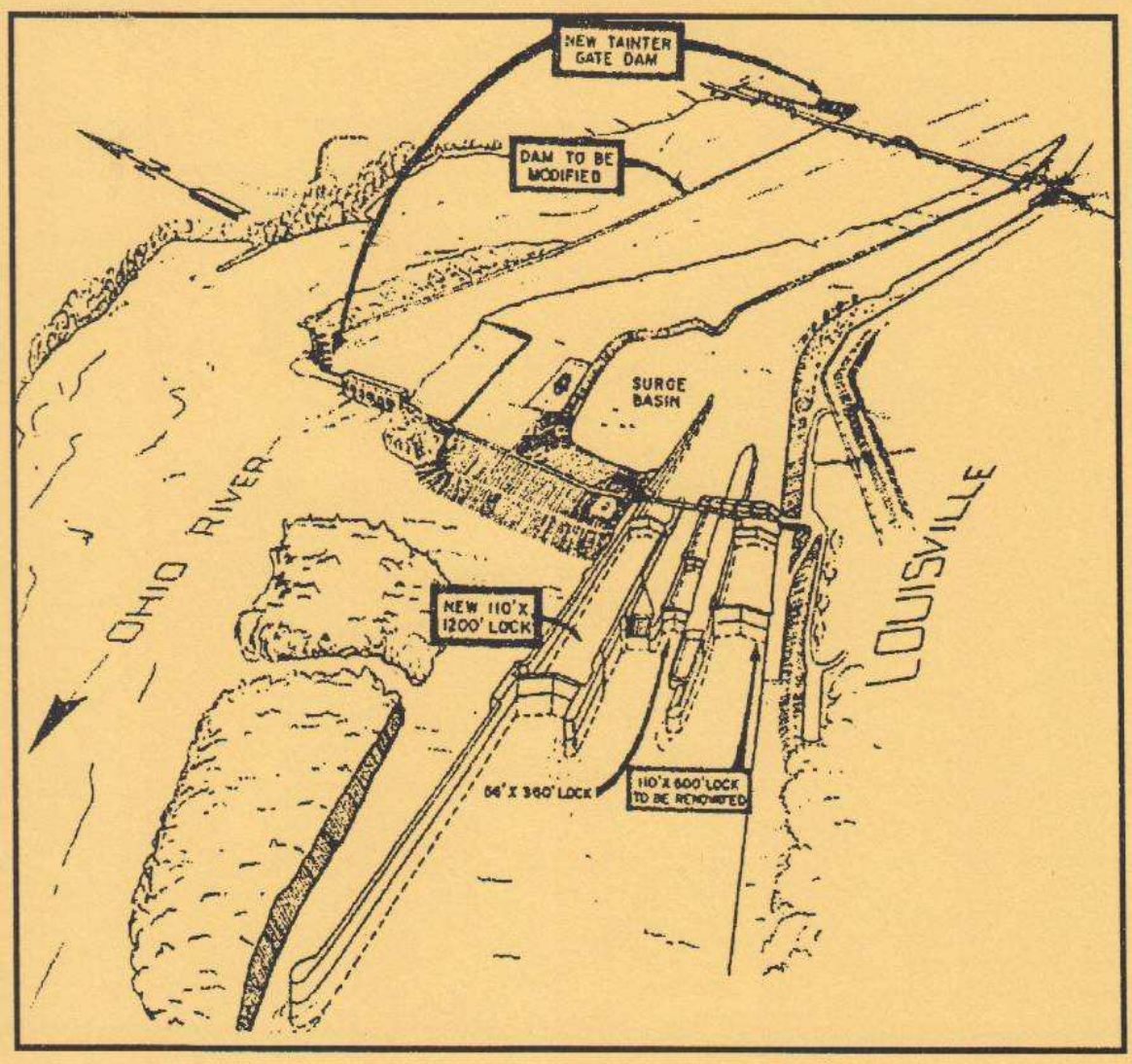
The Falls of the Ohio at Louisville



"Overcoming Obstacles"

