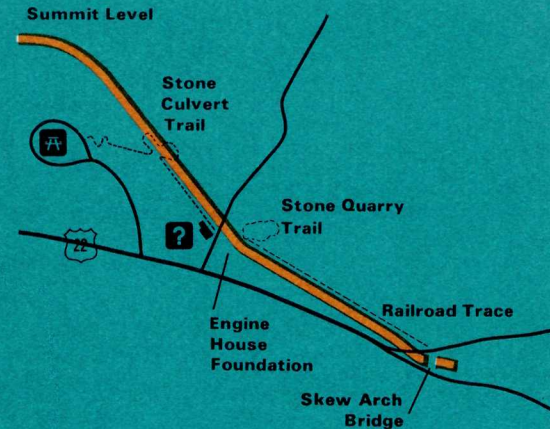


On Sunday morning we arrived at the foot of the mountain, which is crossed by railroad. There are ten inclined planes; five ascending and five descending; the carriages are dragged up the former and let slowly down the latter by means of stationary engines; the comparatively level spaces between being traversed sometimes by horse and sometimes by engine power as the case demands. Occasionally the rails are laid upon the extreme verge of a giddy precipice and looking from the carriage window, the traveler gazes sheer down without a stone or scrap of fence between into the mountain depths below. The journey is very carefully made however, only two carriages traveling together and while proper precautions are taken, it is not to be dreaded for its dangers.

It was pretty traveling thus at a rapid pace along the heights of the mountains and with a keen wind, to look down into a valley full of light and softness and catching glimpses through the treetops . . . and we riding onward high above them like a whirlwind.

*Charles Dickens' description of his trip over Allegheny Mountain in 1842.*

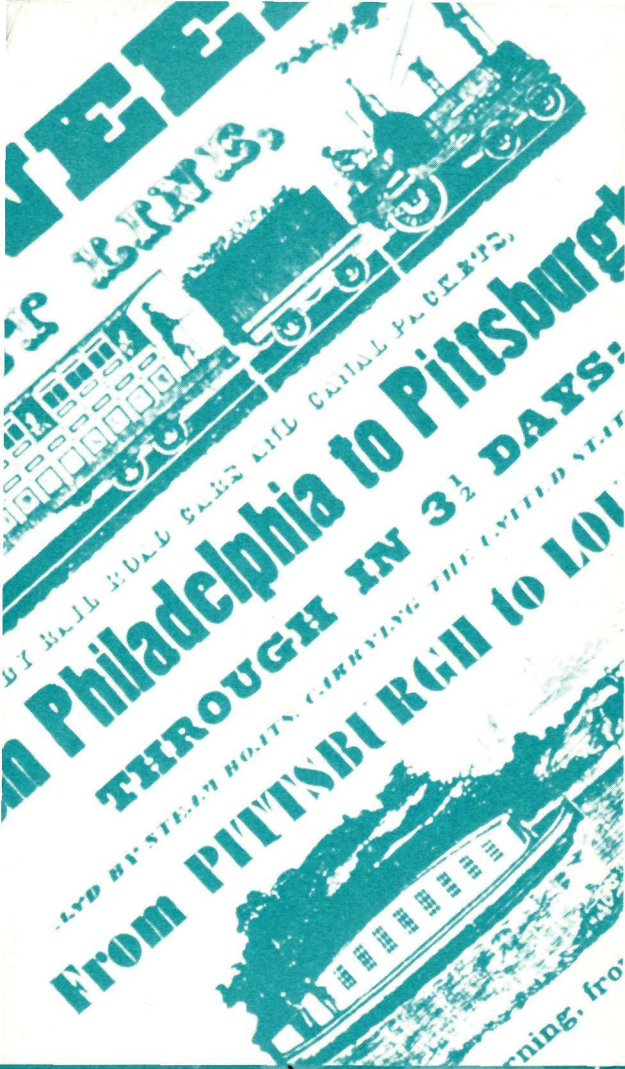


As the Nation's principal conservation agency, the Department of the Interior has basic responsibilities for water, fish, wildlife, mineral, land, park, and recreational resources. Indian and Territorial affairs are other major concerns of America's "Department of Natural Resources." The Department works to assure the wisest choice in managing all our resources so each will make its full contribution to a better United States—now and in the future.

