

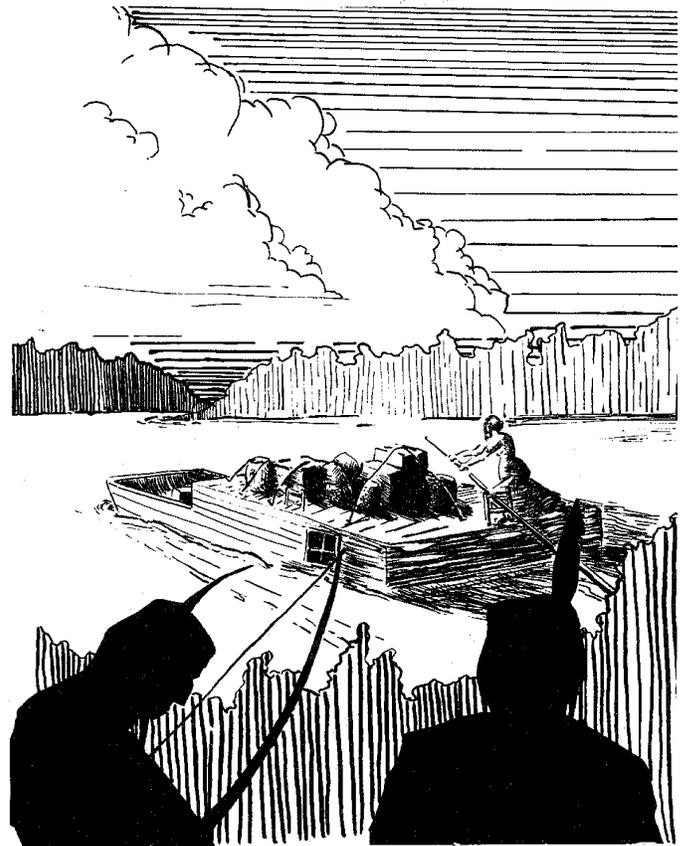
Chapter 3

REDUCING THE RISKS OF NAVIGATION

Mother Ann Sharp sat on the riverbank near the flatboat, puffing her pipe, listening to the distant roar of the Falls of the Kiskiminetas, and watching the children romping through the bright-green foliage of late May. She and her husband Andrew expected another child in a month, and she hoped when Andrew returned with the canoe he would agree to camp for the night. That day they had floated out of Conemaugh River and descended the Kiskiminetas, dashing between the threatening rocks at the Falls of the Kiski.

Captain Andrew Sharp had moved to Western Pennsylvania at the end of the Revolution and in 1794 had decided to follow the frontier to Kentucky. The Sharps joined the families of other veterans at Blacklick Creek, where they built a flatboat and embarked on a flood, running the shoals and rapids on Blacklick Creek, Conemaugh River, and the Kiskiminetas. While crossing the Falls of the Kiski on May 30 they lost a canoe that broke free and went spinning downstream. The Captain landed the flatboat and jugged across the river bends to catch the canoe.

As the sun set, Mother Sharp heard her husband crashing through the brush and shouting: "Indians are coming!" She and the women hastily shoved the children into the flatboat and climbed in after. Captain Sharp raced to the boat and slashed the rope at the bow with his axe as the Indians fired. The first volley smashed Mother Sharp's pipe from her mouth and wounded her husband in the left shoulder; the second hit the Captain in the right shoulder as he cut the stern rope, but he clambered over the gunnel into the boat and Mrs. Sharp handed him a rifle. She loaded while he, despite his wounds, fired with good effect. Warriors pursued the drifting boat downriver, firing from behind trees. Captain Sharp blazed away in return till he fainted from loss of blood. By dark, two men lay dead in the



Ambush on the Kiski

boat, Captain Sharp and another were badly wounded, and the boat, with no able men aboard, careened wildly down the flooded Kiskiminetas, narrowly missing snags and rock studded banks.

Mother Sharp hushed the children, telling them the Indians would hear and return, made her bleeding husband as comfortable as possible, and crawled to the stern, over the bodies and around the women and children huddled in the boat bottom. She stood cautiously, grasped the tiller oar and, by forcing the oar back and forth with all her strength,

found that she could control the course of the boat. During the silence of that long night, punctuated only by sounds of rushing water, whimpering children, and groans of the wounded, she held the boat in the channel as it floated out of the Kiski and down the Allegheny. Through the mists of daybreak she spied white men on the bank and called for help. The men paddled a canoe to the flatboat to help Mother Sharp land nine miles above Pittsburgh.

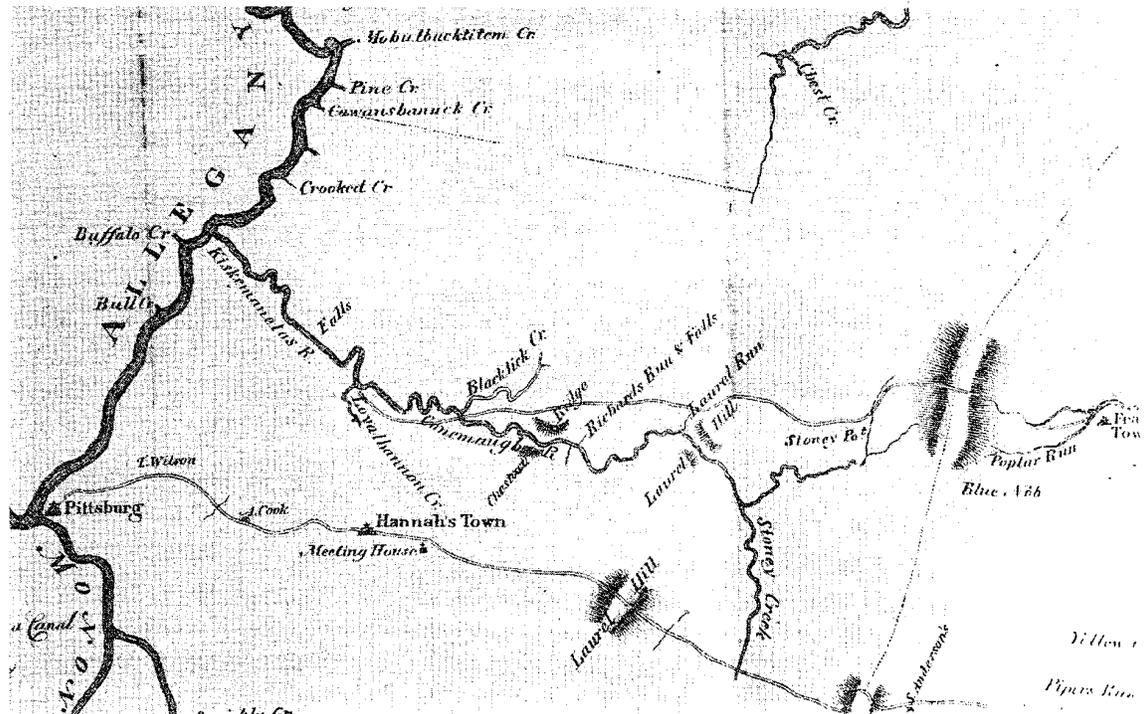
Captain Sharp died of his wounds on July 8 and was buried with the honors due a veteran of the Revolution. But only his children followed the casket to the cemetery, for Mother Sharp had just been delivered of child.

Richly laden and slowly moving flatboats were easy prey. General Wayne's victory at Fallen Timbers in 1794 curtailed Indian attacks on river traffic, however, and the ambush on the Kiski in 1794 was the last Indian attack on flatboats in the headwaters district. Boatmen, nevertheless, still ran a gauntlet during each voyage: renegades at Cave in Rock and boatwreckers near Fort Massac on

the lower Ohio, sharpsters at Natchez and New Orleans on the Mississippi, and robbers on the trails leading back to the headwaters district.

