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ABSTRACT

This teaching guide explores the history of the Chesapeake and Ohio (C & O) National Historic Park, its building and its times. The lesson can be used in units on the early industrial period of U.S. history and in courses on geography or science and technology. Students realize the role canals played in western expansion and in the evolution of transportation by focusing on the construction of the Chesapeake and Ohio Canal. Student objectives include: (1) to describe the importance of George Washington's role in the building of a Potomac River canal; (2) to explain the role canals played in the early industrial economy of the nation; (3) to outline the effect the C & O Canal had on the Potomac River Valley; and (4) to research forms of transportation used in the students' own communities in the early days of development. (LB)

Teaching with Historic Places

The Building of the Chesapeake and Ohio Canal

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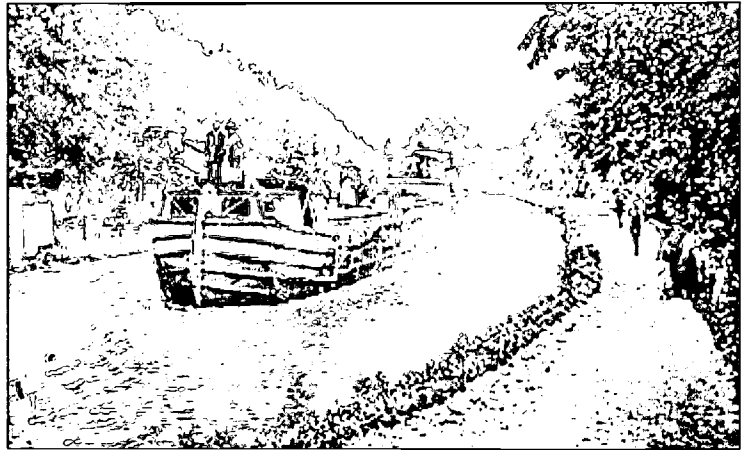
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The Building of the Chesapeake and Ohio Canal

Birds still sing from the trees, and the Potomac River continues to rumble as it rushes through the Great Falls. Other sounds from the past can be imagined if one stands quietly on the towpath of the Chesapeake and Ohio Canal. The shovels of immigrant workers scrape as they carve the canal out of the mountains and ridges along the river; hooves clop as the mules pull coal-laden boats down a crowded canal, their bells keeping beat with the



footsteps of the small children who guide them; a brass lock horn blares and the shout "Heeeey Lock!" alerts a lock tender to an approaching boat; and voices murmur at nightfall as families tie up their boats after a long 16-hour day.

The rich history of the Chesapeake and Ohio Canal, also known as the C & O Canal, is vividly portrayed at several sites along its 184.5-mile route, a route that today forms a beautiful national park along the Potomac River in Maryland and the District of Columbia. Giant trees shade a sandy towpath between the river and the old canal bed, visited by thousands of hikers, bikers, birders, and naturalists who enjoy the spectacular scenery of the park. If they pause long enough, they can also hear the voices of those who lived and worked along the canal during an important era in American history.

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About This Lesson

This lesson is based on the National Register of Historic Places registration form for the Chesapeake and Ohio Canal and other documents. It was written by Sherilyn Seyler, Park Ranger at the C & O Canal National Historical Park, Hancock Visitor Center, and Kathleen Kupper, Supervisory Park Ranger at the Georgetown area of the C & O Canal National Historical Park.

Where it fits into the curriculum

Topics: This lesson could be used in units on the early industrial period of American history and in courses on geography or science and technology. It will help students realize the role canals played in western expansion and in the evolution of transportation by focusing on the construction of the Chesapeake and Ohio Canal.

Time period: Early to Mid 19th Century.

Objectives for students

- 1) To describe the importance of George Washington's role in the building of a Potomac River canal.
- 2) To explain the role canals played in the early industrial economy of the nation.
- 3) To outline the effect the C & O Canal had on the Potomac River Valley.
- 4) To research forms of transportation used in the students' own communities in the early days of development.