**National Park Service  
U.S. DEPARTMENT OF THE INTERIOR**

# Allegheny Portage Railroad

NATIONAL HISTORIC SITE • PENNSYLVANIA



In 1776 Philadelphia was the largest and most important city in North America. Indeed, in all the British dominions, it was exceeded in size only by Bristol and London. Philadelphia's cosmopolitan population of Quakers, Welshmen, Germans, Swedes, Englishmen, and Jews helped make the city a leading center of culture and finance.

By the time that the first census was taken in 1790, however, New York, which had been the second city for almost a century, had nosed out Philadelphia by a few thousand. From then on, the gap widened rapidly and by 1820, New York was almost double the size of Philadelphia.

Philadelphians were alarmed. Three years previously New York State had begun construction of the Erie Canal. And the merchants of Baltimore were pressing the State of Maryland for transportation connections to the West. It was obvious that with these aggressive steps, the ports of New York City and Baltimore would completely outstrip Philadelphia unless Pennsylvania improved its communications with the West. With increasing public pressure, the Pennsylvania legislature authorized construction of a Pennsylvania canal on February 25, 1826. Gov. John Andrew Shulze ceremoniously broke ground for the Main Line Canal at Harrisburg, July 4, 1826.

The canal construction bill provided for a State-financed "Main Line" from Philadelphia to Pittsburgh. The route was to be a mixture of railroads and canals. Almost all the railroad mileage lay between Philadelphia and Columbia, 81 miles

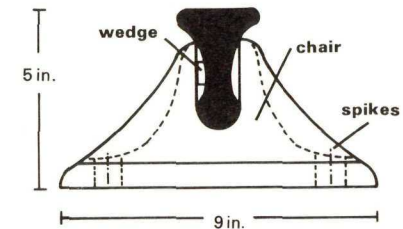
away on the Susquehanna. The canals, which totaled 276 miles, ran from Columbia to Hollidaysburg and from Johnstown to Pittsburgh. Only the mode of transportation for the 36 miles between Hollidaysburg and Johnstown remained in doubt.

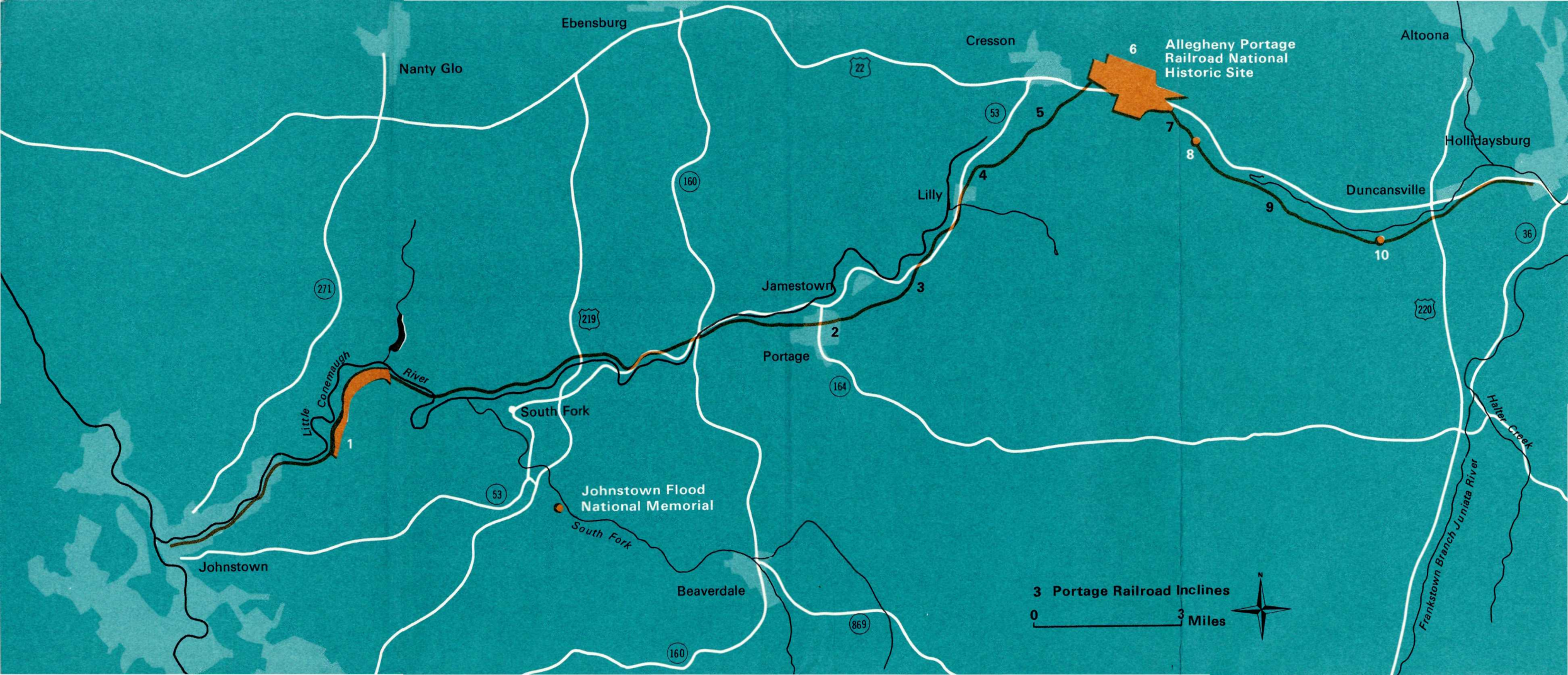
As construction of the Main Line system moved rapidly up the waterways approaching Allegheny Mountain from both east and west, the canal commissioners realized that they had a much greater problem than they had anticipated. They considered digging a 4-mile tunnel through Allegheny Mountain, but the technological knowledge for such an undertaking was lacking. They briefly considered a turnpike, but the idea was soon abandoned because of the extreme steepness of the grade on the eastern side of the mountain. Finally the commissioners decided upon a portage railroad. The idea was approved by the Pennsylvania General Assembly, the first contracts were let in May 1831, and work on the first track was completed in November 1833. Thus came into being one of the most unusual means of overland transportation ever conceived.

