

Mercer Boat Program

Compiled by Deena Barlev 2015-16

Safety:

- Hands and objects inside boat; operators may be walking past
- Sit while in lock and turning
- Please no 21st century technology (cell phones for pictures only)

Introduction

- Welcome to **The Chesapeake & Ohio Canal National Historical Park**—“a very long name for a very long park”—184.5 miles (296.9 km) from **Georgetown** in Washington, DC, following the Potomac River NW to **Cumberland**, MD at edge of Appalachian Mountains
- Name C&O reflects original ambitious goal: **to build a navigable waterway from tidewater at Georgetown to the Ohio River**
 - compare Canal to River—*how different?*
 - shallow, smooth, **man-made** CANAL (about 6 feet deep)
 - deep, dangerous, **natural** RIVER with swift current, undertow, waterfalls and rocks (too dangerous – “only ONE one-way trip possible”)
- **What is a canal?** Man-made waterway used to move goods and people; can you name other famous canals? (hundreds all around the world)
 - Erie – 360 miles connecting Atlantic Ocean with Great Lakes
 - Panama – 48 miles connecting Atlantic and Pacific Oceans
 - Suez – 120 miles connecting Mediterranean and Red Seas in Egypt
- C&O Canal 60-80 ft wide, originally 6 ft deep but now only 2-3 ft in some areas
- Towpath originally 12 ft wide but now only 7 ft in some areas
- Because of Potomac’s winding path, not useful to refer to north/south/east/west
 - rather **upstream** and **downstream**, and
 - **river** side and **berm** side (berm always the side opposite the towpath)
 - **towpath** always runs along river side of Canal (with few minor exceptions)
- **July 4, 1828** - construction of the Canal, dubbed “The Great National Project,” began—the same day the B&O Railroad broke ground (attended by President John Quincy Adams)
- **1831** – first stretches of Canal opened while construction continued
- **1850** – construction eventually stopped when Canal reached Cumberland; original plan was for Canal to go much further west, but the COMPETITION from RAILROADS had not been foreseen (cost \$14 million to build)

- From **1828-1850** (22 years of construction) thousands of immigrants found work on the Canal (nicknamed “The Grand Old Ditch”) digging the canal, building locks, culverts and aqueducts
- **During Civil War (1861-65)** it was perilous to operate boats on Canal that extended along Potomac—the boundary between the North and South; confederate raiders burned canal boats and sabotaged parts of Canal; Union Army seized boats to re-purpose them (musket balls have been found along Canal, where they were traded across Potomac)
- **1889** – massive flood caused the **C&O Company** to enter receivership, and was acquired by the **B&O Railroad** (who didn’t want the right of way to fall into the hands of a rival railroad); B&O operated Canal for several decades but invested only minimally in its upkeep
- **1924** – another devastating **flood closed Canal for good**; some talk of repairing Canal in 1929 but with onset of Great Depression, plans never realized
- **Canal “done in” by Man** (receivership), **Nature** (floods) and **Machines** (railroad)
- Canal operated from **1831-1924** (93 yrs) but was only profitable for about 4 of those years, in the **late 1870s**
- **1938** – 184.5-mile long stretch of property (almost 20,000 acres) acquired by Federal Government for only \$2 million (BARGAIN!!) and put in the domain of the **National Park Service**
 - **1950s** – NPS proposed to turn Canal into a scenic Parkway like Skyline Drive
 - **1954** – **Supreme Court Justice William O. Douglas** reviled the thought of destroying and paving-over the beautiful river corridor, which he called **“a refuge, a retreat, a long stretch of quiet and peace”**; challenged editors of *The Washington Post*—who were in favor of the proposed construction—to walk the entire towpath, which persuaded them to come out in favor of keeping the land natural—THOUGH IT TOOK THE EFFORTS OF MANY INDIVIDUALS AND ORGANIZATIONS OVER **ANOTHER 17 YEARS** FOR THE C&O CANAL TO BE DESIGNATED A NATIONAL PARK:
- President Eisenhower made C&O Canal a **National Monument** in **1961** under the Antiquities Act; President Nixon signed into law the C&O Canal National Historical Park Act on Jan 8, **1971** - designating the ***Chesapeake & Ohio Canal National Historical Park***