Materials for students

The materials listed below either can be used directly on the computer or can be printed out, photocopied, and distributed to students. The map and images appear twice: in a low-resolution version with associated questions and alone in a larger, high-resolution version.

- 1) two maps that indicate U.S. borders in the early 19th century and principal canal routes at mid century;
- 2) three readings on early attempts to build a canal and the economic impact of the canal's completion;
- 3) a drawing showing the building of the Canal;

- 4) a plan for a typical canal boat;
- 5) four historical photographs showing the canal in use.

Visiting the site

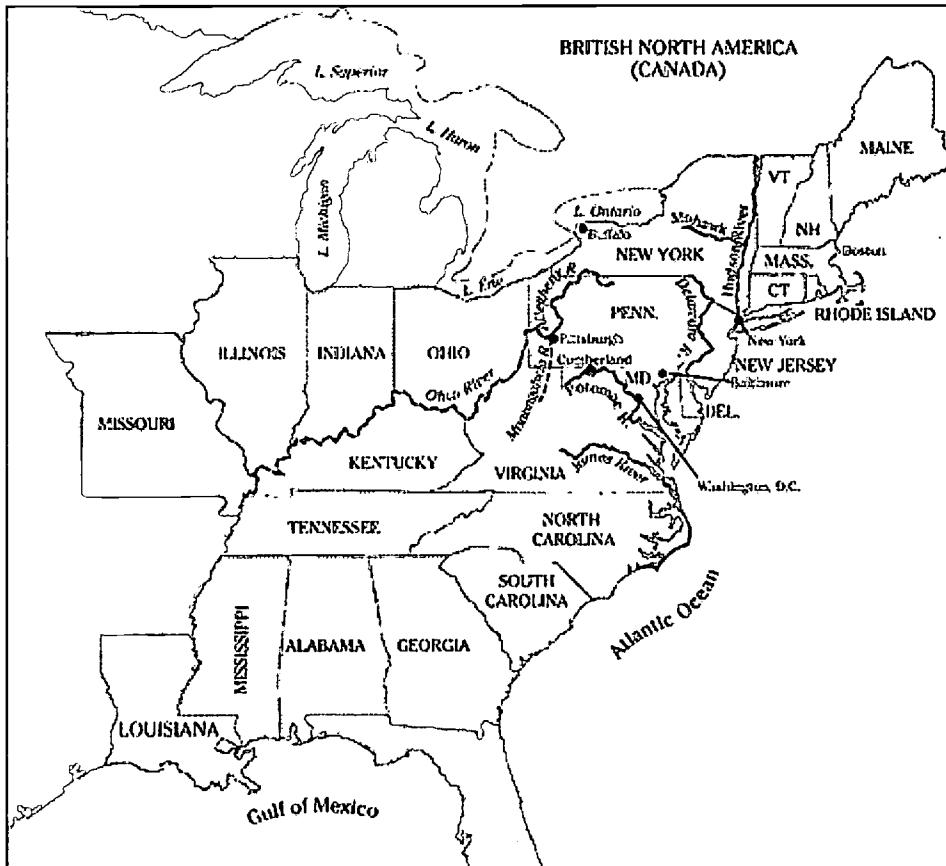
The Chesapeake and Ohio Canal National Historical Park is administered by the National Park Service. The park is 185 miles long and follows the path of the Potomac River. It begins in the Georgetown section of Washington, D.C., where there is a visitor center and mule-drawn boat rides. Other places of interest include the Great Falls and the Great Falls Tavern Visitor Center, Harpers Ferry, Sharpsburg, the Paw Paw Tunnel, the Hancock Visitor Center, and Cumberland. For further information, contact the Superintendent, C & O Canal National Historical Park, Box 4, Sharpsburg, Maryland 21782 or visit the park web pages at <http://www.nps.gov/choh/>

