byways to the PAST

CANAL IN THE MOUNTAINS

The Juniata Main Line Canal in the Lewistown Narrows

Pennsylvania Department of Transportation

Scott D. Heberling

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Commonwealth of Pennsylvania
Pennsylvania Historical and Museum Commission
for the Pennsylvania Department of Transportation

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Canvass White and the Lewistown Narrows

One hot afternoon in the summer of 1826, 36-year old Canvass White stood on a rock at the edge of the Juniata River, contemplating the imposing mountain barrier that loomed ahead. Nearby stood his assistant, George T. Olmstead, who was busy supervising the small survey crew as they gathered up their equipment at the end of a long day. White was one of America's most prominent canal engineers. Although chronic poor health would prematurely end his life at the age of forty-four, during his short career he served as Principal Engineer for New York's Erie Canal and was a consultant to many other canal companies. There were few men better suited for the task with which he had been charged. Yet, as Canvass White stood on his rock that summer day, he was perplexed.

For the past month, White and Olmstead had been working their way upriver, surveying a route for the Juniata Division of the Pennsylvania Main Line Canal, which was to extend from the mouth of the Juniata at Duncan's Island to the river's headwaters at Hollidaysburg. So far, their task had been fairly easy, as they followed the river through the farming country of Perry and Juniata counties, past the villages of Newport, Millerstown, Thompsontown, and Mifflin. But now, only ten miles short of Lewistown, they faced a challenge like none they had yet faced that summer. Just ahead of them, the Juniata River emerged from a narrow gap in the mountains. Sheer cliffs dropped hundreds of feet to the river's edge, and vast boulder fields covered the slopes, seemingly ready to come crashing down on the unwary traveler at any moment. How would it be possible to build a canal through terrain like this?

View of the Juniata River in the Narrows, 2007

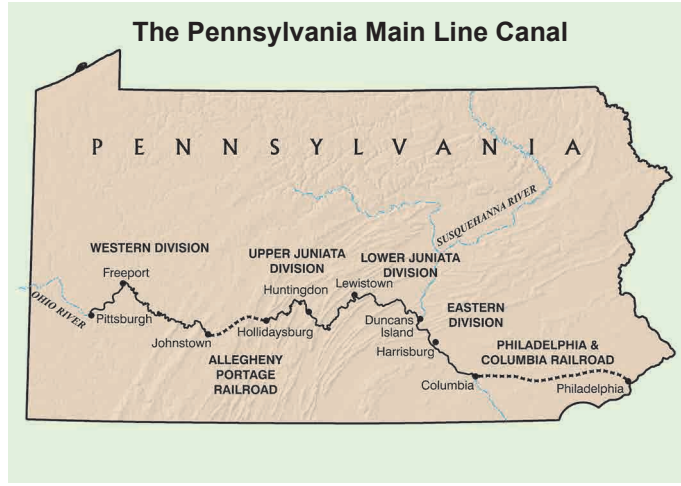
facing page: "Lewistown Narrows" by T. Moran (Robert E. Wagoner Collection)

The gap that confounded Canvass White and his party, known locally as the "Lewistown Narrows" or "Long Narrows," was a formidable obstacle facing early travelers. Nearly 60 years earlier, when the Juniata Valley was still a wilderness, the Rev. Charles Beatty had written: *"We traveled the Juniata River eight miles to a place called the Narrows, where rocky mountains bound so close upon the river as to leave only a small path…at this time [the waterway] is greatly encumbered by trees fallen across it, blown by a great wind…we were obliged to walk…along the edge of the water."* Now, the canal engineers were charged with constructing a key link in the Pennsylvania Main Line Canal through the gap where the Rev. Beatty had found it difficult even to walk a pack horse in 1768. Against enormous odds, they created a transportation system that changed Pennsylvania forever.

The Pennsylvania Main Line Canal

Canvass White and George T. Olmstead were players in a remarkable drama that dominated the American scene for several decades in the early nineteenth century. The story of the construction of Pennsylvania's canal system is a tribute to human ingenuity and determination. Nowhere was this more true than at the Lewistown Narrows, where the canal builders accomplished their task in the face of seemingly insurmountable obstacles and were able to maintain their canal as a viable transportation system for the next sixty years despite the ravages of nature and a steady technological evolution that eventually made their system obsolete.

The section of canal through the Narrows was part of the Main Line's Juniata Division, which extended more than 125 miles along the Juniata River from Duncan's Island in Perry County to Hollidaysburg in Blair County. The Main Line's five segments—the Western Division, Allegheny Portage Railroad, Juniata Division, Eastern Division, and Philadelphia and Columbia Railroad—were part of an extensive system of state-owned canals and railroads known collectively as "the Public Works." Pennsylvania's system was the most ambitious of those that resulted from the canal-building mania that swept the United States in the 1820s. The success of New York's Erie Canal, completed in 1825, posed both a threat and a challenge to Pennsylvania, which rushed to construct a competing system. Unfortunately, the system's enormous construction and maintenance costs, together with chronic problems in daily operation, made it an economic failure from the very beginning. At the same time, the Main Line Canal was a remarkable engineering achievement that opened much of the state to development, promoting settlement and industrial expansion throughout a vast area.



The Main Line linked Philadelphia and Pittsburgh and consisted of a railroad between Philadelphia and Columbia, a canal along the Susquehanna and Juniata Rivers from Columbia to Hollidaysburg, a railroad over the Allegheny Mountains from Hollidaysburg to Johnstown, and a canal along the Conemaugh, Kiskiminetas, and Allegheny Rivers to Pittsburgh. The Main Line stretched for over 395 miles, much of it through previously unsurveyed and undeveloped territory. Other state-owned canals were built along the West and North Branches of the Susquehanna, the Delaware River, and along various rivers to connect the Ohio River with Lake Erie. By 1834 there were 601 miles of state canals and 119 miles of state railroads, built at total cost of over $22,000,000. In addition, there were over 409 miles of privately-owned canals in Pennsylvania.

Survey and Construction of the Juniata Division

As Canvass White stood along the Juniata River gazing at the gap in the mountains, other engineers were busy surveying alternative routes for the Main Line. Politicians and businessmen enthusiastically promoted specific routes that would best serve their own interests. Nobody wanted to be bypassed by the Public Works. Historians have noted that "Every Pennsylvanian who lived along a brook deep enough to float a duck was dreaming of the day when, with the help of a state appropriation, his brook would be a navigable canal."