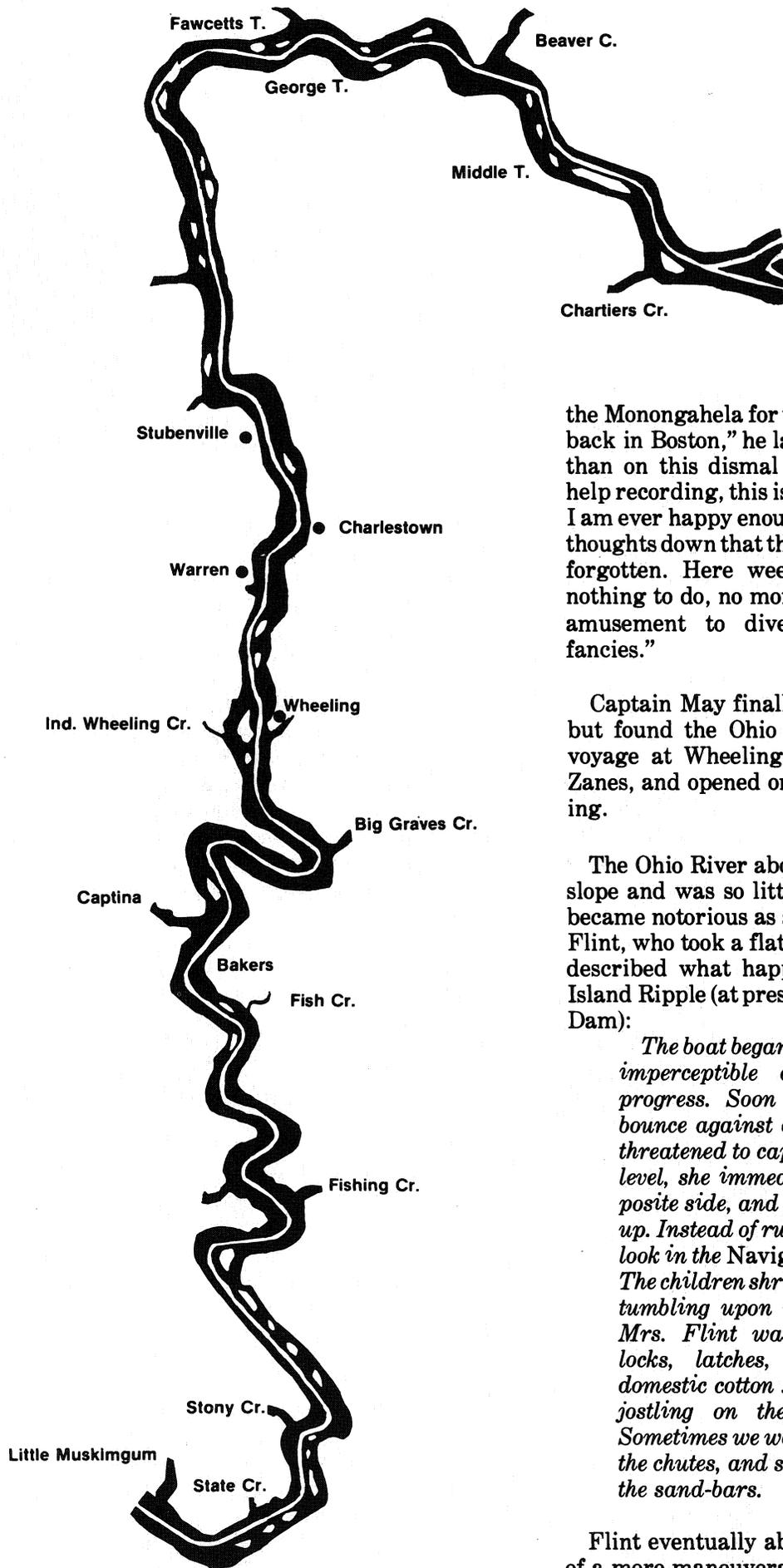
But human hazards were infinitesimal when compared to the natural obstructions to navigation. Rivermen braved Allegheny River ice, Monongahela low water, and snags, boulders, shoals, ripples, shallow bars, and great flow fluctuations on nearly all inland streams. Ice on the Allegheny stopped traffic for weeks in most winters and destroyed many watercraft on both the Allegheny and Ohio. When the Allegheny ice broke in 1793, for instance, it swept away and sank a fleet of flour-laden flatboats at Wellsburg on the Ohio, causing losses estimated at 437 pounds in Pennsylvania currency. The Monongahela low water problems were perhaps best described by John May, a Boston merchant on his way in 1789 with a boat load of merchandise to join Rufus Putnam at Marietta.

Captain May had a flatboat that drew only 12.5 inches of water, but shallow conditions stopped him on



Kiskiminetas-Conemaugh Valley - 1790

Portion of Map by John Adlum and John Wallis (See end of chapter)



From Zadok Cramer's
Navigator, the first
 navigation charts
 Carnegie Library of Pittsburgh

the Monongahela for weeks. "Oh that my goods were back in Boston," he lamented, "or anywhere rather than on this dismal Monongahela river! I cannot help recording, this is the severest trial of my life. If I am ever happy enough to get out of this, I put these thoughts down that the lessons of the past may not be forgotten. Here week after week, with little or nothing to do, no money stirring, & with no sort of amusement to divert the mind from gloomy fancies."

Captain May finally got out of the Monongahela, but found the Ohio little better. He gave up the voyage at Wheeling, rented a building from the Zanes, and opened one of the first stores in Wheeling.

The Ohio River above Wheeling had such a steep slope and was so littered with obstructions that it became notorious as a flatboat graveyard. Timothy Flint, who took a flatboat from Pittsburgh in 1815, described what happened when he hit Deadman Island Ripple (at present site of Dashields Locks and Dam):

The boat began to exchange its gentle and imperceptible advance for a furious progress. Soon after, it gave a violent bounce against a rock on one side, which threatened to capsize it. On recovering her level, she immediately bounced on the opposite side, and that in its turn was keeled up. Instead of running to the oar, we ran to look in the Navigator. The owner was pale. The children shrieked. The hardware came tumbling upon us from the shelves, and Mrs. Flint was almost buried amidst locks, latches, knives, and pieces of domestic cotton. . . . Sometimes we were jostling on the rocks in the ripples. Sometimes we were driven furiously along the chutes, and sometimes we stuck fast on the sand-bars.

Flint eventually abandoned the flatboat in favor of a more maneuverable skiff to descend the Ohio.

Deadman Island Ripple, Horsetail Ripple, the Trap, Beaver Shoals, White Woman Rapids, each obstruction on the upper Ohio was known by name to rivermen. Emigrants relied on Zadok Cramer's *Navigator*, first printed in Pittsburgh in 1802, which furnished the first navigation charts available to those who risked their all on the inland rivers.

Collisions with snags and rocks heavily damaged the inland river flatboat fleets. Flatboat losses have been estimated as high as 25%, and marine insurance rates for flatboats were near 10%. The carriers must have estimated that one boat in ten would be totally lost. With rivers badly obstructed and commercial losses heavy, it was not surprising that state and local governments became interested in improving river navigation long before the federal government began work in 1824.

Rivermen commonly removed minor obstructions to navigation. Captain Meriwether Lewis, during his 1803 trip down the Ohio, dredged channels through gravel bars with canoe paddles and spades, and he told President Jefferson that with hard work he could clear a fifty-yard channel in an hour. Captain George Rowley, who later served as snagboat captain for the Pittsburgh Engineer District, often boasted that he had backed all the way up the Ohio to Pittsburgh, meaning he had poled keelboats up the river, and mentioned that he always carried flashboards and stakes aboard his keelboats. When his boat grounded, he drove stakes into the river bottom and placed boards on the upstream side of the stakes to divert the river flow under the boat hull, thereby gaining a little more depth and washing sand from around the hull.

The need for improved navigation in the headwaters district was so great that in 1794, when Captain Sharp and his family were ambushed on the Kiskiminetas River, that stream had already been improved for navigation by rivermen and Pennsylvania was planning a project for the stream.

The Kiskiminetas River was the first stream west of the Alleghenies to be declared legally navigable. The Pennsylvania Council on March 9, 1771, designated it a navigable public highway and forbade obstructions that might prevent navigation by "his Majesty's liege subjects," Pennsylvania still being a colony at the time. Colonel Charles Campbell, owner of a milldam on Blacklick Creek, the first mill in the Kiskiminetas-Conemaugh basin, wished to ship the product of his mill to market in flatboats, and about 1790 he and others interested in navigating the Kiskiminetas system joined to clear the boulders from the channels, especially from the Falls of the Kiski near the present site of Apollo, Pennsylvania. Campbell and his associates contracted with Pennsylvania to continue work in 1794 on the Kiski and Conemaugh. In the same year, Pennsylvania began work on the Monongahela, Youghiogeny, Allegheny, and French and Conewango creeks.