Setting the Stage

The Chesapeake and Ohio Canal, begun in 1828 and completed in 1850, was an artificial waterway constructed along the Potomac River. It succeeded an earlier venture, led by George Washington, to improve navigation of the Potomac by constructing canals. The C & O was intended, as its name suggests, to connect the Chesapeake Bay to the Ohio River, but it never made it that far. Rough terrain, problems with acquiring a right-of-way, labor shortages, and too little capital consistently delayed work, and by the time the canal reached Cumberland, Maryland, about half-way to the Ohio, the Baltimore & Ohio Railroad had diminished the need for a water route to the Ohio Valley. When the full canal opened in 1850, a boat traveling northwest from Washington, D.C. to Cumberland covered 184.5 miles and passed through 74 lift locks that elevated it 605 feet, enough to compensate for the Potomac's fall as the river flowed down to the bay. The C & O closed in 1924, but during its 75 years of operation it provided the Potomac River Valley a major commercial route.

Locating the Site

Map 1: United States in 1821



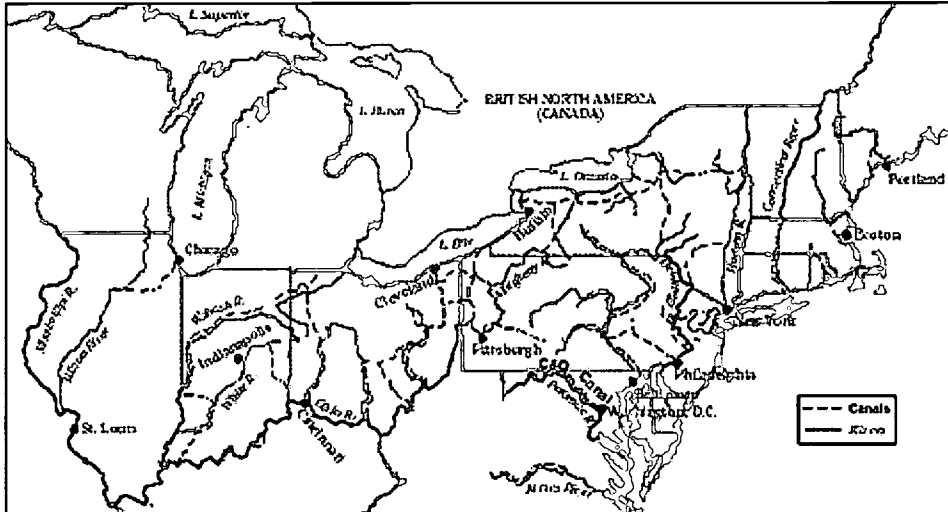
Questions for Map 1

1. In 1821, what were the western states?
2. Given that rivers flow towards the ocean, in which direction do the major rivers east of the Appalachian Mountains flow? What about the rivers west of the Appalachians? Why might this create a problem for cross-country trade?

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Locating the Site

Map 2: Principal canals built by 1860.



Questions for Map 2

1. Why do you think canals were built along major rivers? What did the rivers provide that the canals needed?
2. Few of the many canals that were built by the middle of the 19th century are still in use today. Why do you think canal travel declined?

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Determining the Facts

Reading 1: George Washington's Influence on the C & O Canal

George Washington has often been called "the father of his country," but he is also considered to be the "father of the C & O Canal." During his lifetime Washington devoted much time and energy to the project of building a canal along the Potomac River.

Washington's interest in the canal began when Lord Fairfax of Virginia hired him to survey Fairfax's western lands. This job took the young Washington along the Potomac into the Ohio Valley, and as he walked through the wilderness he realized that the river provided the most direct route from the tidewater to the Ohio Valley. He also saw all the obstacles that stood in the way of navigating the Potomac: it flowed west to east, had many rapids and whirlpools, and at Great Falls the river dropped 75 feet through a rock-filled gorge in less than half a mile. Yet Washington saw in the fertile Ohio Valley the potential for western expansion, farming, and development. After several more journeys to the head of the Potomac, he realized the greatest obstacle to development was poor internal travel. A canal had never been attempted in America but he became convinced that a water route was possible.