View of the Narrows, facing west (The EADS Group, Inc.)

White and Olmstead completed their preliminary survey along the Juniata River to Lewistown in August 1826. They managed to devise a way to get the canal through the Narrows, although it would require a great deal of deep cutting and partial relocation of the turnpike road that followed the edge of the river. In many places it would be necessary to build the canal in the river bed itself. The work would be both hazardous and expensive.

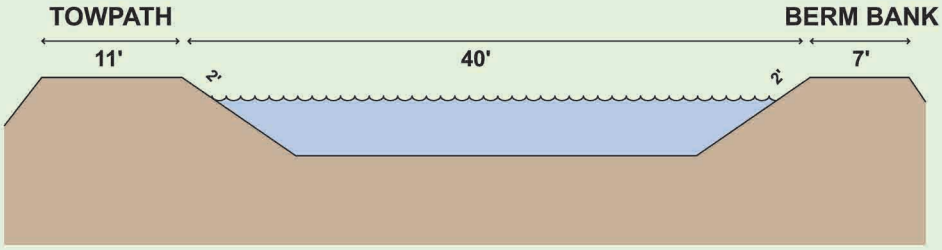
Based on their study of alternatives the canal engineers concluded that the Juniata-Conemaugh route was the best means of linking the Susquehanna and Allegheny rivers. Turning aside continuing opposition from business interests along the West Branch of the Susquehanna and elsewhere, on April 9, 1827, the legislature authorized construction of the Lower Juniata Division between Duncan's Island and Lewistown.

In May 1827 DeWitt Clinton Jr. was appointed chief engineer on the Juniata Division. Clinton was the son of New York governor DeWitt Clinton, Sr., the "father of the Erie Canal." Clinton's engineers soon began to locate and survey the canal route eastward from Lewistown. Their solution for getting the canal through the Narrows was to construct it within the river channel for most of the distance, relying on unusually high embankments to protect the canal from spring floods. Water was provided by a river dam and intake sluices at the head of the Narrows. Two lift locks were necessary at the upper end of the Narrows and one at the lower end. In his official report Clinton discounted the stories of frequent catastrophic flooding in the Narrows, optimistically predicting that "if the freshets ever should rise higher than the banks of the canal, no injury can be reasonably apprehended."

Clinton estimated the construction cost of the entire Juniata Division between Duncan's Island and Lewistown to be $597,775.16, including $245,382.27 for the section between Mifflintown and Lewistown, far more than any other segment. Construction contracts for the 16 miles of canal below

Lewistown were let in August 1827 with the hope that it could be opened for navigation in the spring of 1829. Progress was much slower than expected due to high water, inefficient contractors, and outbreaks of disease among the workers. Nevertheless, by the end of 1828 the canal between Duncan's Island and Lewistown was about two-thirds complete.

Contracts on the Lower Juniata Division were let by half-mile sections, with separate contracts awarded for locks, dams, aqueducts, and other major features. Dimensions of the canal prism and associated features were standard throughout the Juniata Division: the prism was 28 feet wide at the base and 40 feet wide at the water line, with a water depth of at least four feet. The towpath generally was built on the river side and was at least 11 feet wide, while the berm side was at least 7 feet wide.



Generalized Canal Cross-Section

Following the tedious process of grubbing an 80-foot swath along the canal route, earth was excavated by pick and shovel and used to build up the banks. Blasting was necessary in many areas. The final step in construction was the application of a layer of clay called "puddle" to the interior of the canal in order to waterproof it. The amount of physical labor involved in canal construction is almost unbelievable by modern standards. The task of building a canal between Harrisburg and Pittsburgh would present a daunting challenge even today; it seems incredible that the 1820s canal builders accomplished the task using only picks, shovels, and wheelbarrows, and even more amazingly, it took them only a few short years.

All lift lock chambers on the Juniata Division were 15 feet wide and 90 feet long, with a four-foot wide spillway along the uphill side. In contrast to the Eastern and Western Divisions, where the locks were constructed of cut stone laid in mortar, most of the locks on the Juniata Division were built of dry-laid "rubble stone" faced with watertight planking; 77 were of this type, while seven (including those in the Narrows) were of rubble stone laid in mortar, and four were of cut stone. On the Lower Juniata Division, there were 33 lift locks, two outlet locks, three guard locks, and one weigh lock; other structures included 42 road bridges, 37 farm bridges, seven towpath bridges, three foot bridges, 18 aqueducts, five river dams, 46 culverts, and 27 waste-weirs. All of these structures were built according to standard design specifications. A single quarry near the village of Mexico produced most of the building stone used on the Juniata Division.

Typical Lift Lock
(Hahn and Kemp,1999)

Important canal features in the Lewistown Narrows included a river dam and feeder sluices, three lift locks and two lock houses, one regulating or "stop" lock, two waste-weirs, one public bridge, and a long river wall. The river dam at the head of the Narrows fed the 28.5 miles of canal downstream to Millerstown. Water was taken into the canal at this point through stone sluices fitted with wooden gates. The dam originally contained a crib-lock large enough for boats, arks, and rafts to pass through it, but as river travel declined, the lock was eliminated.

Most of the work on the canal was done by Irish immigrants, who proved to be a constant source of irritation to local residents. Laborers were expected to move about 15 cubic yards of earth each day, the equivalent of three feet of canal. Wages in 1827, including "tools, drink, and boarding," were $11-12 per month, although as sickness created a labor shortage in 1828, wages rose to $15-18 per month.

On February 28, 1828 the *Mifflin Eagle* reported that *"the work on this canal progresses rapidly; many sections are now more than half completed. The sections in the Narrows appear to get along slower than the rest. This is occasioned in a great measure by the high water, which has prevented the work from going on."* An ice flood in March 1829 caused a substantial amount of damage to the dam at the head of the Narrows before it had even been completed and was the first occurrence of a chronic problem.

Water was first let into the canal below Lewistown in September 1829. On September 22 local newspapers reported that "Lewistown is at this moment in an uproar of rejoicing, by a brilliant illumination and all the other usual accompaniments, on account of the water being this day let into the canal." In early November, navigation was opened all the way to Duncan's Island. The Juniata Aqueduct at Duncan's Island finally was opened with great ceremony in the summer of 1830, completing the Lower Juniata Division to Lewistown.