Governor Thomas Mifflin launched Pennsylvania's river projects in 1790 with the aim of securing the trade of the West for the Commonwealth, which, the Governor said, was "a natural avenue from the shores of the Atlantic to the vast regions of the Western Territory." His river improvement program was one of the opening shots of the economic war waged by Philadelphia, Baltimore, New York, Richmond, and their respective states for access to western commerce through construction of improved waterways, roads, canals, and railroads to the headwaters district and the Great Lakes.

Governor Mifflin appointed Timothy Matlack, Samuel Maclay, and John Adlum in 1790 to locate river routes and connecting portages from Philadelphia to the Susquehanna, from tributaries of the Susquehanna to tributaries of the Allegheny, and on to Lake Erie via French and Conewango creeks. Adlum had assisted Andrew Ellicott in boundary surveys and in platting the towns of Erie, Waterford, Franklin, and Warren; Matlack and

Maclay were Revolutionary veterans who served in the Pennsylvania legislature and in Congress.

The surveyors ascended the Susquehanna, its West Branch, and Sinnemahoning Creek to Driftwood, crossed the divide and examined the Allegheny, Clarion, Kiskiminetas-Conemaugh rivers and French and Conewango creeks. They met Chief Cornplanter and the Seneca council on the Allegheny and found the Indians eager for the opening of the waterways for trade. They also made the mistake of examining the Clarion and its East Branch and the Conemaugh and Little Conemaugh rivers in August, at extreme low water; their boatmen fainted from the labor of dragging their canoes for great distances over the shoals.

In their report to the Governor, the surveyors recommended that all the streams examined be cleared of snags, boulders, and bars. In their opinion, the best route examined was up the Susquehanna system to Driftwood on the Sinnemahoning, a short portage to Portage Creek in present McKean County, down that creek and the Allegheny to Warren, up Conewango Creek to Lake Chautauqua, and from there a second portage to Lake Erie. Lake Chautauqua, they thought, should be dammed at its lower end to raise the lake level and assist navigation on Conewango Creek by releasing lake water through the dam. The Pennsylvania assembly had allotted 600 pounds currency for the survey. Costs were actually just over 1,411 pounds, a 135% cost overrun and not a good omen, but the assembly was well pleased with the report and acted upon it.

To plan improvement of the Youghiogheny and Monongahela as southern trade routes, Governor Mifflin selected John Badollet, schoolmate of Albert Gallatin at Geneva, Switzerland. Badollet emigrated to America to join Gallatin on the Monongahela in 1786, and became his partner in founding New Geneva and in building a glass and gun factory there. He later became judge and militia captain in Greene County, surveyed roads in Ohio and Indiana, and opened the federal land office at Vincennes, Indiana.

Badollet canoed from the mouth of Indian Creek down the Youghiogheny and examined the Monongahela to the southern boundary of Pennsylvania. He found both streams much obstructed by fish dams, built by Indians and pioneers to trap fish at low water, and he recommended that the state strictly enforce the act of April 13, 1782, in which the two rivers had been declared navigable public highways. He reported navigation on the Monongahela was hampered by caving banks, which constantly fell into the river and formed bars that obstructed boat traffic. Bank instability was even a threat to parts of Pittsburgh. Rocks, he declared, were the greatest menace to Youghiogheny commerce. Boatmen on the stream



John Badollet - navigation planner Indiana Historical Society Library

had removed some of the largest boulders, but many yet remained. Badollet recommended a channel clearance project for both streams, with minimum fifty-foot width on the Monongahela, minimum forty-foot width on the Youghiogheny, and both with minimum depth of twelve inches at low water. Flatboats and watercraft drawing a foot or less could slide over the rocks and bars and down the channel at low water. Boats drawing more than a foot could wait for a rain.

In legislation enacted on April 13, 1791, and April 10, 1792, the Pennsylvania assembly funded improvement of rivers in the headwaters district as part of a program designed to open an east-west waterways system with connecting portage roads. The Susquehanna River system was to be improved to Driftwood Fork of Sinnemahoning Creek, the Allegheny from Warren to Portage Creek, the Kiskiminetas-Conemaugh and Little Conemaugh from Portage in Cambria County downstream, all of French Creek, the Youghiogheny to the mouth of Indian Creek near Ohiopyle Falls, and the "Mon" to the Virginia line. On April 14, 1792, the Governor asked contractors to bid for improvement of the streams named "by blowing rocks, erecting sluices and wing walls, clearing shoals, &c." To insure proper contract performance, the Governor appointed agents of information, equivalent to modern resident engineers, to prepare detailed onsite plans and inspect the work. John Badollet was made agent for the Youghiogheny and Monongahela, William Findley and William Smith for the Conemaugh and Kiskiminetas.

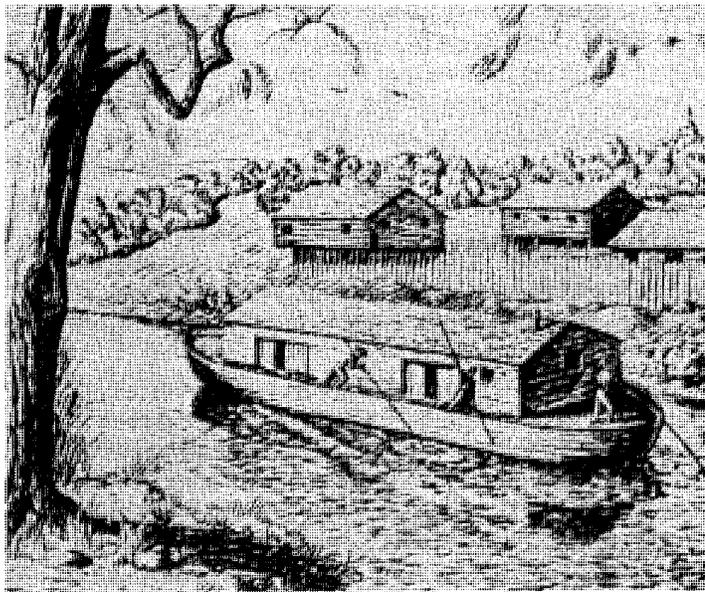
Findley and Smith obtained a copy of the Adlum report of 1790 and prepared detailed plans for the Kiskiminetas-Conemaugh project in late 1792. They thought it possible to build locks and dams on the Little Conemaugh River and the Poplar Run branch of the Juniata, a reservoir at the summit for water supply, and a canal connecting the two streams to completely eliminate the portage, but funds were too limited and a road was built from Frankstown on the Juniata to the Little Conemaugh.

Strict enforcement of navigation laws on the Kiski and Conemaugh rivers was imperative, Smith and Findley asserted, for "the navigation has been shamefully obstructed by persons clandestinely and sometimes openly replacing their fish-dams where they have been regulated or thrown down."

They laid plans for the improvement of the Kiskiminetas and Conemaugh rivers under four contracts, blasting away obstructive rocks and building longitudinal side walls to form a 25-foot wide and 14-inch deep channel at low water for flatboat traffic, with clear sluices and towing paths at rapids for ascending boats, at an estimated cost of 3,050 pounds currency.

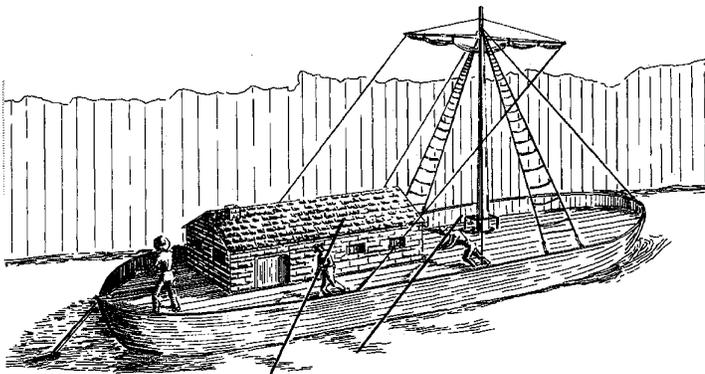
Colonel Charles Campbell, David Todd, John Dennison, James Brady, and other men interested in undertaking the contract work complained in 1793 that the Findley-Smith cost estimates were way low, but the problem was resolved through negotiation and the contracts let in early 1794, just before Captain and Mother Sharp set out down the river. Some contractors performed well; others not. Captain James Brady took the contract to clear the Conemaugh from the site of Johnstown to the mouth of Richards Run on April 22, 1794. He finished the job as agreed by September 1, 1796. Charles Campbell and John Dennison in 1794 took the contract for the three sections from the mouth of Richards Run on the Conemaugh to the mouth of the Kiskiminetas and went speedily to work, blasting channels through shoals and dumping the stone in low walls to divert low water flow into the main channel. State inspectors reported, however, that some channels were cut in the wrong direction, some of the riprap walls poorly located, and that the contractors had not performed well. The contractors were required to remedy project defects and did not receive final payment for their work until December 9, 1805, about nine years after the originally scheduled completion date.