What is a portage railroad? Basically, it is a stile, or set of stairs—on a grand scale. Mechanized inclined planes lift and lower the cars from one level to another. On the levels, locomotives pull the cars from one plane to the next. Thus, the inclines represent the vertical distance from one step to another, and the levels, the steps themselves.

Specifically, this 36.69-mile railroad consisted of a series of ten inclined planes, five on each side of the mountain. At the top of each plane a stationary steam engine provided motive power to an endless hemp rope moving up one track and down the other to which the ascending or descending cars were attached. The operators usually tried to counterbalance the weight of ascending cars with the descending ones at each plane. This helped relieve some of the strain on the 30 to 35 horsepower stationary steam engines. In between the planes were stretches of nearly level track over which the cars were initially transported by horse and later by steam locomotives.

The iron rails used on the levels had no base and were known as "edge rails." They sat in grooves in cast iron forms called chairs." The chairs were held in position by 2 iron spikes driven into wooden pegs placed in solid stone ties called "sleepers." Each stone tie weighed over 500 pounds.





Ebensburg

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Cresson

Altoona

Allegheny Portage  
Railroad National  
Historic Site

Hollidaysburg

Duncansville

Lilly

Jamestown

Portage

South Fork

Johnstown Flood  
National Memorial

Johnstown

Beaverdale

3 Portage Railroad Inclines

0 3 Miles

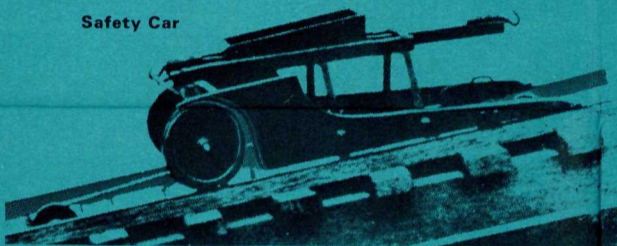


Frankstown Branch Juniata River  
Halber Creek

The planes were numbered from 1 to 10 beginning at Johnstown and proceeding eastward toward Hollidaysburg. The slope of the planes varied from a minimum of 4 percent (a 4-foot rise in 100 feet) on plane 9 to a maximum of 6 percent of plane 8. The highest point on the route was at the top of plane 6 on the east face of Allegheny Mountain, 2,291 feet above sea level, and nearly 1,380 feet above Hollidaysburg and 1,137 feet above Johnstown.

Improvements, made possible by rapidly expanding technology, were constantly made on the portage. In 1835 the steam locomotive *Boston* went into service on the 14-mile long level between planes 1 and 2. By 1850, steam locomotives had replaced horses as motive power on all levels. These early locomotives could reach an average speed of 15 miles per hour.