As was the case throughout the Public Works the actual cost of constructing the Lower Juniata Division far exceeded the original estimates. The final bill would total nearly $2,500,000.

The Canal in Operation

The canal segment in the Lewistown Narrows proved to be one of the most troublesome sections of the Juniata Division. Because the Narrows were so constricted, flood waters swept through the gap with great force, often overflowing and eroding the banks of the canal. Although DeWitt Clinton Jr. was a competent engineer, it turned out that he was disastrously mistaken in his opinion that flooding would not be a serious problem. It did not take long to discover that the threat was very real, since flooding and ice flows caused great damage to the canal even as it was being built.

By March 1831 the supervisor of the Lower Juniata Division already was recommending a second river dam and regulating lock midway through the Narrows in order to slack the water and minimize damage to the canal during periods of flooding. Although no immediate action on this proposal was forthcoming, in 1831 the canal towpath was raised and strengthened through the entire length of the Narrows. Despite the improvements, the canal was badly damaged again the following spring. By the end of 1832 the regulating lock had been completed. Although it helped to alleviate flood damage, it did not completely solve the problem in the Narrows. Some damage occurred nearly every winter and spring. Flooding was not the only chronic problem: the turnpike through the Narrows frequently was closed because of rocks falling from the steep slopes on the north side and portions of the south bank collapsing into the canal.

Over and above any emergency action that was required, the continued operation of the canal depended on constant vigilance and regular maintenance. During the boating season watchmen were hired to patrol the banks of the canal, inspecting for leaks. There was a speed limit of four miles an hour, so that the banks would be protected from erosion caused by boat wakes. Every winter the canal was drained so that repairs could be made, including removal of accumulated silt and rehabilitation of locks and other structures. Maintenance and repairs were the responsibility of a foreman appointed by the supervisor of that canal section.

During the height of the 36-week boating season, the Main Line Canal was a busy thoroughfare with boats passing every 15-20 minutes. Some of the larger boats operated 24 hours a day, but most ran only during daylight, stopping at one of the many inns and taverns along the canal route at night. Vessels were of three types: the packet boat, which carried passengers only; the transportation boat,

Juniata Division near Newport
(Ernest Coleman Collection)

which hauled only freight; and the combination boat, which carried both. Over 40 boats were based in the vicinity of Lewistown, and boats were being constructed in that town as early as 1835.

It soon became obvious that the system's high construction and maintenance costs could never be financed by tolls collected on the line. The system's location and design made effective competition with the Erie Canal impossible. The Erie Canal was built over the relatively level terrain of western New York, but the rugged topography of central and western Pennsylvania made canal building a nearly-impossible task, especially given the rudimentary state of engineering at the time. While the Erie Canal had only 83 locks in 363 miles, overcoming elevation changes of only 654.8 feet, the Juniata and Western Divisions of the Pennsylvania Canal overcame elevation changes of 1,168 feet with 167 locks over 276 miles. Each lock was not only a chronic maintenance problem but also meant a delay for travelers and commercial shippers.

While the Canal Commissioners may have grossly underestimated the cost of constructing and maintaining the Juniata Division, their assessment of its economic benefits to the region turned out to be correct. By 1831 the cost of shipping merchandise between Philadelphia and Pittsburgh had been reduced by over 35 percent since the opening of the canal. Farmers in Centre County and the Kishacoquillas Valley in Mifflin County brought large quantities of grain to the warehouses at Lewistown, where it was loaded onto boats for the trip east or west. In 1846 merchants shipped 257,067 bushels of wheat and 33,269 barrels of flour over the canal from Lewistown.

Sale and Decline

Because the Main Line Canal was a chronic drain on the state treasury the legislature began to search for ways to dispose of the system as early as the 1840s. In 1857 the Pennsylvania Railroad purchased the Main Line for $7,500,000, a fraction of its value. The railroad's purpose in acquiring the Main Line is obvious, since the two systems were in direct competition. Nevertheless the state was relieved to find a buyer. By the time of the sale the Public Works had incurred over $101,000,000 in construction costs and interest, most of which was financed with borrowed money. In contrast the canal had earned only $43,786,000 from its operation and sale over two-and-a-half decades.

Although the state hoped that the railroad would continue to operate the canal system, the more unprofitable divisions soon were dismantled. The Western Division and Allegheny Portage Railroad both were abandoned by 1864, but the Railroad made a commitment to maintain canal operations east of the Alleghenies. The company embarked on an ambitious modernization program, spending over $1,500,000 on improvements and repairs between 1857 and 1865. The cost of these improvements resulted in an operating loss of over $500,000 for the Juniata Division during the railroad's first eight years of ownership.

In 1867 the Pennsylvania Railroad created a subsidiary, the Pennsylvania Canal Company, to run the Main Line and its other divisions. It focused on the company's more profitable coal-hauling divisions. By the early 1870s most money for improvements and repairs was being spent on the Eastern, Susquehanna, Wyoming, and West Branch divisions. The long-term prospects for the Juniata Division were not bright. After the abandonment of the Western Division and Allegheny Portage Railroad ended through-traffic between Philadelphia and Pittsburgh, most of the boat traffic on the canal was engaged in local trade, which still was relatively profitable.

The Upper Juniata Division was shut down in the mid-1870s, but the Lower Juniata Division remained in service for another decade. Finally in 1888 the 22-mile section between the Huntingdon and Aughwick feeder dams was abandoned, and the disastrous flood of the following year caused so much damage to the remaining canal that all operations above Newport were terminated. By the close of the 19th century the Juniata Division was only a memory.

An Enduring Legacy

The Pennsylvania Main Line Canal played a crucial role in the development of central Pennsylvania, encouraging settlement and economic development. The route of the canal largely determined the route of the Pennsylvania Railroad's main line twenty years later. Many of the region's most important towns—Hollidaysburg, Huntingdon, Lewistown, Mifflintown, Thompsontown, Millerstown, and Newport—first became prominent because of the canal, and a host of smaller villages grew up along the line. The early canals of Pennsylvania were a training ground for many of America's first professional engineers and were instrumental in the growth of civil

engineering in the United States. Individuals associated with the Juniata Division, including Canvass White and DeWitt Clinton Jr., were among the leading engineers of the day. Nearly two centuries later we still marvel at their accomplishments.