No comparison of costs with benefits of the Kiskiminetas-Conemaugh project was ever



attempted, but canoe and flatboat traffic plied the waterway in a steady stream. In the spring of 1818, for example, 59 flatboats carrying up to 40 tons each of dry goods from Philadelphia and bar iron and salt produced in the Kiski-Conemaugh basin passed the mouth of Loyalhanna Creek on the way to Pittsburgh and west. Major tributary streams, such as Blacklick Creek, were also placed under the protection of state navigation laws. State commissioners George Mulholland, Peter Wallace, Andrew Boggs, John Hill, and Jacob Drum expended \$5,000 in state funds to repair the Kiski-Conemaugh project in 1822, and traffic on the waterway continued until Pennsylvania completed a canal through the basin.

We Have Met the Enemy and They Are Ours
 All Americans remember Commodore Perry's message of victory on Lake Erie on September 10, 1813, but few are aware of the contributions of French Creek boatmen to that victory. When the Commodore began construction of a fleet to meet the British flotilla on Lake Erie he needed ship rigging, naval hardware, and munitions, and he made contracts with the experienced shipbuilders and iron manufacturers of Pittsburgh and the Monongahela. The job of delivering these naval stores to Erie was given to keelboatman Marcus Hulings of French Creek.



Marcus Hulings and his five husky sons had pushed keelboats up the Allegheny in 1790 to settle at Franklin, where they opened an inn, kept a ferry, built a milldam on French Creek, and organized a keelboat line to supply Allegheny basin pioneers with the necessities of life. He and his sons began the business of rafting timber from French Creek forests to Ohio River ports, skimmed oil from French Creek for use as liniment, and later entered the petroleum business in Tennessee.

Hulings and his boys loaded rope, cannon, and shells aboard his keelboats at Pittsburgh in the summer of 1813 and set out up the Allegheny and French Creek to Waterford, from whence only a short overland haul to Erie would be necessary.

Keelboats

Thrusting the long wooden poles firmly into the creek bottom, the Hulings boys staunchly planted their feet on the keelboat runways, braced their shoulders to the poles, grunted under the strain, and slowly walked the keelboats under their feet toward the head of French Creek. When their utmost efforts could not stem the currents at rapids, they lashed hawsers to their boats, jumped to the bank, seized the ropes and scrambled through the brush, hauling the boats and the precious naval stores upriver. At the longest rapids, they double-tripped, leaving part of the cargo at the foot of the rapids, towing the boats up, unloading, then returning to bring up the rest of the cargo. In spite of bodies scratched and bruised, clothes torn by brambles, muscles burning from fatigue, Marcus Hulings and his sturdy sons beat their way up French Creek, delivering the naval stores and ordnance to Commodore Perry in time for him to finish and arm his ships. When Perry's resounding message was received in September 1813, there was great rejoicing at Pittsburgh ropewalks and foundries and in the homes of Marcus Hulings and his boys, for the enemy, in part, belonged to them.

Marcus Hulings might not have been able to get his keelboats up French Creek in the low-water season of 1813, had the creek not been improved for navigation. Captain Le Mergier of the French Engineers first cleared snags from the stream in 1753. The British put bateaux transporting troops, munitions, and supplies into operation on French Creek in 1759, but lost many boats on the snags and rapids. Colonel Henry Bouquet said one of his large bateaux struck "in a Rapide, and being carried down with Great Impetuosity by the Current fell against a Tree hanging on the River; splitt & oversett, one man was killed by the Tree, another drowned." Bouquet sent a hundred men in 1761 to again clear snags and trees from French Creek.

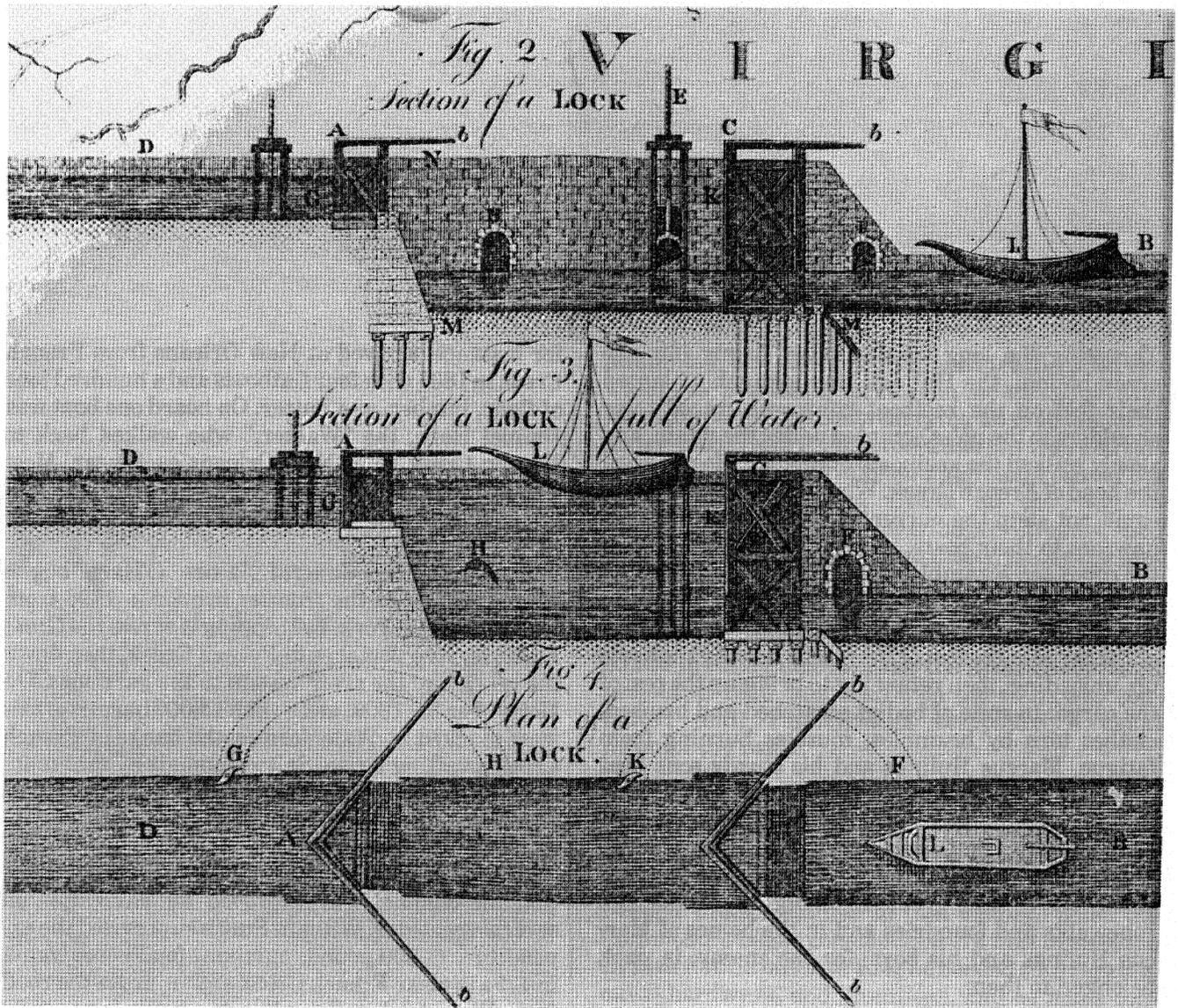
The American pioneers who moved into the French Creek basin after the Revolution sent hundreds of flatboats freighted with whiskey, beans, furs, paper, salt, and lumber down French Creek to faraway markets. Samuel B. McGaw of Meadville,

for instance, arrived at New Orleans from French Creek in 1806 with four flatboats and a hundred tons of flour, lumber, and butter. On board one boat was Daniel Horn, the "Walker," who walked back to French Creek from New Orleans each year. Most French Creek boatmen sailed to Philadelphia and took the short walk over the Alleghenies.