Locks and Aqueducts

- **Lock** – device for raising and lowering boats between stretches of water of different levels; a “hydraulic elevator”
- **Leonardo DaVinci** - 15th-16th century Italian inventor who devised and sketched plan for lock gates (MITER lock is two 45 degree angles meeting each other)
- River and Canal flow **DOWNSTREAM**, but boats had to return **UPSTREAM** and climb approximately 605 feet over 184 miles
- Solution? Series of **74 lift locks** (plus one **Tide Lock** in Georgetown), each of which raised or lowered a Canal boat **8-10 feet** to the next level of Canal; generally took about **10 minutes** to “lock through” (fastest on record 2 ½ minutes in 1831)
- Every lock had a lock keeper who was responsible for opening and closing the locks 24 hours a day and lived in the lock house (painted white to be seen at night); when locks were close together, one lock keeper might be responsible for 2 or 3 locks (Georgetown, Great Falls)
- As boat approaches lock, boatman blows 3 notes on tin horn and calls out “HE-EY, LOCK!” As boat moves upstream, lower gates are opened and upper already closed; boat travels into the lock, boatmen close lower gates, sealing lock
- Gates weigh 2 tons but a person can push them because they are giant levers and balance beams
- Notice: boatmen tie up boat to “snubbing posts” when in lock so it doesn’t move
- Your bathtub is like a lock: When tub is plugged, your rubber ducky will rise as water is added to tub, and sink as water drains out
- In order to let in the water, doors called **PADDLES** (or butterfly valves/wickets) are opened with a **LOCK KEY** made of iron (show key); **LOCK KEY** is a giant wrench. Watch how the boat crew uses this wrench to turn the iron rods (or stems) attached to the paddles (show model)
- Lock keeper shouts, “**LOCK READY**” before turning key; boatman responds “**LINE READY!**” Impossible to open until water level is **exactly even on both sides of gate**
- 100 ft rope attached to 2 mules walking on the towpath; boat begins to travel by mule power
- Only 1 boat at a time can pass through lock; at its busiest, 550 freighters on Canal, so sometimes traffic jams at locks
- **Other structures** built as a part of Canal:
 - **feeder locks** behind dams allow water from Potomac River to flow in/out of Canal as needed (Violettes Lock in Seneca)
 - **guard locks** protect Canal during floods by diverting flood waters back into the Potomac
 - **culverts** (structures that allow water to flow under the Canal) – about 200 built to cross small streams

- **Paw Paw Tunnel** – 3,118 ft (about $\frac{3}{4}$ mile) long, under a mountain
 - tunnel took almost twelve years to build
 - only wide enough for single lane traffic; in one notorious incident, two captains refused to budge for several days and had to be smoked out by burning a roaring fire of cornstalks at upwind entrance to tunnel
 - **aqueducts** (bridges that carry water) – 11 built to enable the Canal to cross major streams
 - **Monocacy Aqueduct** at Mile 42, considered by many most beautiful feature of Canal
 - constructed of pink and white quartz sandstone quarried from base of nearby Sugarloaf Mountain
 - withstood Confederate attempts to blow it up during the **Civil War**
 - suffered extensive damage during **Hurricane Agnes in 1972**
 - **Mary's Wall** – at Mile 13.9 “dry laid” (no mortar) retaining wall, over 50 ft tall—one of the tallest in existence on earth!
 - **Stop Gates** – 7 on Canal, including one at Great Falls, to hold back water in the level behind the gate in the event of a breach in the section below or a need to drain and repair the lower section
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- Today there is water only in **first 22 miles** of Canal, but rarely enough to float anything more than a canoe
 - Parts of Canal have been completely re-watered, and some towns along its path are hoping to do more in the future, but in the meantime, much of the bed of Canal is filled with trees and shrubs