The Lewistown Narrows: A Vital Transportation Corridor

The Pennsylvania Main Line Canal was one of many important historic transportation routes that passed through the Lewistown Narrows. For Native Americans, early settlers, and modern travelers alike, the long continuous ridges of central Pennsylvania have presented a barrier to east-west travel. The Lewistown Narrows and other water gaps through the mountains were critically important to travelers passing through the Juniata River valley. As technology evolved, new transportation facilities were continually being built, often superimposed on earlier ones. Today, the remnants of these early transportation systems can be seen on both banks of the river.

Long before the first European settler entered Pennsylvania, native travelers established the route through the Narrows as the easiest way to move across the region. In the 18th century the ancient trail through the Narrows was improved for use by pack animals and wagons. The Juniata Mail Stage began weekly service through the Narrows in 1808. In the early 19th century the old road became part of the Harrisburg and Lewistown Turnpike, a key link in the state's east-west road system. By mid-century the Main Line Canal had been constructed along the river's edge on the north side of the gorge, while the Pennsylvania Railroad main line ran south of the river. Until the canal's abandonment in 1889 the canal, railroad, and turnpike operated concurrently.

By the early 20th century the old turnpike through the Narrows had deteriorated to the point that it was almost impassable. Reconstruction of the highway in 1911-1913 cost $220,000 and was said to be the most difficult project ever undertaken by the state highway department. In 1935-1936 the road was reconstructed to handle ever-increasing automobile and truck traffic, requiring the filling of part of the old canal. The rebuilt concrete road, part of the William Penn Highway, served its function well for the next 50 years, but congestion and safety eventually became serious problems. The highway again was completely reconstructed to address these problems. The present highway (US 22/322), completed in 2008, is the most recent phase in a long process by which the transportation facilities in the Lewistown Narrows have continually evolved to meet the changing needs of new generations of travelers.

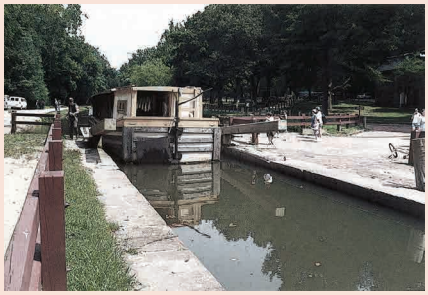
How a Lift Lock Worked

Lift locks were used to raise and lower boats when they passed from one level of the canal to another. On the Juniata Division lock chambers were 15 feet wide and 90 feet long, just slightly larger than the boats. Most Juniata Division locks were constructed of rubble stone faced with wood, but those in the Narrows were unmortared cut stone. The floor consisted of two layers of yellow pine planking nailed to 12-inch square oak timbers. Massive wooden gates at each end were fitted with cast-iron valves or "wickets" which were opened to drain and fill the lock chamber when a boat was passing through it. Both the gates and the wickets were operated by hand. When passing through a lock, boats were tied to wood or stone "snubbing posts" on top of the walls so that they would not be swamped by turbulence in the chamber.

There were 33 lift locks on the Pennsylvania Canal's Lower Juniata Division, including three in the Lewistown Narrows. Two were at the head of the Narrows while the third was at Macedonia Run in what is now the Lewistown Narrows Canal Park.

The process of "locking-through" is illustrated by this series of photographs of a restored section of the Chesapeake and Ohio Canal at Great Falls, Maryland.

1.



With the upper gates open and the chamber filled with water, a boat headed downstream enters the upper end of the lock.

2.

When the boat is completely inside the lock chamber, the lock-keeper closes the upper gates.

5.

As the water level falls, the boat is slowly lowered.

6.

The lower gates are opened after the water level on both sides is equalized.

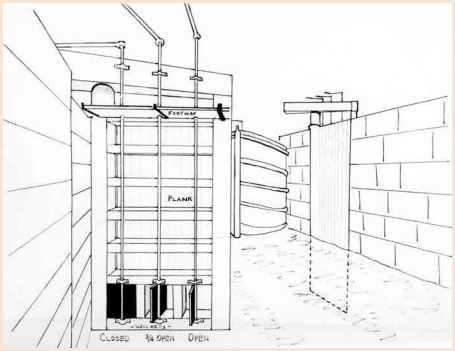


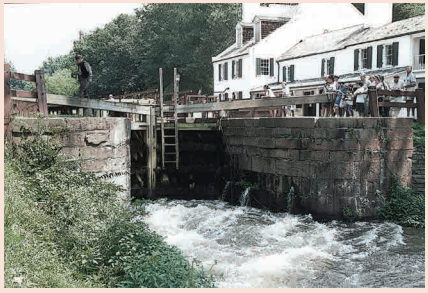
Diagram of lift lock gates
(Ernest Coleman Collection)

Excavation of Lock No.13 at the Lewistown Narrows Canal Park uncovered the base of a lock gate with two cast-iron valves still in place (a). One of the valves was restored by professional conservators. Here the valve is shown before (b), during (c) and after (d) treatment.

3.

The lock-keeper opens the paddle valves in the lower gates...

4.



…and the lock chamber is emptied as water exits the chamber through the valves.

7.

The boat emerges from the downstream end of the lock...

8.

...and continues on its way. The process is reversed for boats heading upstream.

Documenting the Canal

As part of the environmental and planning studies for the US 22/322 improvement project, the Federal Highway Administration and Pennsylvania Department of Transportation completed a comprehensive survey of archaeological and historical resources in the Lewistown Narrows. Eight Native American archaeological sites were discovered and recorded, and extensive data recovery excavations were undertaken at one of them, Site 36Ju104. These studies yielded a wealth of new information concerning Native American use of the Narrows, described in a previous volume in the *Byways to the Past* series (Raber 2007).

The historical studies included detailed survey and documentation of the canal in the Narrows. Although this was one of the best preserved sections of the Juniata Division, conditions were highly variable due to the destructive effects of past flooding, highway construction, and private development. Some portions had been completely destroyed while others were remarkably intact. Project engineers designed the new highway to minimize damage to well-preserved canal sections, but some impacts were unavoidable. These impacts were mitigated by documenting surviving canal features to National Park Service standards as well as developing a public canal park near the eastern end of the Narrows.

Prism and Towpath

The condition of the canal prism and towpath varied greatly in different areas. Several long sections had been completely filled in during highway widening in the 1930s or had been graded by private landowners. Others had been badly damaged by past flooding that had eroded the towpath and filled the prism with sediment, but much of the canal was still in excellent condition. Project historians battled snakes, insects, and dense underbrush while carefully mapping and photographing each canal section.