In 1774, Washington introduced a bill into Virginia's House of Burgesses to build canals around the Potomac's five worst obstacles. A boat would be poled down the river and would detour around each obstacle by using the skirting canals and locks. Maryland, which shared jurisdiction over the river, rejected the plan.

In 1784, just after the Revolutionary War, Washington resumed his efforts to promote the canal. Now that Washington was a national hero, Maryland endorsed his plan. The Potowmack Canal Company was created in 1785 and Washington was chosen as its first president. He was frequently on the work site as canals that skirted the obstructions were constructed, channels dug, and boulders removed. The work was extremely difficult, especially at Great Falls. The lock system installed there, which gradually lowered boats down to the level of the river below the falls, has been recognized by construction experts as an engineering marvel.

George Washington died in 1799. His Potowmack Canal was completed in 1802 and operated until 1828. As many as 1300 boats used the route in some years, each carrying up to 15 tons of cargo. The canals made 218 miles of the Potomac River navigable; that is, it did so when the river wasn't frozen, too shallow because of drought, or overflowing because of floods. Some years there were only about 45 days when the water reached a sufficient level for the locks to operate. The Potomac itself was unpredictable and often tore up boats in rapids and whirlpools. Because no one could pole against the strong current, boats had to be broken up in Georgetown and sold

along with the other cargo. A more effective way was needed to navigate the Potomac.

In the 1820s the rights of the Potowmack Canal Company were transferred to the new Chesapeake and Ohio Canal Company. That company planned to build a continuous canal that would link the Chesapeake Bay to the Ohio River. This canal would also parallel the Potomac, but boats would not have to enter the river itself. Boats would be tied to mules that walked along the towpath, a dirt strip parallel to the canal. Dams built on the river would insure that canal always had a constant water level, and lift locks would carry boats through the changes in elevation along the route.

A lift lock was a watertight section of the canal that had wooden gates at either end. If a boat were traveling upstream, for example, it would enter at the downstream gate; the upper gate would already be closed. Once both gates were shut, paddles in the upstream gate would be opened to allow water into the lock. As the water flowed in, the boat would lift until it was at the level of the canal outside the upstream gate. That gate would then be opened, and the boat would continue on its trip. The process would be reversed for a downstream trip, with the lower gate gradually draining water until the level inside the lock matched the level outside.

This would be, the company thought, an absolutely dependable way to navigate boats and deliver cargo to and from the Ohio Valley. As it turned out, though, George Washington's dream of connecting the tidewater to the Ohio Valley by Potomac River navigation would never be realized.

Questions for Reading 1

1. Why did George Washington want to improve communication and transportation with the Ohio Valley?
2. Did the Potowmack Canal accomplish his goal? Why or why not?
3. How did a lift lock take advantage of gravity?

Reading 1 was adapted from the National Park Service's official handbook to the C & O Canal National Historical Park, 1991.

Determining the Facts

Reading 2: The History of the Canal

On July 4, 1828, President John Quincy Adams turned over a spadeful of dirt during ceremonies at Little Falls, Maryland, and therefore began construction of the Chesapeake and Ohio Canal. It was officially the work of the C & O Canal Company, which raised about \$3.6 million from private and public investors. Included among its stockholders were the federal government, the states of Maryland and Virginia, and the cities of Washington, Georgetown, and Alexandria; all of them hoped the waterway would bring trade and therefore jobs to the region. As it turned out, events that day would affect the C & O in another way, because it was also on the 4th that work began on America's first railroad, the Baltimore and Ohio (B & O).