Quartermaster General James O'Hara began supplying salt to the frontier armies in 1796 from Syracuse, New York, by shipping it across the Great Lakes and the portages to French Creek, then down the creek and the river system to the garrisons. On November 23, 1809, more than 14,000 barrels of salt were stacked at Waterford on the banks of French Creek awaiting a rise. Salt shipments by that route continued until the British disrupted the transportation line during the War of 1812.

French Creek was so valuable for transportation that the channel was improved for navigation on several occasions. William Smith supervised the expenditure of 800 pounds currency for Pennsylvania in 1794 to clear French Creek and improve the road from Waterford to Erie. Funds amounting to \$500 from land sales in Erie County were spent in 1807 for the improvement of French Creek. Pennsylvania appropriated \$2,000 in 1810 and \$800 in 1817 to continue the project. Contractors Richard Patch, a flatboat captain, and John Martin, with shovels, axes, and horsedrawn scrapers, worked over the stream to Waterford, and the channel served well. The huge flatboats built along the stream were commonly used by Monongahela miners to ship coal to New Orleans, and to rivermen a "French Creek" came to mean a sturdy wooden barge.

The Mon and Yough Project After John Badollet made his report on Monongahela and Youghiogheny navigation, the Governor appointed him agent of information on April 10, 1792, and asked that he distribute circulars asking for bids from contractors. Bids were received from James Lang, Samuel Jackson, Neal Gillespie, and several men involved in the Whiskey Rebellion, and were delivered to the Governor by Albert Gallatin. The



Design of navigation locks - John Adlum's map

Dr. Leland R. Johnson

Governor accepted the bid from Samuel Jackson on December 7, 1792. For 1200 pounds currency, Jackson proposed to remove dangerous rocks, build low stone dams, and clear a 50-foot wide channel from the juncture of West Fork and Tygart rivers to the mouth of the Monongahela. Jackson guaranteed the channel would pass downstream at low water flatboats 40 feet long, 12 feet wide, and with 6-inch draft. In accepting the bid, the Governor noted the Monongahela was "not navigated by boatmen who live by the business, but very generally by the farmer, and in boats not calculated to return."

At the time Jackson undertook the contract, he was associated with General James Wilkinson in the flatboat trade down the inland rivers to New Orleans and had flour mills and boatyards in operation in the Monongahela basin; he later built iron

works that supplied ordnance to Commodore Perry and General Andrew Jackson during the War of 1812. Under the inspection of Badollet, Jackson blasted rock, built riprap dams to confine low-water flow to the channel, and completed the project as agreed in 1798.

Isaac Meason, co-founder of Connellsville, and John Gibson of Fayette County accepted the contract on January 31, 1793, for improving Youghiogheny River navigation from the mouth of Indian Creek above Connellsville to its confluence with the Monongahela at McKeesport. Improvement of the "Yough" was badly needed, for many flatboats sank with loss of life while trying to descend the swift, boulder-strewn stream. In 1788, for example, a flatboat stove on rocks at Youghiogheny Falls and both families aboard drowned.

XY (Fig. 1.) are the tier flood gates, each of which consists of two leaves, resting upon one another, so as to form an obtuse angle, in order the better to resist the pressure of the water, the first (X) prevents the water of the superior Canal from falling into the Lock; and the second (Y) dams up & sustains the water in the Lock; these flood gates ought to be very strong, and to turn freely upon hinges, in order to make them open and shut with ease, each leaf is furnished with a long lever Δb , Δh , Cb , Cv . they should be made very tight & close, that as little water as possible may be lost.

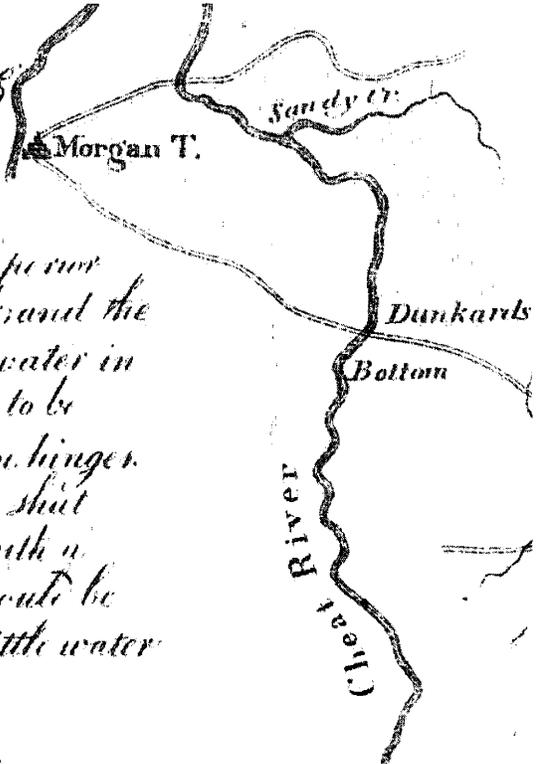
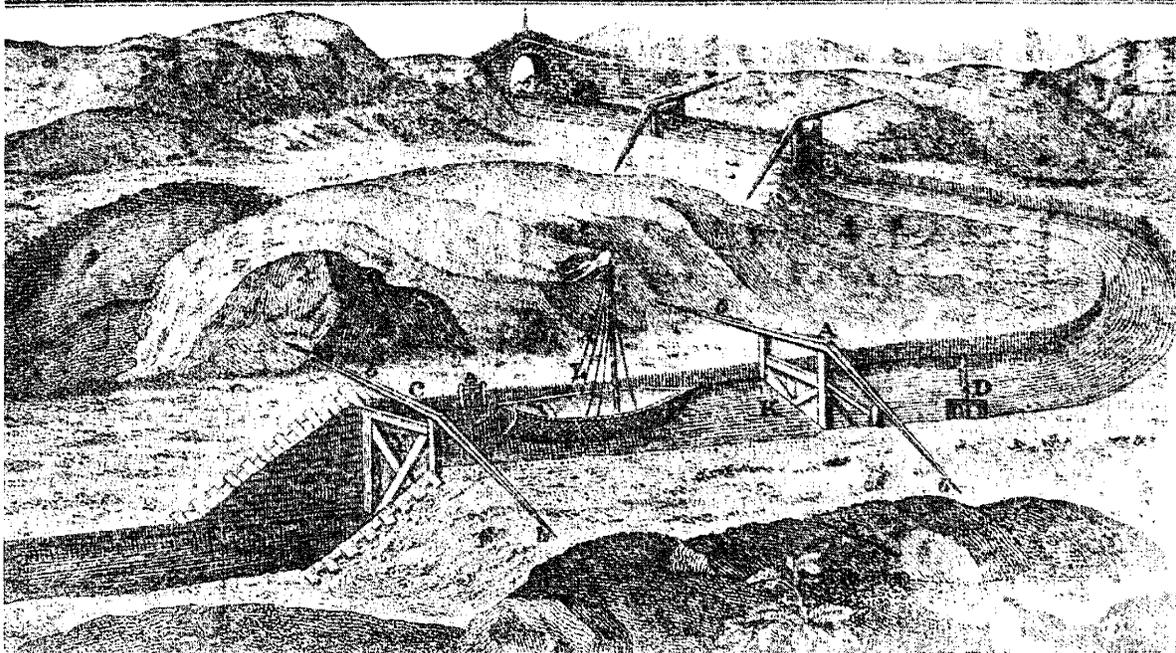


Fig. 1.

Perspective VIEW of part of a CANAL with LOCKS.



Meason and Gibson removed the dangerous rocks listed by Badollet in his report, destroyed fish-dams, blasted a channel and placed the spoil in riprap dams. The project was a credit to the contractors, the state inspector reported in 1797, when he approved final payment to the contractors.

Pennsylvania kept the Youghiogheny project in repair; \$2,950.03 was expended for the purpose in 1821. Flatboat traffic on the stream thrived, and Joshua Gilpin wrote in 1809:

The Youghiogheny is navigable from about 3 miles above the town [Connellsville] to the Ohio & of course gives an immense outlet for all the produce of this country--the union therefore of wood, coal, iron & perhaps a variety of other minerals with water carriage to a market down the Mississippi seems to destine it to be a great manufacturing district--there are already 7 furnaces & as many forges & slitting mills in this country all of them upon or at the foot of the mountains. . . the iron made in the furnaces is chiefly converted into castings and bar iron, nail rods, sheet iron &c. & sent down the Ohio in Arks, for the supply of the western country which is the chief market.