Well-preserved section of canal prism and towpath, 2000

River Wall

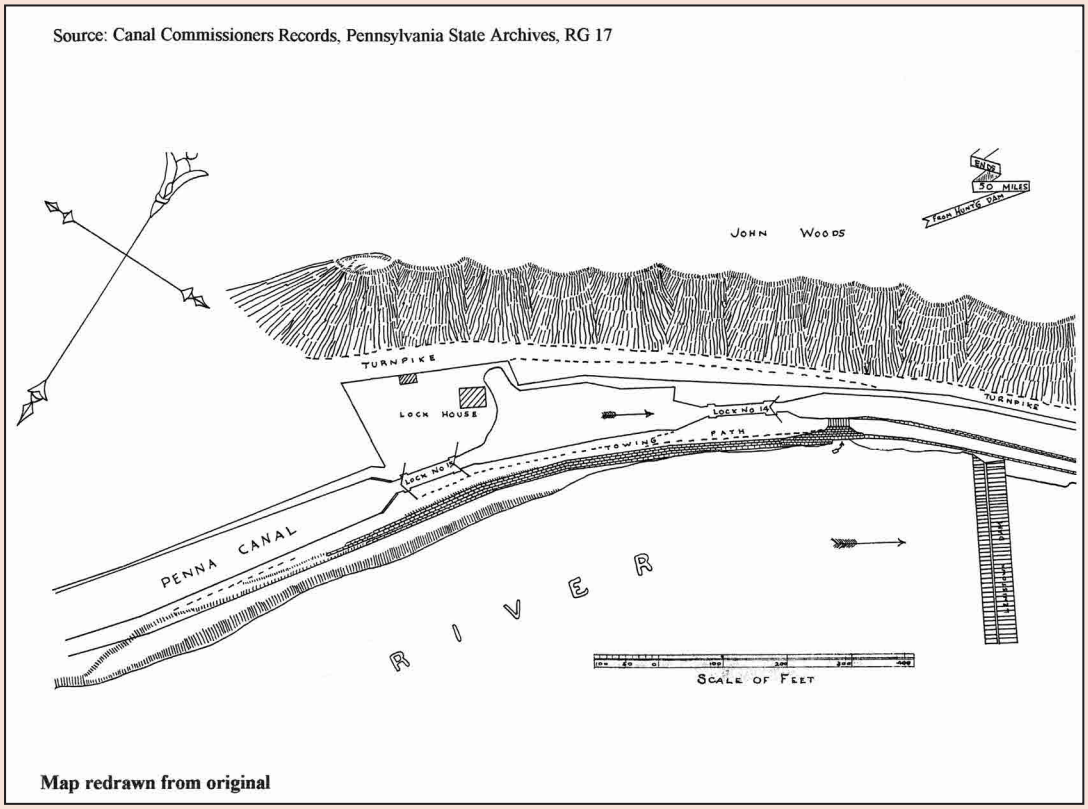
Early 20th century view of river wall
(Ernest Coleman Collection)

The canal's location adjacent to the river exposed it to destructive flood waters and ice jams which swept through the Narrows each spring. The engineers took extraordinary measures to protect the canal from swift river currents. The towpath and berm banks were unusually high, originally built to be 18 feet above low water and 25 feet above the river bottom. The engineers also built a massive river wall, 2-15 feet high depending on the terrain, along the outer face of the towpath bank.

Representative section
of river wall, 2000

Dam, Feeder Sluices, and Lift Locks No. 14 and 15

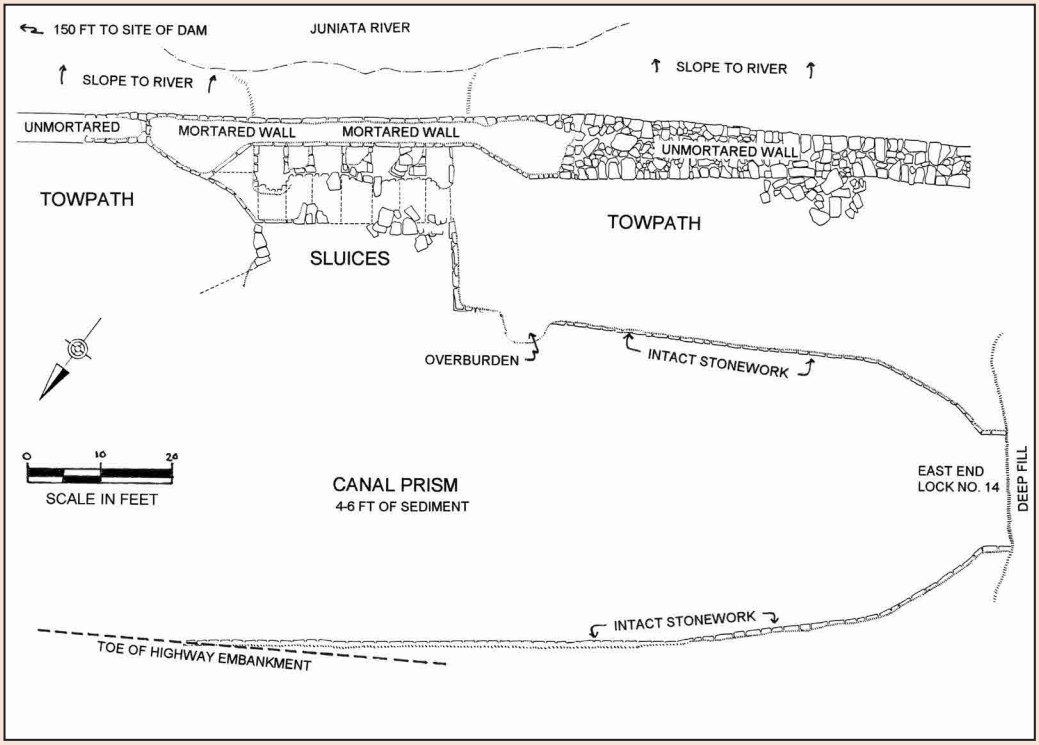
An important group of canal structures was located at the upper (west) end of the Narrows. A river dam and associated set of four feeder sluices provided the water that fed the 28.5 miles of canal between Lewistown and Millerstown, making canal operations possible. Although the dam was long gone in 1997, the stone feeder sluices still survived and were carefully documented by the survey team as a rare example of a type of structure found at only one other location on the Juniata Division. Near the sluices were Lift Locks No. 14 and 15, which had been completely buried under deep fill in the mid-20th century. Today the two locks remain buried under reconstructed US 22/322, but the remains of the feeder sluices unfortunately were lost as a result of the highway project.