From the start, problems slowed progress on the canal. An acute labor shortage forced the company to recruit workers from other states and abroad. Disputes arose with landowners who resisted efforts to purchase necessary land. A long legal battle with the B & O involving the right-of-way between Point of Rocks and Harpers Ferry slowed construction of both the canal and the railroad until about 1832. Inflation increased the cost of labor, materials, and land during the late 1820s and 1830s until they far exceeded the original estimates. Labor unrest among the predominantly Irish workers and the financial panic of 1837 added more difficulties, and between 1842 and 1847 construction stopped entirely. The canal was finally completed in 1850 at a total cost of \$11 million, the original plan to extend the waterway over the Allegheny Mountains having long since been abandoned.

Boats began to appear on the canal soon after the first short section was completed in 1831 between Little Falls and Seneca. Trade increased as other segments opened in western Maryland, and cargoes of flour, grain, building stone, and whiskey began to move down to Georgetown. Not until the canal reached Cumberland, however, did the tonnage increase substantially. Large quantities of coal from the Cumberland region began to be shipped, and by 1871, the peak year, some 850,000 tons were carried down the canal. Trade was so busy that at times more than 500 boats were in operation on the canal.

Coal traffic then began to decline, however, as mining companies shifted more of their business to the B & O Railroad. A major economic depression in the mid-1870s and major floods in 1877 and 1886 put a severe strain on the C & O's finances. In 1889 another serious flood forced the canal company into receivership, at which point the B & O Railroad bought up the majority of C & O's bonds. The railroad had captured almost all of the canal's trade by 1924 when another devastating flood struck. This time no repairs to the canal were made, and its operation as a trade route came to an end.

In 1938 the railroad sold the entire canal to the U.S. Government for \$2 million, which placed it under the supervision of the National Park Service. The Park Service did some

restoration under the emergency work programs of the 1930s, and other repairs took place in the following decades. In 1961 President Eisenhower proclaimed the canal a national monument. In 1971 Congress declared the C & O Canal a National Historical Park, thus conserving its historic and natural features for all to enjoy. Today, visitors can examine how the locks work, take rides in canal boats pulled by mules, and bike and walk along much of the canal's 185 mile route.

Questions for Reading 2

1. Why did governments at the local, state, and even federal level help pay for the canal?
2. What kinds of troubles plagued the builders of the canal?
3. What kinds of products were carried on canal boats?
4. What natural disasters hastened the closing of the canal?
5. Why do you think shippers chose to use the railroad rather than the canal?

Reading 2 was adapted from the National Park Service's official handbook to the C& O Canal National Historical Park, 1991.

Determining the Facts

Reading 3: Serving the Potomac River Valley

The Chesapeake and Ohio Canal brought a variety of benefits to the Potomac River Valley, an area that was predominantly agricultural. Construction created many jobs, both skilled and unskilled, but there were not enough workers around to fill them all. As a result, wages went up, and many new workers came from other regions or from other countries.

The building of the C & O helped other people in the region. Landowners profited directly from the sale of their property to the canal company and indirectly because surrounding property increased in value. Others established construction firms that produced good profits because building materials were in high demand. Workers needed food and shelter, which created more jobs local farmers and builders.

The canal continued to help the region's development after it opened. It lowered the cost of transportation, which allowed industries and farmers to ship their goods farther. Cheaper freight rates also made it possible to bring in more goods: farmers, for example, could now import fertilizer and thereby rejuvenate soil that had lost most of its nutrients.

The owners of and workers in the coal mines near Cumberland were among the biggest beneficiaries of the canal. Competition between the B & O and the C & O for cargo reduced freight rates; as costs fell, the profits for mine owners and operators increased. Georgetown shippers who carried the coal to New England textile mills and iron-smelting operations made substantial profits as well.

Other canal-related industries supported many families in the Potomac Valley. Water flowing through the canal powered new grain mills, foundries, and textile factories, all of which produced still more jobs. Some members of the construction teams took on the positions of canal boat captains and crew, while others found jobs as lock tenders and maintenance workers. As boat building and repair became a profitable occupation, dry docks were constructed in various locations along the canal to provide places for these repairs. Many people operated grocery and feed stores along the waterway. Merchants provided provisions for boatmen, their families, and their mules. The pay the workers received from the canal company was usually spent in the neighboring towns and cities along the canal.