Boats and Cargo

- **THIS BOAT**, the **Charles F. Mercer**, named for first president of the C&O Company (1828 to 1833) is called an **excursion boat** (a packet modified by the addition of a “bird cage” canopy)
 - took people on day trips between DC and Great Falls (15-mile, 4-hour ride each way)
 - this boat is 56 feet long at the waterline, weighs 7 tons (~15,000 lbs) but even one person could move it (flat bottom, less friction on water)
 - boats made of oak and pine, sealed with Creosote
- **MOST BOATS** traveling on Canal were freighters or **CARGO BOATS** (*show model*)
 - NOT “barges” which did not have cabins, stables or rudders
 - fully-loaded cargo boat weighed as much as 150 tons (330,000+ lbs)
 - locks’ dimensions: 95-100 ft long, 15 ft wide, 12-18 ft deep
 - boats had to be smaller than locks’ dimensions, max: 90 ft long, 14 ½ ft wide; fully-loaded freighter could draft 4 ½ ft
 - a lock could hold 90,000 gallons of water
- What did CARGO boats carry?
 - “COAL to heat, WHEAT to eat, LUMBER to sleep (homes)”
 - **DOWNSTREAM** from interior to port city: **primary cargo was coal** from *Allegheny Mountains* (100-120 tons per load) but also bulk goods from farms, forests, and mines, e.g., fruits and vegetables, lumber, wheat, flour, oats, pork, grain, whiskey, cement, red sandstone – used to build Canal locks, Smithsonian Castle and other structures in DC (spare red sandstone still in storage as needed to repair locks or Castle)
 - **UPSTREAM** to interior carried goods and merchandise (e.g., guano for fertilizer, tobacco, salt, salted fish, oysters, potatoes, bricks, manufactured goods, supplies for remote lock houses and settlements)
 - made the trip from Cumberland to Georgetown in about a week
 - fee (\$15.50 one way) paid at the end of the trip, like a toll road, or could be paid on account
 - **stern** = back, **bow** = front, **starboard** = right, **port** = left
 - 4 sections of boat:
 - small area in stern – **family cabin** or living quarters:
 - about 12x14 ft, had chairs, table, bunks, small coal- or kerosene-burning stove, storage (bunk beds, shelves)
 - wooden lever called **tiller** (to steer boat) also at stern
 - “bathroom” was chamber pot that got dumped overboard— Canal water POLLUTED and UNSANITARY—**not safe for bathing, drinking, cooking or even swimming, although they did swim**

- two **cargo holds**, one forward and one aft of mid-ship's cabin, 6 ft deep
 - at bow – **stable** for two recovering mules
 - at mid-ship – **hay house** with corn, hay and other food for a total of 4 mules (worked 2 at a time in 6 hour shifts called “tricks”)
- 1870s – “hey-day of Canal” – 500-550 boats on Canal (approximately 3 per mile); could be 15-20 boats at a time waiting near some locks that were bunched together (evidence that it was profitable to transport goods via the Canal)
- **What moves boat?** mules, people, wind, current (downstream only)
 - **The Canal is a river** and its current is approximately ½ mile per hour
 - Canal declination (downhill slope between locks) is 1” per mile
 - 75 ft drop at Great Falls
- **Level** – stretch of Canal between locks; the 184.5 miles of Canal divided into **69 segments**, varying in length from ~ 1 to 5+ miles long, usually 2-3 miles long
- mules pulled boats into and out of locks (unlike the way we do it now)
- boat travels about 2-2 ½ mph
 - in 1800s 2 mph was fast speed to move cargo (in those days you traveled by foot, boat or horse)
 - maximum speed 4 mph to minimize WAKE (waves caused by movement of boat thru water)
- **How did boats pass each other?**
 - There was hierarchy of boats (“etiquette”) that had right of way: packets, then loaded freighters, then empty freighters, then tour boats, then everything else
 - Lower class boats would pull over to the **berm** side (opposite of towpath side), pull mules to the river side, then stop the mules, which let towline go slack and sink to bottom of Canal; boat with right-of-way would then **float over towline of other boat**, their mules would step over the other boat's line, and once clear of each other, both would come up

Mules

- *See separate “What Do You Know about Mules?” resource for more information*
- Mule is hybrid of **Mom Mare** (horse) and **Dad Donkey**
- Why did Canal boats use mules, not horses?
 - mules are stronger, sturdier, have more patience and stamina than horses
 - “If a horse is like a race car and an ox is like a tractor, a mule is like a pick-up truck”
 - mules require less maintenance than horses, have fewer hoof/leg problems
 - mules work well together in pairs
 - mules are smarter than horses and won’t put themselves in danger or work themselves to death (will “quit at end of shift”)
- Mules are harnessed one behind the other, slantwise, which pulls the boat straighter than if they walked abreast
- Those who walk the mules on the Canal towpath are called "Drivers" (not "muleskinners" or “hoggees” as in other places)
- Mule commands:
 - “GIDDYUP” or “COME UP” or “STEP UP” = go
 - “GEE” = turn right
 - “HAW” = turn left
 - “WHOA!” = stop
 - “COME AROUND” = turn back
 - “GET UP” + kissy sound = speed up
- working (**cargo**) **boats** used teams of 2 mules, working in 6 hour shifts called “tricks”
- path mules walked on called TOWPATH because it was built for mules to tow boats; was soft from “mule cakes” or “mule muffins” that were left where they dropped
- if boat stopped at night, mules rested on shore; were fed hay and “feed” (high-protein mixture of oats, molasses and other ingredients)
- during winter, mules were usually stabled with local farmers (who did not necessarily take good care of them; mules often got “scrawny” over the winter)
- mules could usually work up to 15 years on the Canal; if well cared-for, mules can live 40 years or more (“anything over 25 years is a gift”)
- children as young as 7 years old were responsible for mules
 - woke up at dawn, worked in multiple 6-hour shifts called “tricks”
 - sometimes rode mules, usually walked barefoot (shoes were expensive!) on soft towpath and warmed their feet in “mule cakes”
- At least one Captain used his dog to drive mules and also to swim into Canal to take the towline to hitch the mules