Circa 1855 map showing complex of canal structures at the upper end of the Narrows

Remains of feeder sluices

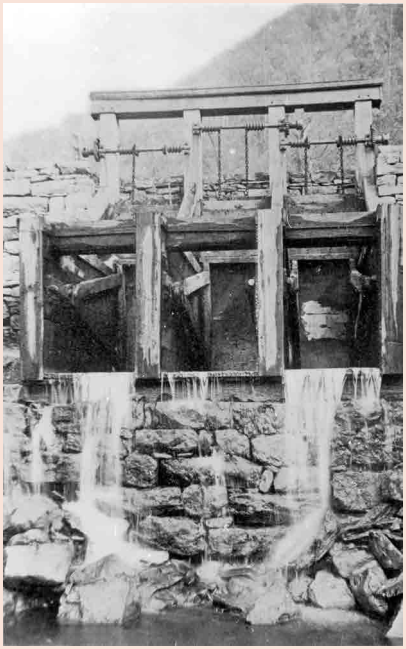
Intact stonework adjacent to the buried Lift Lock No.14



Plan of sluices and eastern approach to Lift Lock No.14

Waste-Weirs

Waste-weirs were sluices with sliding wooden gates which were built into the side of the towpath bank to provide a means of removing excess water from the canal. In dry seasons the gates normally remained closed, but during rainy weather they could be opened to regulate the water level. This was important so that water did not overflow and erode the canal banks. A bridge carried towpath traffic over the weir. There were two waste-weirs in the Lewistown Narrows, one at Macedonia Run near Lift Lock No. 13, and the other at Roaring Run.



The waste-weirs in the Narrows were similar to this one at Dauphin (Ernest Coleman Collection)

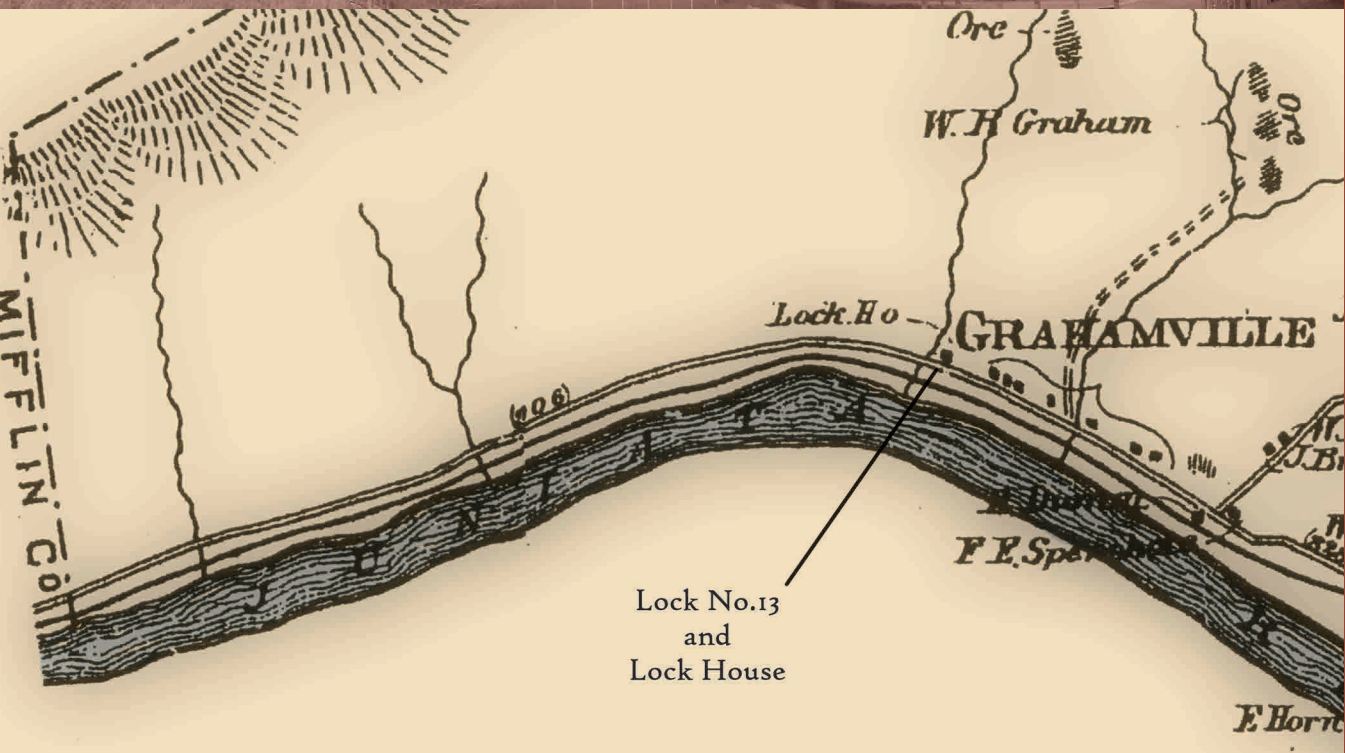
Remains of Waste-weir No.11 at Roaring Run, 1997

Remains of Lift Lock No.13, 1997

Lift Lock No. 13

Lift Lock No. 13 was located at Macedonia Run, near the east end of the Narrows. Although portions of the walls had collapsed and the chamber was filled with sediment and highway fill, archaeology revealed that the original wood floor and other structural elements were remarkably intact. This lock eventually became the centerpiece of the Lewistown Narrows Canal Park.