Competition from the B & O Railroad and destructive floods eventually put the canal out of business. Although it never provided great fortunes for its investors, the canal did serve the Potomac Valley for nearly a century and stimulated growth in the region.

Questions for Reading 3

1. Who benefitted during from the canal's construction? In what ways were their lives improved?
2. What types of jobs did the completed canal provide the people of the Potomac Valley?
3. The reading describes many benefits that the C & O Canal brought to the Potomac Valley. Do you think anyone in the area disliked the changes that resulted from its construction? If so, why do you think they might have felt that way?

Reading 3 was adapted from the National Park Service's official handbook to the C & O Canal National Historical Park, 1991.

Visual Evidence

Drawing 1: Building the Canal



(David Demero, C & O National Historical Park official handbook, 1991)

The canal was built mainly with hand tools and horse power. Construction did not simply begin at one end and progress steadily to the other end, leaving a finished canal in its wake. Instead, the job was let to dozens of contractors in 1/2 mile sections, and, for the most part, they worked simultaneously. Their activities would not have been performed concurrently or so close together, but they are shown together here to make portraying this work easier.

In the distance the tunnel is being dug (1). Blasting was often necessary to clear a path for the canal. After trees were cut or broken (2), stumps were pulled out with huge, horse-powered winches (3). Root-cutting plows (4) scraped the surface in preparation for digging (5), berm-building (6), and puddling with waterproof clay (7). Cut stone (8), pre-built lock gates (9), and iron hardware were shipped to the site, where workers constructed aqueducts (10), feeder dams (11), guard locks (12), culverts (13), retaining walls (14), lift locks (15), waste weirs (16), and stop locks (17).

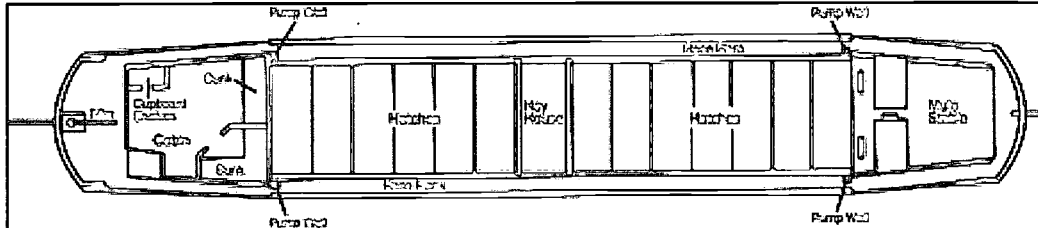
Questions for Drawing 1

1. If the canal were being constructed today, what machines would have been helpful? On which jobs would they have been used?

2. Engineers designed the canal to give lockkeepers as much control over the river as they could. What do you think each of the following elements did, given their names and locations?
- a) feeder dams (11)?
 - b) guard locks (12)?
 - c) waste weirs (16)?
 - d) stop locks (17)?

Visual Evidence

Drawing 2: Typical Canal Boat



Canal boats were 90 to 95 feet long, approximately 6 feet high, and roughly 14.5 feet wide, only inches narrower than the locks. Each of the hatches were about 4 feet wide and the cargo was packed tight and covered. Usually the boats were built of pine, with oak bottoms. Mules were the normal mode of power for canal boats. Boaters used two mules at a time and had to carry the animals feed. The teams were changed every few hours.

Questions for Drawing 2

1. How does the diagram above help you understand the carrying capacity of canal boats. How efficient do you think they were?

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Visual Evidence

Photo 1: The Four Locks Community



The Four Locks community developed in a region where the Potomac River makes a hairpin turn, traveling a loop of about four and half miles before returning to within a half mile of itself. The Canal Company decided to shorten its route by cutting across the neck rather than following the river bank. This decision created problems, though, because it meant they had to build four locks (numbers 47 through 50) close together to compensate for the rise of the river over those four-and-a-half miles. The community that developed there consisted of several buildings, including a lockhouse (a home for the lockkeeper and his family), a store, several houses, a barn, a wait house (for those on the boats), a warehouse, and a school.