CSI - CSO Fall Tour

October 1, 2, & 3, 2004

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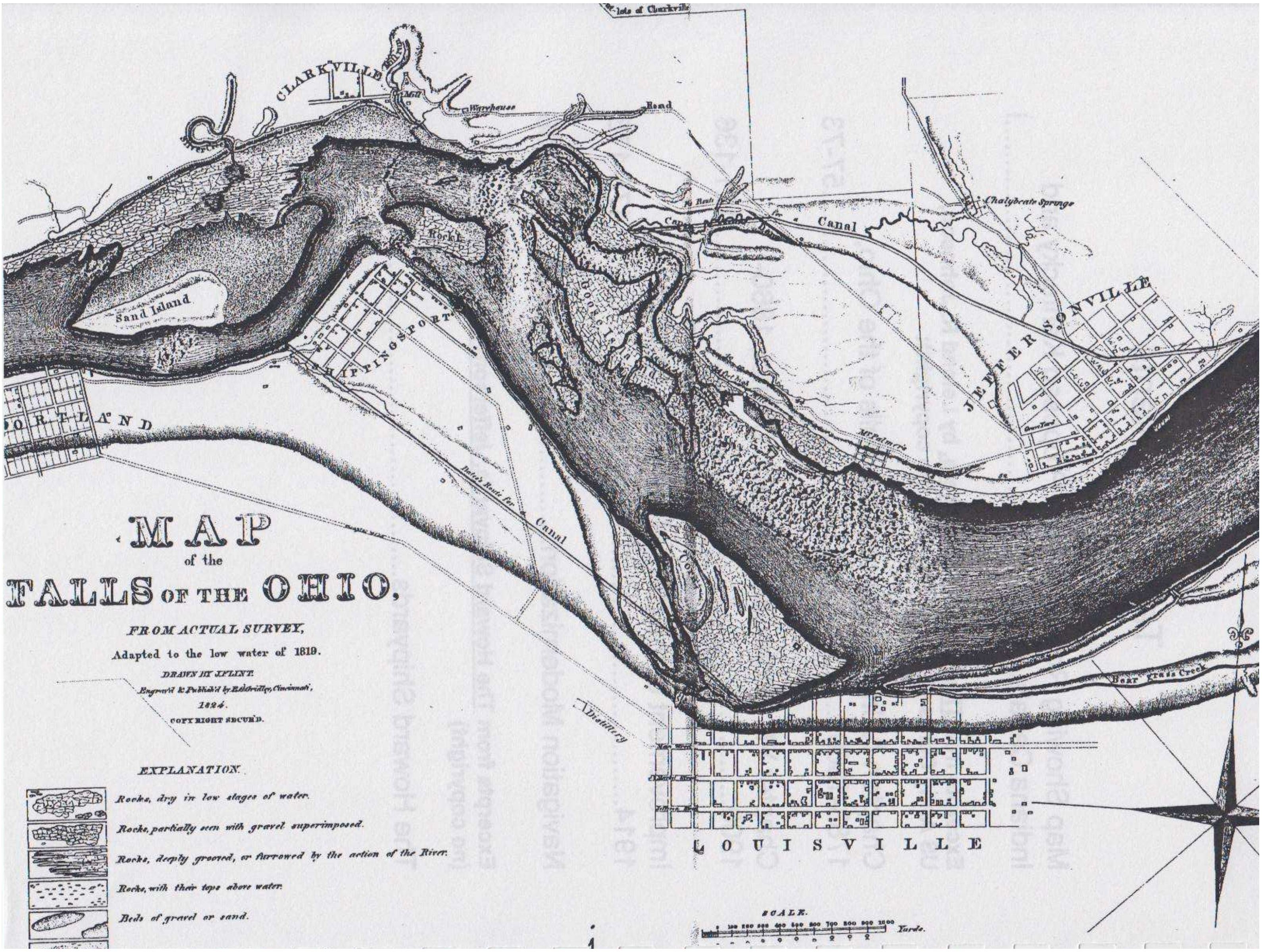

MAP
of the
FALLS OF THE OHIO,
FROM ACTUAL SURVEY,
Adapted to the low water of 1819.
DRAWN BY J. FLINT.
Engrav'd & Publish'd by H. Aldridge, Cincinnati,
1824.
COPY RIGHT SECUR'D.
EXPLANATION.
Rocks, dry in low stages of water.
Rocks, partially seen with gravel superimposed.
Rocks, deeply grooved, or furrowed by the action of the River.
Rocks, with their tops above water.
Beds of gravel or sand.
CLARKVILLE
Mill
Warehouse
Road
Canal
Chalybeate Springs
JEFFERSONVILLE
Sand Island
Rock
SHIPPINGSPORT
PORTLAND
Canal
Distillery
Bear Grass Creek
LOUISVILLE
SCALE.
Yards.