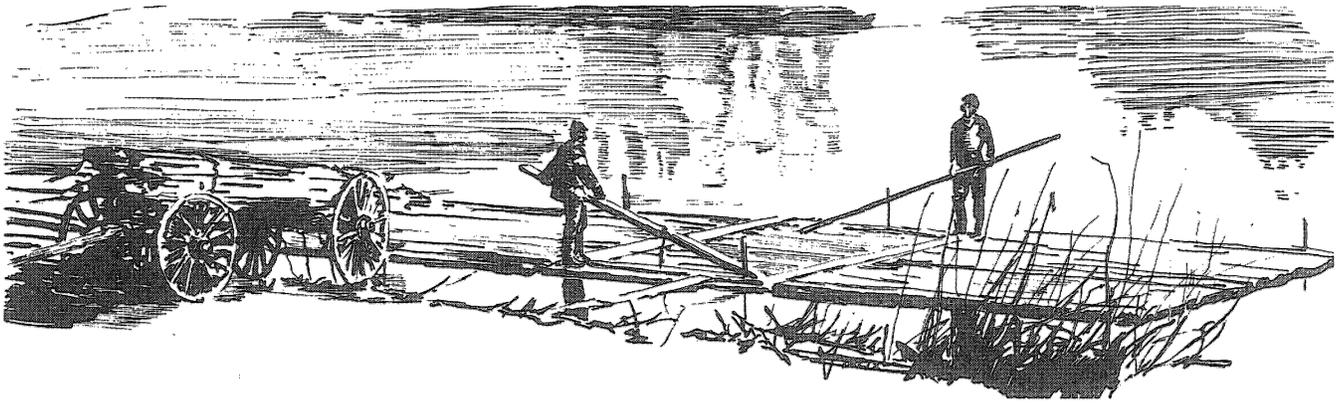
Pennsylvania invested funds in the improvement of its rivers until about 1825, when it embarked on a vast canal construction program. Almost every stream capable of floating a canoe at high water in the Allegheny, Monongahela, and Beaver River basins in Pennsylvania was improved for navigation or declared a legal public highway to prevent construction of dams that would close traffic on the streams. Other states also acted to improve and protect streams for navigation. New York made the upper Allegheny River and its tributaries legal public highways and acted to prevent their obstruction; Ohio protected its streams; and in the upper Monongahela basin Virginia protected its rivers and authorized the first slackwater navigation project built west of the Alleghenies.



General John G. Jackson Clarksburg, West Virginia, Public Library

Slackwater on West Fork Virginia chartered a company led by Congressman George Jackson of Clarksburg to clear the Monongahela and its West Fork for flatboat navigation on December 5, 1793, and required that all persons building milldams on those streams install slopes for the passage of watercraft; in 1800, Virginia declared the Monongahela, West Fork, Tygart River, and several tributaries navigable public highways. Flatboats transporting agricultural produce and manufactured iron products regularly sailed from Clarksburg, Fairmont, and Morgantown to Pittsburgh and New Orleans. The flatboat *Hopewell*, Simeon Woodrow, master, for example, arrived at New Orleans from Morgantown in 1806 with a cargo of 250 barrels of flour and 2 barrels of whiskey. Traffic was so heavy on West Fork that in 1807 Virginia required millowners to maintain lamps at the head of chutes through their dams for the guidance of flatboat captains.

George Jackson and his two sons, Edward and John G. Jackson, who represented Harrison and Lewis counties in the Virginia legislature and in Congress, built flour mills and iron forges in the vicinity of Clarksburg; Edward Jackson owned a milldam on West Fork five miles below the mouth of Stonecoal Creek; and John G. Jackson had a milldam at his iron furnace and foundry on Elk



Building a raft

Creek at Clarksburg. Both shipped the products of their mills by river, and in 1817 John G. Jackson, general of Virginia militia and civil engineer, organized the Monongalia Navigation Company to build dams with locks and chutes on West Fork to supply slackwater for flatboat navigation.

Virginia chartered the Monongalia Navigation Company and agreed that when General Jackson and his associates had raised three-fifths of the capital needed to build the project the Commonwealth would subscribe the remainder, provided the chutes through the dams be at least 60 feet wide and the slopes below at least 65 feet long, with not over a 4 degree slope angle.

State governments commonly required owners of milldams on navigable streams to install chutes or locks for navigation during the 19th century. Navigation locks, a Renaissance invention sometimes credited to Leonardo da Vinci, were first built in America in 1790, but their construction costs were high and mill owners usually built navigation chutes and slopes. Chutes were openings in milldams about two feet lower than the remainder of the dam crest. They were closed with boards at low water to conserve water for the mills located at one abutment of the dam. When flatboats wished passage, the millowners removed the boards and the boats dashed through the chute. To prevent the boats dropping from the chute to the river bottom, slopes, generally of rock-filled timber construction, were installed below the dams, sloping from the chute to the riverbed at, in the case of the West Fork dams, no more than a 4° angle.

In July 1818, General Jackson and the Monongalia Navigation Company, which had offices in the Webster building in Clarksburg, informed the Virginia Board of Public Works that \$90,000 in company stock had been subscribed. The Board sent its chief engineer, Major Thomas Moore, to investigate the project, survey the West Fork and upper Monongahela in detail, and report his findings. Moore began his survey on June 6, 1820, at the juncture of Stone Coal Creek with West Fork near

Weston. He found five milldams were in operation on the stream between Weston and Clarksburg; the only improvements necessary on that section were removal of rocks and installation of slopes below the dams. Just below Clarksburg, the Major found the navigation company had begun construction of its first dam, 300 feet long and 9 feet high, but neither lock nor slope was under construction. He learned the contractor had agreed to build the dam with a lock and slope for navigation and an adjacent sawmill for \$2,600. The contractor did not complain of his bargain, said Major Moore, "but I am of the opinion, that if he executes the lock in a proper manner, he will find it a hard one."

The Virginia engineer reported many people in the West Fork valley opposed the project:

The objections they urge against it are these; that the fording places on the river will be destroyed; that it will require a much greater freshet to pass the dams with large flat bottom boats and rafts than is necessary in the natural bed of the river, and consequently, that the opportunities of getting their boats and lumber to market will be less frequent, even if the slopes to the dams should always be kept in repair; but they contend, that where there are so many, it may be expected that one or more will frequently be in an impassable condition. They also suppose that it may have a tendency to overflow the lands, and render the country sickly. The latter two, however, are unfounded, because in the first 45 miles, about 21 miles is already covered by the reflux water of 6 dams, without having produced in any important degree, either of these effects.

The principal problem with the project, said Moore, was water supply; the drought flow of West Fork was next to nothing. The flatboats navigating West Fork seldom exceeded a 15-foot width, so to conserve water Moore recommended width of the navigation chutes be reduced to 25 feet and that sidewalls be built down the slopes to confine

available water. He recommended installation of navigation slopes in the five milldams between Weston and Clarksburg, construction of seven dams with average nine-foot lift and slopes and locks in each to furnish slackwater from Clarksburg to the mouth of West Fork, and clearance of the Monongahela channel from Fairmont to the Pennsylvania line. He estimated the cost of the dams would be \$3,000 each and total project costs to be \$32,800, and he recommended that Virginia purchase company stock to aid the project.

Contractor Thomas Chapman completed the first company dam near the mouth of Jacks Run in 1821; he built the navigation slope, but thought the 16-foot wide lock to be "unnecessarily large." Its construction was deferred pending restudy. Company president John G. Jackson planned the six additional dams and slopes needed to canalize West Fork to its mouth and also developed plans to meet the water supply problem by diverting the flow of Buckhannon River to Stonecoal Creek and West Fork through a 5-mile long, 50-foot deep canal cut through the divide. Jackson then accepted the contract for building the six lower dams, while continuing to serve as president of the company. The arrangement was a serious mistake; because of it, Virginia withdrew its support from the project in 1822 after contributing only a few hundred dollars.

