves. By 1850, the stones had become scarce enough that transporting them locally from upriver became a viable business. During low water, large flatboats were pulled upriver by horses walking along the river bank, cobbles and gravel were collected, and the boats were maneuvered back to towns. The first boat fitted with a clawing device for digging up materials from the river bed was the *Higbee*; it plied the Allegheny River in the late 1870s. Its first trip was made to help meet the demand for paving materials for residents along the Ohio River. In 1879, a towboat called the *Kangaroo* arrived at Cincinnati, Ohio, with five barges of Allegheny River cobbles and boulders to be used for paving (Kussart, 1938; Schafer and Sanja, 1992).

To supply the area's growing glassmaking industry (the first glass factory opened in Pittsburgh in 1797), sand was collected from bars and shoals along Pittsburgh riverbanks. In low water, teams of horses drew wagons out onto the rivers (at low flow), or small flats were pushed about, and sand was shoveled into them. As the business grew, larger flatboats were used. By 1852, the first steam-powered sand digger raised sand from the bottom of the river and placed it into flatboats. In 1854, J.K. Davison & Brother, today known as Davison Sand & Gravel Company, was established. With the introduction of concrete, in the 1870s, the demand for both sand and gravel went up, and commercial extraction became a viable business.

The second half of the 19th century saw the formation of more sand and gravel companies. In 1903, the Pittsburgh *Gazette* reported that every year over 1.5 million tons of sand were taken from the Monongahela and Allegheny Rivers by five sand and gravel companies in Pittsburgh. Sand from the Allegheny River was considered the best because it is hard and has a high silica content, desirable for both building purposes and glassmaking. As early as 1909, Allegheny County alone produced approximately 2.3 million tons of sand and gravel; most of the digging occurred in the lower Allegheny River and on the upper Ohio River (Kussart, 1938).