The ropes which pulled the cars varied in length from 3,616 to 6,662 feet. Generally they were 6-1/4 to 7 inches in circumference and made of hemp. From the outset, ropes were never satisfactory. They often broke and were a constant source of trouble, anxiety, and expense. In 1841, John Augustus Roebling, who later was the engineering genius behind the Brooklyn Bridge, suggested substituting wire for hemp ropes. The idea was accepted and the superiority of the wire rope led to its use on all the planes by 1849.



Safety Car

Another improvement was the invention of the "buck," or safety car, a spring-loaded friction brake. Used on the planes, it reduced the possibility of accidents if the ropes broke while cars were being pulled up or lowered down the steep inclines.

One improvement seems so obvious now that it's surprising it wasn't thought of sooner. A vexing problem from the start had been four time-consuming steps: unloading the canalboats, loading the contents onto the railroad cars that were then hauled over the mountain, unloading the cars, and placing the cargo on different boats.

In October 1834, Jesse Christman, who lived on a tributary of the Susquehanna, loaded his family, household goods, and some livestock on his boat *Hit or Miss* and started for Illinois. At Hollidaysburg, where he expected to sell his boat, John Dougherty suggested that the boat could be safely hoisted over the mountain and set afloat again in the canal at Johnstown. Dougherty then prepared a railroad car to bear the novel burden. The boat was taken from the canal basin and placed on the car, and by noon of the same day it began the climb up the mountain. All this was done without disturbing the family's arrangements for cooking, sleeping, and daily activity. That night the Christmans rested on top of the mountain, and the next morning they descended the western slope and sailed on for the Mississippi Valley.

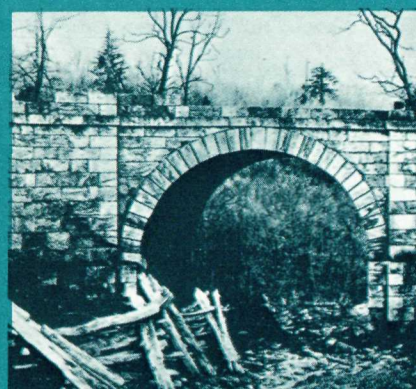
Soon canalboats were being built in three or four sections. The completely watertight sections were disassembled in the water, hauled out and carried over the mountain. In the basin on the other side all parts were put back together, and a complete boat sailed off to its destination. The sectional boats could also be lifted out of the water at Columbia, put on flatcars, and carried on to Philadelphia via the railroad—and vice versa when traveling westward. They provided the most convenient method of shipping goods and passengers from one end of the State to the other without unloading once along the way.

From the first the inclined planes of the portage were never completely satisfactory, whether from the viewpoint of ease or safety. While the portage was in full use with its system of planes, its operation necessitated changing power 33 times in 36 miles. To move a section boat over the road from the basin at one end to that at the other involved 12 stationary engines, 12 different teams of horses, 9 locomotives, and 54 workmen.

All of the problems with the inclined planes were never solved, and in 1839-40 Pennsylvania sent out engineers and surveyors to mark out a route over the mountain for a railroad that would bypass the planes. A route was selected close to the portage, and in the early 1850's the State spent more than \$2 million building the line.

On July 11, 1855, the New Portage Railroad went into operation. It was short-lived, however, for the entire Main Line system—all the canals and railroads—was sold to the Pennsylvania Railroad Company in 1857. Chartered in 1846, the Pennsylvania Railroad by 1854 had completed Horsehoe Curve over Allegheny Mountain and was able to provide continuous rail service the year around between the eastern seaboard and the Ohio Valley. The Portage Railroad and the Pennsylvania Main Line Canal were now part of the past.