Archaeology exposed the original wood plank floor of the lock



Lewistown Narrows Canal Park

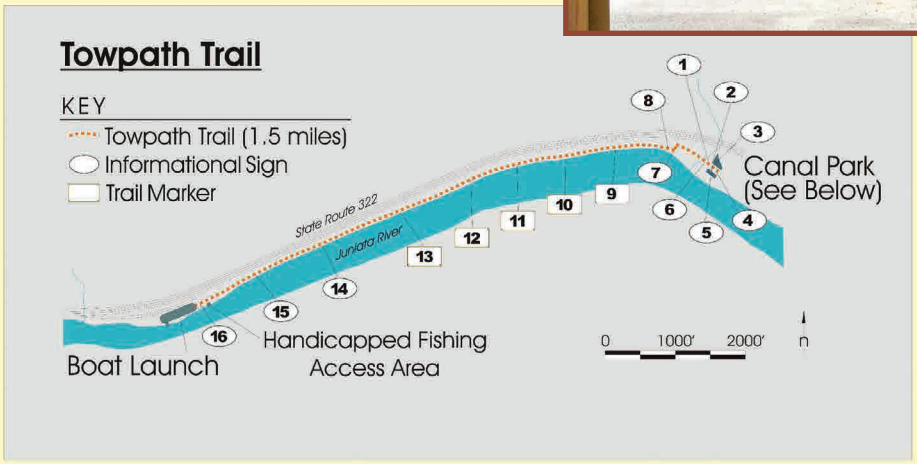
As part of the US 22/322 improvement project the Federal Highway Administration and Pennsylvania Department of Transportation funded the development of a public park designed to interpret the Narrows' transportation history, particularly the story of the Juniata Division of the Pennsylvania Main Line Canal. The park features a stabilized lift lock and restored section of canal, a picnic area, a series of interpretive exhibits, and a 1.5-mile long towpath hiking trail along the river between the canal park and a new Pennsylvania Fish and Boat Commission Access Area. Designed by The EADS Group, Inc. and Heberling Associates, Inc., the park will be owned and maintained by Mifflin and Juniata Counties. It was completed in June 2008.

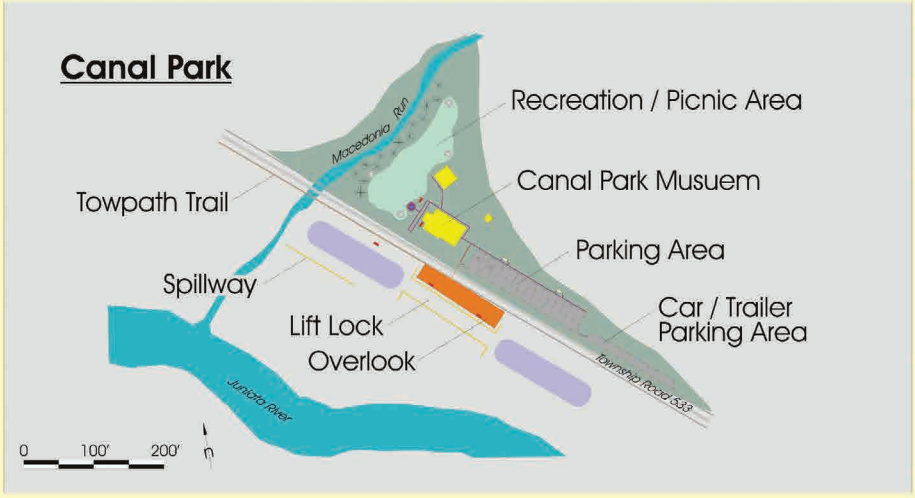
View of Canal Park at beginning of construction, summer 2007

Map modified from Pomeroy, Whitman & Co., 1877

Canal Park entrance sign

Walking Trail Map and Key Points of Interest





Plan of Canal Park and Towpath Trail (The EADS Group, Inc.)

Restoration of Lift Lock No. 13

The centerpiece of the Lewistown Narrows Canal Park is Lift Lock No. 13, one of three locks in the Narrows. Prior to the project, the lock was filled with up to five feet of silt and rubble, and the north wall and both ends had collapsed. However the south wall was mostly intact, and archaeology revealed that the original wood floor and substructure were still in excellent condition. Following archaeological excavation and detailed documentation of the lock, skilled stone masons repaired and reconstructed the chamber walls, following the original 1820s design plans and specifications. A layer of sand was placed in the lock chamber to protect the wood floor and gate remnants which were left in place.

Today the rehabilitated Lift Lock No. 13 commemorates the 88 historic locks on the canal's Juniata Division. It is one of the very few that have survived to the present day and one of a handful in Pennsylvania to be completely excavated and documented through archaeology.

Clearing Vegetation

Excavating Lock Chamber

Lock No.13 prior to restoration, August 2007

Restored Lock No.13, April 2008

Documentation of Upper and Lower Miter Sills and Gate Remnants

Repair and Restoration of Masonry

Restoration of Canal Prism

Prior to the project the canal section to the east of Lock No. 13 had been almost completely destroyed by flooding and erosion. On the north side, fill had been dumped into the canal during the 1930s highway widening. It was necessary to remove the fill and sediment and rebuild the towpath bank to historic specifications.

View looking west toward lock after preliminary clearing, October 2007

View looking west toward lock after rebuilding of towpath bank, October 2007

Final grading of towpath, March 2008

Final grading of berm bank, May 2008

Re-excavation of canal prism at upstream (west) end of lock, January 2008

Final grading of prism at upstream end of lock, May 2008

Feeder Pond and Spillway

Since the canal followed the edge of the Juniata River, it had to cross many small streams. Some of these passed under the canal through stone culverts while others flowed directly into the canal, providing a source of water. Larger streams would have dumped too much silt and debris into the prism, so systems of ponds and spillways were constructed to avoid this problem. One such pond and spillway complex was located at Macedonia Run. The towpath dipped down at this point to permit shallow water to flow across it. Although the pond was filled in years ago, part of the stone spillway remains and was repaired as part of the project.

Exposing original stone erosion protection on towpath bank west of lock, November 2007

Repaired spillway, May 2008

Lock Keeper's House

This house was built in 1860 to serve as the headquarters of a local iron-mining operation, but it also housed the lock-keeper for the adjacent lift lock. It replaced an earlier lock house on the same site. This structure was repaired and then transferred to Mifflin and Juniata counties for possible use as a museum or park office.


Lock Keeper's House, 2005


Lock Keeper's House after restoration, June 2008

Picnic Area and Interpretive Signs


Construction of the picnic area, May 2008


Installation of interpretive signs, May 2008

Bridge over Macedonia Run

A new bridge over Macedonia Run was specially designed to blend into the park's setting

Towpath Hiking Trail

A 1.5-mile hiking trail follows the canal towpath between the Canal Park and the new Pennsylvania Fish and Boat Commission Access Area in the Narrows. Eroded sections of the towpath were repaired so that it can carry foot traffic, but the natural setting was preserved. A series of numbered trail markers refer hikers to a brochure containing descriptive information about historic and natural features.