Life on the Canal

- Canal boats generally had crews of three to five, often all members of the same family
- Whole families lived on boats, but NOT ALL families ALL lived on boats ALL the time; more likely that some kids lived on boat with a parent OR on land with a parent
- Each family member had a role on a cargo boat (roles interchangeable)
 - Father remained in the bow to grab a line or pole if things went wrong
 - Mother steered boat and did other “woman’s work” on the tiller deck of the family cabin; sometimes cooking, laundry, mending, child care
 - very young children tethered to deck so they didn’t fall off (many children drowned because Canal too dirty to learn to swim in, strong undertow near locks)
 - Children who lived on Canal boats with their families were part of the work force. Kids as young as 7 took care of mules: brushed, harnessed, fed, cleaned stable, walked with mules on towpath, carried lantern to help mother or father steer in dark; walked barefoot because shoes were expensive, and towpath was soft with “mule muffins”
 - When ice closed Canal in winter, children went to school (~3 months) to learn BASIC reading, writing, calculation; also did school work during boat season
- A boat captain doing two round-trips per month might make \$50/month (about \$800 in today’s money) or about \$450/year (about \$7,500 in today’s money); as the 19th century wore on, they were considered the “working poor” (though merchants and businesses along Canal prospered)
- **Where did they get their drinking water?** Filled up jugs at wells and springs; river and Canal water not safe to drink. Beer and spirits were safer (even children drank 2% “lite beer” on boats!)
- **Where did they bathe?** Canal water was polluted and bathing in river would be dangerous, so families bathed in a tub on board (maybe once a week)
- **Where did they get their food?** Purchased at towns and lock houses along the way (eggs, fish, eels, ham, bread, potatoes). Children picked wild berries along the way. Unwritten rule: if boats passed a farm, the first 2 rows of corn were available to boatmen (wink wink)
- **What did they do with their trash?** Tossed into Canal or woods. “Mule Muffins” remained where they dropped on towpath (most trash was “organic” and biodegradable—no plastics)
- **What did families do for fun?** Wasn’t much time for “fun” but children would make up games, stories and songs as they walked with the mules
- Canal operated from March-December (when ice closed Canal); flat-bottomed boats would just sit at bottom of Canal during off-season

Tavern & Lock Keepers

- All lock houses painted white to be more visible in the dark
- Usually one family of lock keepers was responsible for one lock, but if there was a series of locks close together (e.g., Georgetown and Great Falls), one lock keeper might be in charge of 3-4 locks and was paid extra
 - Great Falls Lock keepers tended 3 locks: 18, 19, 20
- Lock keepers paid by C&O Canal Company from \$150-250 per year, plus free lodging and one acre of land to grow produce, raise animals (cows, chicken, pigs); most lock keepers had to supplement their income with other jobs off-season (working in stores, Tavern, farming)
- C&O Company preferred to hire men w large families to get additional labor for free
- Boat captain would blow horn to notify lockkeeper of arrival to open lock
 - In 1870s “heyday of Canal” 500-550 boats on Canal (appx 3 per mile)
 - could be 15-20 boats waiting in lock at a time
- Tavern was (probably) the only hotel on Canal (possible to lodge with farmers)
 - 15-miles from Georgetown, took 4 hours each way, cost 50 cents (about a day’s wage for a common laborer)
 - people would come up to get away from city, spend a quiet afternoon, return or stay at Tavern
- 1828 middle section of Great Falls Tavern built as residence for lock keeper’s family, although it was sometimes incorporated into the Tavern’s hotel function
- 1831 two additions:
 - North end – Public House, bottom floor “ballroom” and tavern – 2nd floor separate quarters for males and females, 3rd floor “honeymoon suite” if marriage license shown
 - South end – residence of lockkeepers and tavern keepers

With grateful thanks to: NPS Rangers Mark Myers, John McCarthy, Carl Lennartson, Geoffrey Suiter, Rebecca Jameson, Zenas Dowdell, and many C&O Canal National Historical Park volunteers for this information.

Recommended reading:

- *Captain Kate*, by Carolyn Reeder – young adult novel about 12-year-old girl who runs her family’s canal boat during the Civil War
- *The C&O Canal Companion: A Journey through Potomac History*, by Mike High – the most comprehensive resource on the Canal (2nd edition, 2015)