Colonel Benjamin Wilson and Edwin S. Duncan, representing the navigators and millowners who opposed the project, took their case to the Virginia Board of Public Works. Wilson said in thirty years he had rafted more than 200,000 board feet of lumber from his West Fork mills to Pittsburgh and had never lost as much as fifty feet of lumber. The Monongalia project, he protested, is merely a visionary scheme, and he claimed the navigation slope at the dam finished in 1821 had already been twice destroyed by floods.

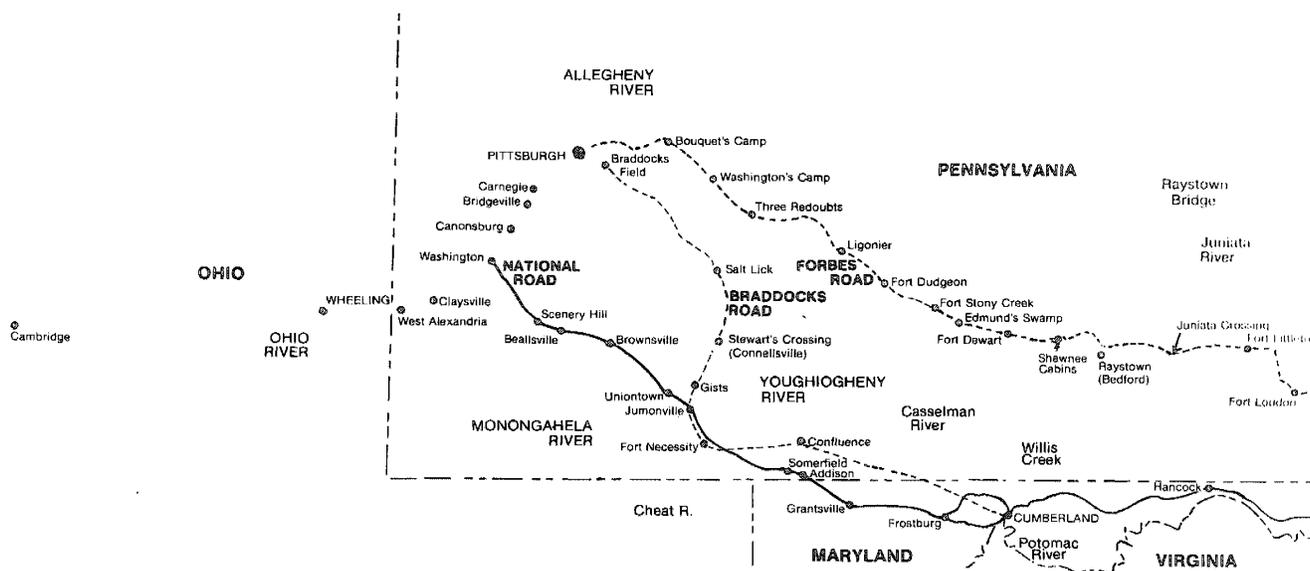
Wilson's son-in-law Duncan raised serious issues. Is it not strange, he asked, that the principal stockholder and company president is also the contractor? Who will inspect his work to insure it is properly done and not a fraud perpetuated on other

stockholders, including state government? And, he asked, where is the \$90,000 in stock subscriptions the company claimed to have had? The company had given, said Duncan, stock for offers to furnish construction materials and labor and for mortgages on worthless wilderness lands. The Board of Public Works accepted the allegations without investigation and stopped all state subscriptions to the Monongalia Navigation Company.

General John Jackson, brother-in-law to President James Madison, first United States Judge for Western Virginia, and also a noted duelist, vehemently answered, asserting the Wilson and Duncan had made serious misstatements of fact, if they had not deliberately lied, to even old scores with him. The decision of the Board was final, however, and state support was not renewed.

General Jackson mortgaged his saltworks, iron mines, foundries, tanneries, and woolen and flour mills, and, almost singlehanded, continued construction of the West Fork slackwater system, building five more dams with lift averaging nine feet and with navigation chutes on the stream below Clarksburg. Twelve-foot wide, stone-filled, timber crib dams were built near Yellow Rockford, the mouth of Coon's Run, the mouth of Bingamon Creek, Shinstown, and Maulsby's Ford, at a cost of \$21,350, to which Virginia had contributed \$412.80. Construction of locks for upward bound traffic and the proposed canal from Buckhannon River was never undertaken.

Jackson had the dams and chutes nearly finished in May 1824, when a near record flood swept down West Fork and heavily damaged the structures. In his efforts to repair the dams, Jackson overworked himself, suffered from exposure to the elements, and died on the job in March 1825; he had lost most of his estate and finally his life on the West Fork project. His wife Mary, daughter of Governor Return J. Meigs of Ohio, offered to continue repairs to the project after the death of her husband, but the other stockholders, discouraged by the end of state support, flood damages to the dams, and the fact that



Roads to the west

West Fork had insufficient flow to fill the pools behind the dams in summer, decided to abandon the project. In 1829 Edwin Duncan brought suit for removal of Jackson's dams as nuisances to navigation, but that proved unnecessary, for West Fork floodwaters did the job efficiently without cost.

Intercity Rivalry and the Ohio River Project Tempers flared in the rival cities of Pittsburgh and Wheeling on the upper Ohio River during the hot, dry summers of 1818 and 1819. Wheeling had won its contest against Wellsburg, Moundsville, and Steubenville to become the Ohio River terminus of the National Road from Cumberland in the Potomac valley, and when the National Road opened into Wheeling in 1817 the city prepared to challenge Pittsburgh for the title "Emporium of the West."

The roads cut by Army Engineers through the forests for Generals Braddock and Forbes and improved navigation on the Allegheny, Monongahela, and headwaters tributaries had given Pittsburgh an early lead in the competition for control of westward emigration and Ohio River commerce. Wheeling countered in 1817 with advertisements describing the advantages of traveling the National Road to Wheeling and taking the Ohio River there. A Wheeling newspaper editor claimed that nine-tenths of the boats lost on the Ohio were wrecked above Wheeling and that the channel was at least six inches deeper below Wheeling than above. "We are

convinced," Wheeling merchants said, "that Steamboats cannot be profitably employed above this place during the summer months." Wheeling, they said, was the head of low-water navigation on the Ohio.

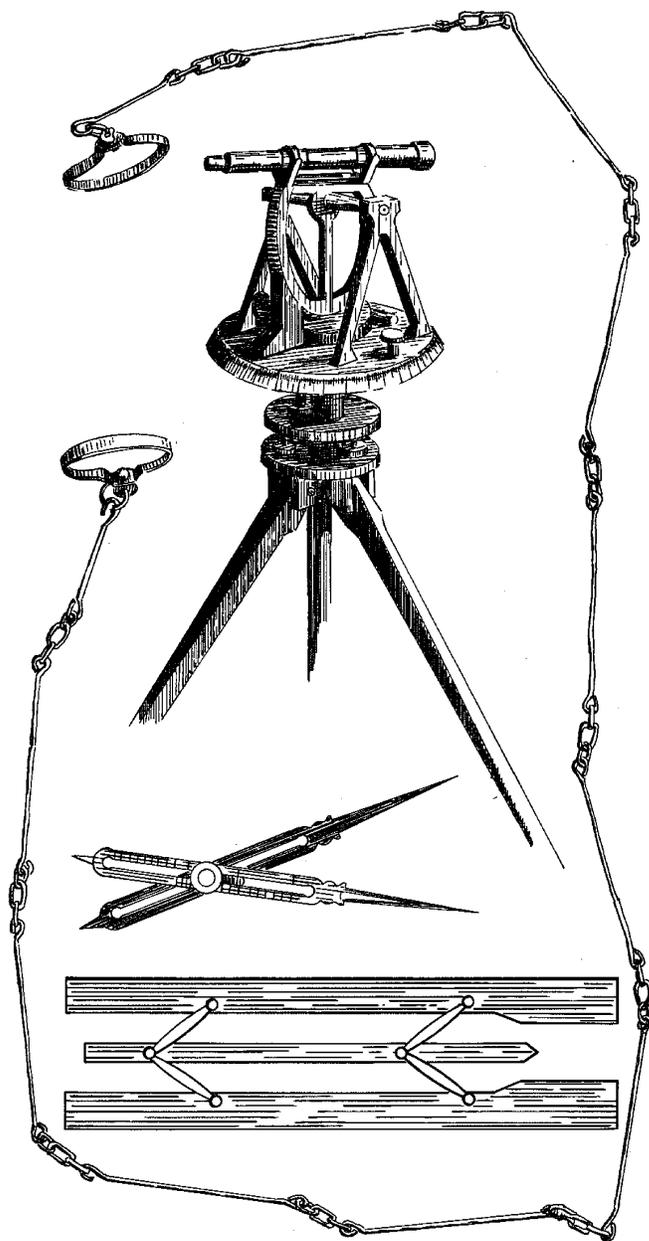
The opening of the National Road did erode Pittsburgh's economic position, and business losses were multiplied in 1818 and 1819 by extended droughts. "Our rivers are so low as to render navigation very difficult," lamented Neville Craig, editor of the *Pittsburgh Gazette*, in 1818, "and at this moment there is probably near a million worth of merchandize lying along our shores. The western merchants are lounging through our streets or moping in our taverns in restless anxiety." Before rains ended the drought of 1818 more than three million dollars worth of commodities had accumulated at Pittsburgh. For twenty years we neglected the improvement of Ohio River navigation, Craig continued, "it now becomes a task that can no longer be dispensed with!"