Questions for Photo 1

1. Why might a store at Four Locks attract a lot of business? In other words, why might a family be more likely to shop there than at a store near just one lock?
2. Why would a school be located in such a remote area?

Visual Evidence

Photo 2: The Round Top Cement Company



Photo 2 shows the Round Top Cement Company located at mile 127.4 of the canal. As land was being surveyed for the canal, investigators found a large outcrop of limestone along the river, on the downslope of a hill called Round Top. A Mr. Shafer immediately built a plant to turn the limestone into cement on what would become the berm side of the canal. A berm is generally a bank of earth; in this case, it is the side of the canal where the towpath does not run. The river provided water power until the canal was built, and then the plant used water from the canal. As of 1882, the plant employed 100 workers, and it could produce up to 2200 barrels of cement per week.

Questions for Photo 2

1. Look at Drawing 1. For which parts of the canal itself might the cement manufactured here be used?
2. The business dwindled and came to halt in the 1920s. How do you think the decline of the use of canals impacted the business of the Round Top Cement company?

Visual Evidence

Photo 3: Boatyard at Cumberland, Maryland.

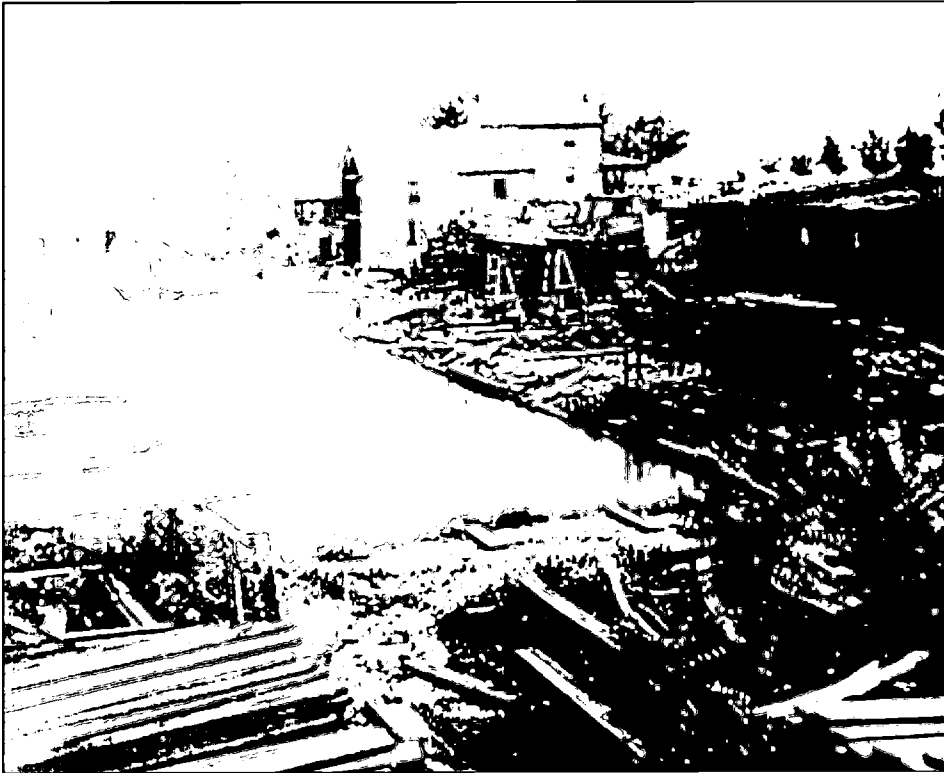


Photo 3 shows the C & O Canal boatyard in Cumberland. On the right, a new boat is being built; in the foreground, processed lumber is stacked in preparation for new construction; and the boats in berths in the background may be for sale or may be in storage after undergoing repairs.