CHAPTER IV: IMPROVEMENT OF THE FALLS OF THE OHIO, 1783-1860

The Corps of Engineers launched its program for the improvement of navigation on the Ohio River in 1824, but for several reasons, chiefly political, Congress did not authorize a federal project for the improvement of the Falls of the Ohio, the worst obstruction to navigation on the river, and that project was undertaken by a private corporation. The hydrographic studies of Thomas Hutchins in 1766 publicized the nature of the obstructions at the Falls and indicated that improvements to navigation were feasible. It will be recalled that Thomas Jefferson, after study of the Hutchins map, speculated on possible improvement methods at the Falls as early as 1781.

During the late eighteenth century, as an extensive flat and keelboat traffic developed on the Ohio, several methods of improving the Falls were suggested; and after 1800 several private companies, chartered by state legislatures, funded engineering studies of the Falls and made abortive attempts at improving navigation. When the immense development of steamboat commerce began after the War of 1812 the improvement of navigation at the Falls became imperative, and, in the face of federal inaction, the Commonwealth of Kentucky chartered the Louisville and Portland Canal Company in 1825. With the aid of state and federal funds, this company completed the construction of a canal around the Falls of the Ohio in 1830. By the time the canal was completed the federal government had become a major stockholder in the corporation, but despite repeated urging by river interests, who wished the removal of excessive tolls, Congress refused to purchase the remainder of the stock and convert the canal to a toll-free federal project. The corporation eventually, as authorized by the Kentucky legislature in 1842, used its profits to purchase privately owned stock and delivered it to the federal government. By 1855, except for five shares held by the directors of the corporation, the United States was the sole owner of the canal, but Congress chose to leave the control and management of the canal to the directors; and the Louisville and Portland Canal Company became one of the first, if not the first, public corporation in the United States, a forerunner of the modern Tennessee Valley Authority and United States Postal Service.[1]

Congress authorized the improvement of the Louisville and Portland Canal after the Civil War, and the Louisville and Portland Canal project became the responsibility of the Corps of Engineers. The officer assigned to the project was permanently stationed at Louisville, and thereby became the first District Engineer of the modern Louisville Engineer District. A review of the history of the Louisville and Portland Canal prior to the formation of the Louisville Engineer District is therefore in order.

Falls of the Ohio: Problems of Navigation

English explorers and British Army Engineers wrote relatively accurate descriptions of the Falls of the Ohio long before the region was settled — those written by John Peter Salley in 1742 and Captain Harry Gordon in 1766 will be recalled — and practically every traveler on the Ohio who kept a journal recorded his impressions of the worst navigation obstruction on the river. The Falls were formed by an irregular mass of limestone underlying the entire width of the river for a distance of about two miles, forming, in effect, a

natural dam. The river was wide and relatively deep above the Falls, while below it was about half as wide with a lesser navigable depth for about fifty miles. The name "Falls" was a source of some confusion to early navigators, who often expected to find a precipitous cataract, whereas the Falls of the Ohio were not even visible at flood stages. The contraction of the river below the Falls caused the lower pool to rise more than twice as fast during floods than the pool above the Falls, until, at the highest stages, the gradient of the slope was so reduced as to permit navigation with relative ease. But such high stages ordinarily occurred during less than two months of any single year, and for the remainder of each year the whitewater rapids of the Falls made navigation exceedingly hazardous.[2]