Neville Craig, William Wilkins, and Pittsburgh civic leaders organized a town meeting in August 1818 to discuss improvement of the Ohio, but public support for the project ended when rains fell and the rivers rose. Craig continued his newspaper campaign, however, and public interest reawakened when a second drought began in April 1819. A boat drawing only fourteen inches of water took thirty-

five days to float from Pittsburgh to Cincinnati in September 1819. The owner said he grounded at least fifty times on ripples where the river was only ten inches deep and "worked as hard as ever I did in my life" getting his boat over the bars. By the end of 1819, scores of boats were grounded on bars or laid up along the Ohio and its tributaries, for the usual fall rise did not occur in 1819 and navigation did not resume until February 1820. A severe economic recession resulted in the headwaters district.

Neville Craig and William Wilkins organized more town meetings at Pittsburgh during the 1819 drought emergency, and in August Wilkins was made chairman of a committee to plan clearance of the Ohio channel to Wheeling. After Wilkins reported urgent need for removal of boulders from the channel, especially three dangerous rocks at Montour Island, Horsetail Ripple, and Lowry's Ripple, Craig wrote in his newspaper: "If a party of fifty or sixty would assemble on any given day, and go down, the removal of these rocks would only afford a pleasant picnic. Fellow citizens what say you?" In October, with funds donated by the people of Pittsburgh, Wilkins and his assistants went to work at Pittsburgh, dragging rocks from the channel and blasting channels through rocky ripples. The Wilkins party cleared the hazardous obstructions from the river as far as Wheeling by mid-October, when the donated funds were exhausted.

A joint committee appointed by Ohio valley states to survey the Ohio and plan its improvement met at Pittsburgh on August 1, 1819, and Wilkins supplied the commission with boats and survey instruments. The Ohio general assembly on January 27, 1817, had invited all states bordering the Ohio to appoint representatives to a commission charged with devising plans for improvement of Ohio River tion. While not favorably received at first, the dry weather recession of 1818 brought action; Samuel Blackburn of Virginia, John Adair of Kentucky, and Walter Lowrie of Pennsylvania were appointed commissioners, and they selected Magnus Murray as surveyor. Murray had studied law in the office of William Wilkins; he also was a chemist, surveyor,



"Wilkins supplied...survey instruments"



Magnus M. Murray

Carnegie Library of Pittsburgh

iron manufacturer, and civic leader, and he became fourth mayor of Pittsburgh and a founder of the University of Pittsburgh.

The commissioners floated down the Ohio in the autumn of 1819 and observed Murray while he carefully surveyed and mapped the 102 major obstructions between Pittsburgh and the Falls of the Ohio at Louisville. In November, the commission submitted its report and maps to the state governments. The Ohio was full of boulders and snags and obstructed by rock ledges and sand and gravel bars, and it would be necessary, the commission reported, to develop proper equipment for removal of boulders and snags and to perform experiments with methods of deepening the channel at bars and rapids.

Estimating project costs was next to impossible, the commission said, because there were no standards in the United States for ascertaining the costs of blasting rock or dredging bars in a rapid stream. The commissioners did not think comparison of project benefits with costs was necessary, however, for during their trip downriver they had seen more than thirty boats representing millions in invested capital "worse than dead, ruinously expensive to their owners, lying in all directions, chiefly high and dry, some half in and half out of water, all sustaining incalculable injury from an exposure of six or eight months, waiting the returning flood." The commission recommended that each of the four participating states appropriate \$10,000 for the Ohio River project. But of the four states, only Pennsylvania did more than appeal to Congress for federal assistance.

Governor William Findlay, when submitting the report of the commission to the Pennsylvania legislature, declared "there is no object of internal improvement to which an appropriation of the amount suggested by the commissioners could be more beneficially applied." William Wilkins, who had been elected by Allegheny County to the Pennsylvania House in late 1819, pressed for state funding to continue his work on the Ohio; he and his Allegheny County colleagues presented petition after petition in support of appropriation for the Ohio. Wilkins was an Allegheny County attorney, first president of the Bank of Pittsburgh, and member of the Pittsburgh city council. He won election to the Pennsylvania House in 1819 chiefly because of his leadership of the Ohio River project, and throughout his subsequent career as congressman, senator, and secretary of war he supported improved navigation on the Ohio and its tributaries. Wilkinsburg and Wilkins Avenue in Pittsburgh honor him, and the Homewood district in Pittsburgh grew on the site of his estate, long the social center of the city.

Wilkins' campaign on behalf of the Ohio River project succeeded on March 26, 1821, when the legislature provided \$15,000 for improvement of the

river from Pittsburgh to Wheeling. The act appointed William Courtney and James Adams of Pittsburgh and Thomas Foster of Beaver County, all recommended by Wilkins, as Ohio River commissioners charged with "permanent" improvement by removing fishdams, rocks, and timber, and deepening the channel by confining river flow to narrower channels. On August 8, 1821, the three men began work, personally supervising 100 laborers under foreman Asa B. Shepherd. They cleared boulders and snags from twenty-one ripples, placing rock spoil in low riprap dams behind islands to divert low-water flow to the main channel and dredging channels through bars with teams of oxen pulling plows and scrapers. The commissioners paid laborers fifty cents a day, plus all the food and whiskey they could consume. Work ended at the Pennsylvania-Ohio line when the river rose on October 1; it resumed in the summer of 1822 and continued during each low water season until 1825 when funds were exhausted. The aim of the project was to open a low-water channel to Wheeling sufficient for navigation by 25-ton keelboats. In October 1824, the editor of the *Pittsburgh Gazette* commented:

It may be worthy of remark, that notwithstanding the immense trade carried on in Keel Boats, during the late season of low water, not a single accident or detention has occurred from obstructions in the Ohio, between this city and Wheeling. This is no doubt principally owing to the judicious labors of the Pennsylvania Commissioners appointed to clear out the channel of the river.

Summary: Early River Projects The urgent need of the pioneers for easier, more economical transportation than overland trails and roads generated early interest in waterway improvements in the headwaters district. Rivermen commonly made such improvements as they could, then appealed to state government for assistance. To protect flatboat and canoe navigation, state governments declared most streams in the headwaters district navigable public highways, re-

quired that their navigation be not obstructed, and compelled owners of milldams to install slopes to pass river traffic. Pennsylvania, interested in using waterways as routes for western trade, made extensive improvements on streams in the headwaters district, beginning even before Indian resistance had ended, and Virginia approved the first attempt to canalize a stream west of the Alleghenies.

On a small scale, local and state projects undertaken before 1825 met many of the same problems encountered by the Army Engineers at a later date. Declaring streams to be legally navigable was easy; enforcing the laws was more difficult. Removal of boulders and snags and dredging deeper channels required the development of machinery and tools to do the job; permanent improvements required the design and construction of dams; and these tasks made skilled men with some knowledge of engineering indispensable and necessitated substantial capital investment. The early projects had two goals: to gain access to markets for commodities too bulky for economic transportation by packhorse or wagon and to lengthen the navigation season and mitigate the effects of low-water recessions. Flatboat records indicate the early projects achieved the first goal, but had only limited success in accomplishing the second. Permanent river improvement was beyond the technological and financial resources of 19th century local and state governments.