Questions for Photo 3

1. Why is a boatyard necessary for the canal to be effective?
2. Where along the canal do you think would be the best place to locate a boatyard? Why?

Visual Evidence

Photo 4: Daily Life on the Canal



Photo 4 shows a canal family who lived on their boat. The cabins under the deck of the boat were hot and stuffy, so people tended to spend as much time up on deck as possible. The chains attaching the children to the boat allowed for considerable movement, but prevented them from falling into the canal.

Questions for Photo 4

1. Look back at Drawing 2. What do you think it would have been like to grow up on a canal boat? What would have been the good parts? What would have been the bad ones? How would daily life have been different from your life today?

Putting It All Together

The C & O Canal was part of a grand vision of western expansion. Although it never fulfilled its goal of connecting the Chesapeake Bay to the Ohio River, it did have a remarkable impact on the settlement and development of the Potomac River Valley. The canal was one of the nation's most ambitious 19th century industrial experiments, and it served its region well for nearly a century. The following activities will help students understand the impact of canals and other forms of transportation.

Activity 1: Living Beside a Canal

Ask students to imagine that they are a part of a family living in a small 19th-century community within sight of the canal. Have them write a letter to a relative who lives in another region and has never seen a canal or a canal boat. In the letter, they should describe the sight of boats passing along the canal and explain the benefits the canal has brought to their community.

Most school or public libraries have works on canals that students might wish to use. Especially helpful are Elizabeth Kyle, *Home on the Canal* (Cabin John, Md., and Washington, D.C.: Seven Locks Press, 1983), which contains the memories of men and women who lived and worked on the C & O Canal; and Harry Sinclair Drago, *Canal Days in America* (New York: Bramhall House, 1972), which discusses most of the major canals constructed during the 18th century.

Activity 2: Canals or Railroads?

It is July 4, 1828, at Little Falls, Maryland. President John Quincy Adams will shovel earth to signal construction of the Chesapeake and Ohio Canal. In Baltimore, Maryland, Charles Carroll will break ground for the Baltimore and Ohio Railroad. Both gentlemen have the same goal of reaching the Ohio River Valley for trade. Have the students pretend that they are financiers living in the early 1820s and are eager to invest in improved transportation. They should decide whether to put their money in canals or railroads, then write a letter to their board of directors justifying their choice.

Activity 3: Transportation and the Local Community

Have the students investigate the early transportation systems of their own community. Most of America depended on horse or oxen and wagons to carry goods and agricultural products before canals and railroads were built. Have the students work alone or in groups to research the following questions (and others they may pose):

- How long were wagons used in their region?
- Where, when, and how did roads begin to be "improved"?

- When was the first canal or railroad serving the community built? With which market cities were they connected?
- How did improved transportation change the local economy? Have the students present the results of their research to the entire class.

The C & O Canal--Supplementary Resources

The Building of the Chesapeake and Ohio Canal examines the construction of this canal to illustrate the important role canals played in western expansion. Below are materials for further exploration of the subjects this lesson considers.

The Chesapeake & Ohio Canal National Historical Park <http://www.nps.gov/choh/>
The C & O Canal NHP is a unit of the National Park System. The park's web pages provide a detailed history of the park, historical photographs, and information about visiting the park.

C & O Canal Association <http://www.omcdesigns.com/canal/>
The C & O Canal Association was formed in the 1950s in an effort to preserve the Chesapeake and Ohio Canal. Today, the Association maintains its mission of protecting, and promoting the assets of the C & O Canal National Historic Park.

The Potomac Conservancy <http://www.potomac.org/>
The Potomac Conservancy offers information about ways to help protect the C & O Canal and the Potomac River.

National Canal Museum <http://www.canals.org/>
The National Canal Museum offers more information about the canals role in American commerce and transportation.

North American Canals <http://www.canals.com/northam.htm>
This web site provides information about the history of canals through the United States, notices about upcoming events at various canals, and links to related sites.



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