The State never made any money on the canal system. The cost of building and operating the canals was greater than the total income, in contrast to the Erie Canal which paid for itself 12 times over before tolls were abolished. The system also failed to capture a significant share of the burgeoning trade from the western States, but it



Skew Arch Bridge

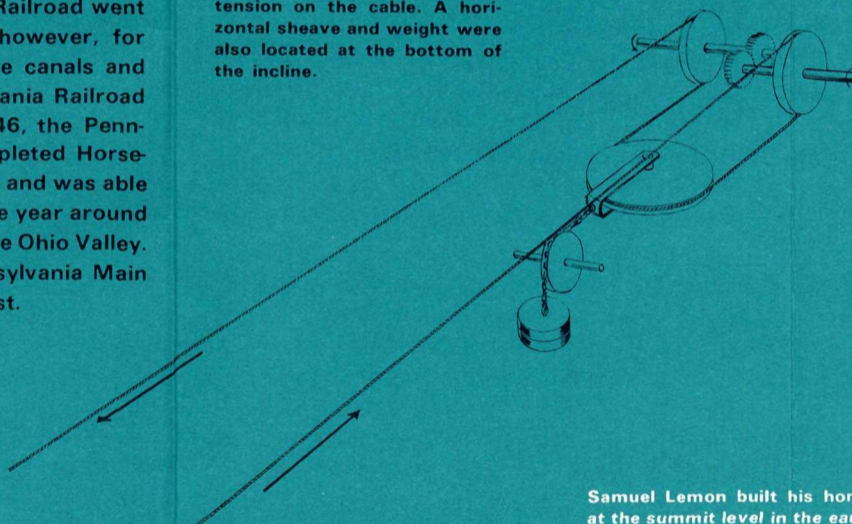
did provide cheap transportation for settlers who cleared the land and established homesteads along the right of way and beyond. The portage stimulated the growth of villages and towns and furnished outlets for new industries. And it provided work for thousands of laborers and skilled workers.

Among the portage's contributions was its role as an engineering experiment. America's early canals and railroads were the great laboratories where methods and techniques were tried and perfected. Their contribution to the Nation's industrial growth in the 19th century is comparable to that of mass communications in the 20th.

#### ABOUT YOUR VISIT

Allegheny Portage Railroad National Historic Site is located along U.S. 22 between Duncansville and Cresson, Pa. Although abandoned in 1857, many structures can still be seen today. The Lemon House, built about 1831 near the summit of Allegheny Mountain, was a tavern and rest stop for passengers. Today it serves as the visitor center

The upright iron sheaves moved the cable up and down the incline. The horizontal sheave, with its weight, maintained the tension on the cable. A horizontal sheave and weight were also located at the bottom of the incline.



Samuel Lemon built his home at the summit level in the early 1830's. Within 15 years, he was one of the wealthiest men in Cambria County, selling coal and supplies to the portage and providing services for passengers and workmen.

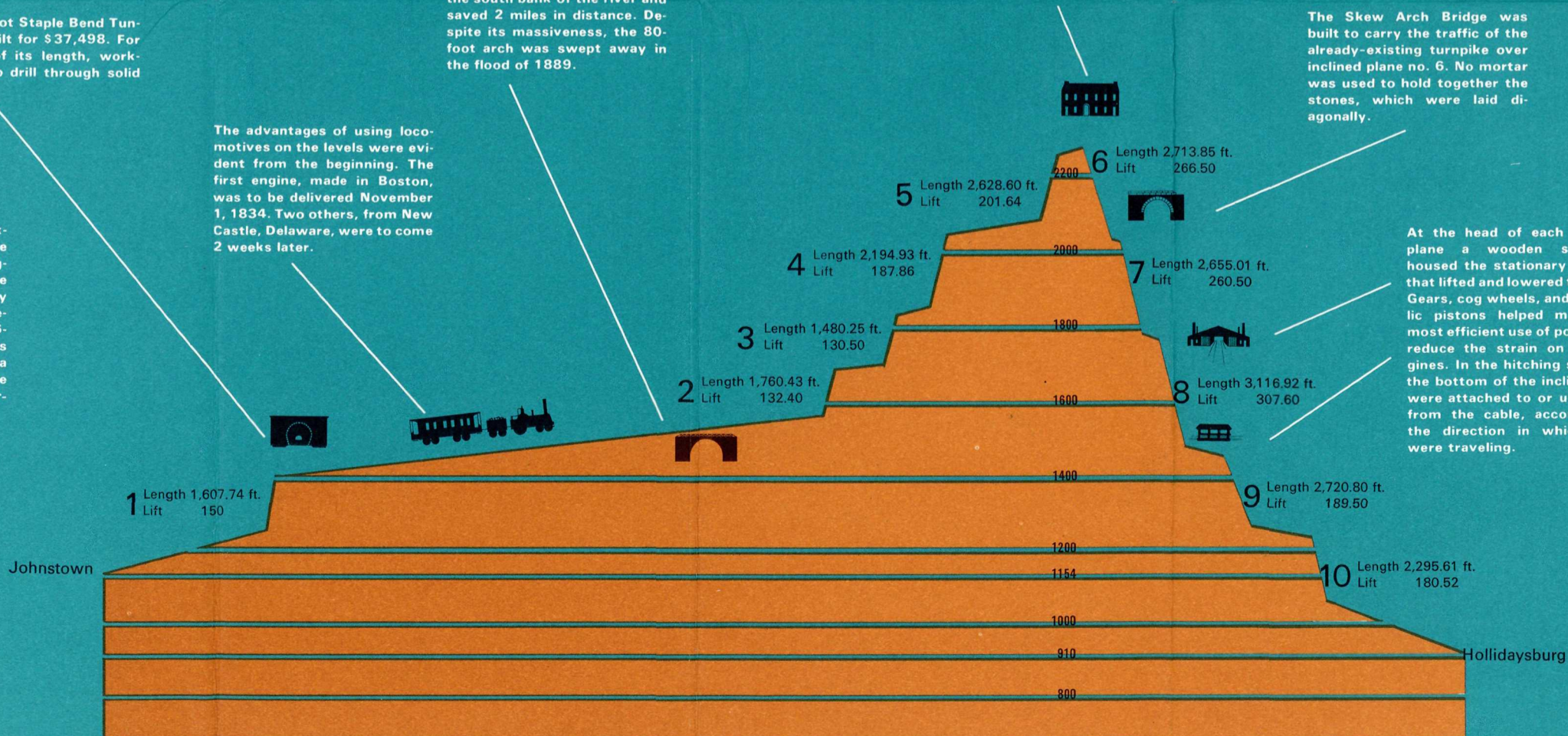
The 901-foot Staple Bend Tunnel was built for \$37,498. For 600 feet of its length, workmen had to drill through solid rock.