Construction of the towpath hiking trail, December 2007

Completed trail, June 2008

Completed Canal Park
July 2008

A Sampling of Canal Terminology

Aqueduct: A structure for carrying the canal and towpath across a stream or river when it was too wide for a culvert.

Berm Bank: The bank of a canal opposite the towpath, usually on the land side.

Crib-Lock: A lock built as part of a river dam to maintain boat traffic on the river.

Culvert: A short-span structure that carried a stream under the canal and towpath.

Guard Lock: The lock at the head of a canal which provided access to impounded water behind a river dam. Same as outlet lock.

Lift Lock: A conventional canal lock designed to raise or lower a boat from one level to another by allowing water to flow into or out of the lock as required.

Lock Chamber: The portion of a lock between the two pairs of lock gates.

Lock Gates: The wooden gates at each end of a lock which, when closed, acted as barriers holding back the weight of water. When opened, they allowed boats to enter the lock chamber.

Lock Keeper: The person responsible for the care and operation of a lock.

Miter Sill: Heavy wooden beams on the floor of a lock in the shape of a V. The lock gates closed against the miter sill to form a watertight seal.

Outlet Lock: A lock used to pass canal boats from a canal to a river. Same as guard lock.

Prism: The water-filled canal channel.

Snubbing Post: Vertical posts on each side of the lock chamber to which boats were secured while locking through so they would not be swamped by turbulence.

Stop Lock: A gate within the canal prism. Normally kept open, it could be closed to guard against flooding or to isolate a section of canal so it could be repaired.

Towpath Bank: The bank of a canal, usually on the river side, that carried a path for the use of the animals that towed the canal boats.

Waste-Weir: A structure built in the towpath bank which contained wooden gates that could be lifted to allow excess water to exit the canal.

Weigh Lock: A lock fitted with special scales to weigh boats and cargo so that tolls could be charged.

Wicket Valve: A small gate built into the lower part of a lock gate to let water into or out of the lock chamber. Also called a paddle valve or butterfly gate.

Source: Hahn and Kemp 1999

Background Image: Lock at Dauphin, Pennsylvania (Ernest Coleman Collection)

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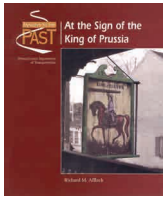
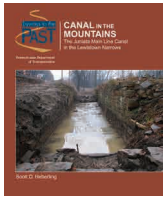
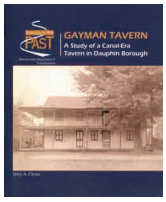
BYWAYS TO THE PAST



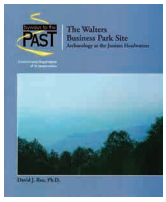
At the Sign of the King of Prussia
Richard M. Affleck
2002



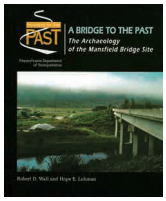
Canal in the Mountains
The Juniata Main Line Canal
in the Lewistown Narrows
Scott D. Heberling
2008



Gayman Tavern
A Study of a Canal-Era Tavern
in Dauphin Borough
Jerry A. Clouse
2003

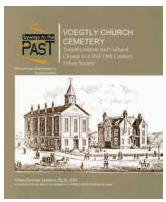


The Walters Business Park Site
Archaeology at the Juniata Headwaters
David J. Rue
2009

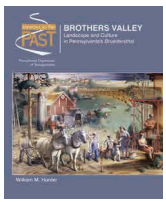


A Bridge to the Past
The Archaeology of the Mansfield
Bridge Site
Robert D. Wall and Hope E. Luhman
2003

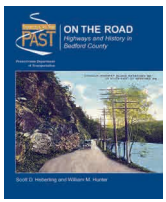
The Wallis Site
The Archaeology of a Susquehanna River
Floodplain at Liverpool, Pennsylvania
Patricia E. Miller
2009



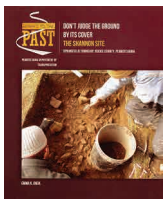
Voegtly Church Cemetery
Transformation and Cultural Change
in a Mid-19th Century Urban Society
Diane Beyon Landers
2006



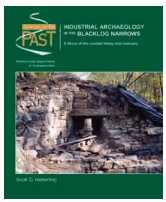
Brothers Valley
Landscape and Culture
in Pennsylvania's *Bruedersthal*
William M. Hunter
2011



On the Road
Highways and History in Bedford County
Scott D. Heberling and William M. Hunter
2006



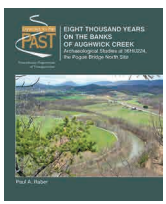
Don't Judge the Ground by Its Cover
The Shannon Site. Springfield Township,
Bucks County, Pennsylvania
Emma K. Diehl
2013



Industrial Archaeology
in the Blacklog Narrows
A Story of the Juniata Valley Iron Industry
Scott D. Heberling
2007

19th Century Quakers on the Frontier
Archaeological Data Recovery Excavations
at the Snook Farm Site, 36BD217
Barbara J. Shaffer, Robert H. Eiswert, Cristie L. Barry,
Charles A. Richmond, and Brenda L. Weller
2017

Connecting People and Places
The Archaeology of Transportation at
Lewistown Narrows
Paul A. Raber
2007



Eight Thousand Years on the Banks of Aughwick Creek
Archaeological Studies at 36HU224,
the Pogue Bridge North Site
Paul A. Raber
2017

The Pennsylvania Main Line Canal was one of many important historic transportation routes that followed the Juniata River and passed through the Lewistown Narrows in Mifflin and Juniata Counties. As part of the environmental and planning studies for the recent reconstruction of US 22/322 through the Lewistown Narrows, the Federal Highway Administration and Pennsylvania Department of Transportation completed a comprehensive survey of archaeological and historic resources. The project included detailed documentation of the Pennsylvania Canal and construction of a public canal park at the eastern end of the Narrows.

This publication presents the history of the canal in the Lewistown Narrows, describes the measures taken to document the remains, and illustrates the process of constructing the canal park. Completed in June 2008, the park features a stabilized lift lock, parking and picnic facilities, interpretive exhibits, and a hiking trail along the old towpath.

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