The advantages of using locomotives on the levels were evident from the beginning. The first engine, made in Boston, was to be delivered November 1, 1834. Two others, from New Castle, Delaware, were to come 2 weeks later.

The Conemaugh Viaduct carried the route of the portage to the south bank of the river and saved 2 miles in distance. Despite its massiveness, the 80-foot arch was swept away in the flood of 1889.

The Skew Arch Bridge was built to carry the traffic of the already-existing turnpike over inclined plane no. 6. No mortar was used to hold together the stones, which were laid diagonally.

To depict graphically the working of the portage railroad, the profile at right has been exaggerated. The profile at the bottom of the page accurately illustrates the elevation of Allegheny Mountain along the 36-mile railroad. Though it does not appear to be much of a barrier, a drive over the route today will convince you otherwise.



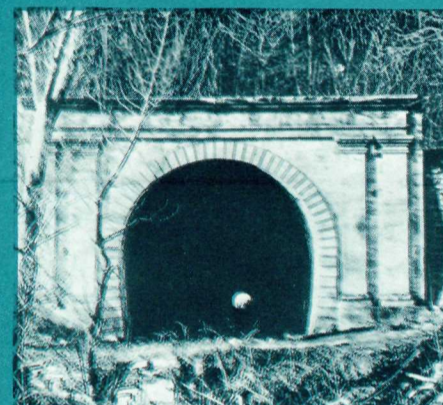
At the head of each inclined plane a wooden structure housed the stationary engines that lifted and lowered the cars. Gears, cog wheels, and hydraulic pistons helped make the most efficient use of power and reduce the strain on the engines. In the hitching sheds at the bottom of the incline, cars were attached to or unhooked from the cable, according to the direction in which they were traveling.

#### JOHNSTOWN FLOOD NATIONAL MEMORIAL

A short distance from the portage are the remains of the South Fork Dam. Built between 1838 and 1853 to supply water during dry spells to the western division of the Pennsylvania Canal at Johnstown, this dam broke on May 31, 1889, causing the famous Johnstown Flood. The memorial is located along U.S. 219 and Pa. 869 near South Fork, Pa.

#### ADMINISTRATION

Allegheny Portage Railroad National Historic Site is administered by the National Park Service, U.S. Department of the Interior. A general superintendent, whose address is P.O. Box 247, Cresson, PA 16630, is in immediate charge.



Staple Bend Tunnel

#### FOR YOUR SAFETY

Much of the route of the portage railroad is now adjacent to or covered by busy highways. Be extremely cautious when stopping to view the different sites along the way.