Early descriptions of the Falls of the Ohio reported the gradient at the Falls at low water at from twenty-two to twenty-eight feet. (In 1914, it was officially reported as 25.24 feet.)[3] There were three channels, or chutes (also "shoots"), over the Falls known as, proceeding from the Indiana to the Kentucky bank, the Indiana (also Indian) Chute, the Middle Chute, and the Kentucky Chute. As the river rose, the Indiana Chute first became navigable, followed by the Middle Chute, and finally the Kentucky Chute. Two projecting rocks in the Indiana Chute, about fifteen feet apart, practically standardized descending flatboat traffic at a width of fourteen feet.[4]

At low-water seasons, teamsters and the drayage industry between Louisville and Shippingport flourished, while waterborne commerce languished. Not long after Louisville was founded in 1778, professional Falls pilots who guided waterways traffic over the Falls were in business. Before the Civil War the Falls pilots, on occasion aided by the Corps of Engineers, took advantage of extreme low water to clear especially hazardous rocks from the Falls chutes. With the possible exception of some snag removal accomplished by the firm of Tarascon and Berthold in 1818 in the harbor at Shippingport, this was the first improvement of navigation over the Falls. Support of the Falls pilots and other navigation interests for improving navigation over the Falls eventually led to Congressional authorization of a federal project for that purpose in 1874, but most early efforts to improve navigation at the Falls were devoted to the construction of a canal, or canals, bypassing the obstructions.[5]

Early Canal Projects, 1783-1812

Perhaps the first proponent of a canal around the Falls to actually attempt to initiate a project was Christopher Colles, an eminent Irish-American civil engineer. Colles, a notable advocate of the construction of the Erie Canal in New York state, like George Washington and Thomas Jefferson, studied the maps of the Ohio River and the Falls prepared by Thomas Hutchins, and he came to the conclusion that the best method of improving the Falls would be by the construction of a canal. On July 4, 1783, he petitioned Congress for a land grant at the Falls, proposing to form a company to construct and operate a canal and thereby open an all-water route for settlers bound for the West. But his petition was not granted.[6]

All states and, in the earliest days, territories (Ohio achieved statehood in 1803; Indiana in 1816) bordering the Ohio River above the Falls became interested in canal projects at the Falls to varying extents; and several canal companies which proposed to accomplish the feat were chartered by state and territorial legislatures in the early nineteenth century. The

state of Ohio was especially active, supporting projects sponsored by both the Commonwealth of Kentucky and the Territory of Indiana. But therein lay the principal complication which early canal companies met, for the states could not agree on the canal location.

The Territory of Indiana incorporated the Indiana Canal Company in 1805; it had some distinguished directors, including General George Rogers Clark, Congressman Jonathan Dayton, General Benjamin Hovey, former Vice President Aaron Burr, and others. General James Wilkinson, who had launched commercial trade with New Orleans via the waterways in 1787 and who had suffered heavy losses at the Falls of the Ohio, lent his support to the Indiana Canal Company. He claimed the project, in addition to its benefits to navigation, could provide valuable water power for industry. He declared that the premience of the Falls of the Ohio area could not "in point of locality and fitness for the grand emporium of internal commerce, be controverted; its position at the head of easy navigation, and its central relation to the most extensive, luxuriant and productive tract within the national limits, or perhaps in the universe, will, at the first glance, decide, that commercial enterprize is to find its way to this point from the ocean, and that here the primary exchange of products for imports is to take place."[7]

The company petitioned President Jefferson and Congress for federal aid for the project, asking a grant of twenty-five thousand acres of public lands to sell and thereby fund the project. Whether this company actually intended to construct a canal, or whether there were other motives behind its organization was questioned. Some suspected that its real purpose was to form an unauthorized banking business; and the participation of General Wilkinson and Aaron Burr in the enterprise later led to speculation that it was organized as a cover for the Burr Conspiracy of 1806. Whatever the motives, Congress refused to authorize the use of public lands for the stated purposes.[8]

Louisvillians, led by James Berthold of the firm of Tarascon and Berthold, organized a state-chartered company, the Ohio Canal Company, in 1804 and employed a former officer of the Corps of Engineers to study and map the Falls and prove the advantages of the canal site on the Kentucky bank. Jared Brooks, who had served as a Lieutenant in the First Regiment of Artillerists and Engineers, conducted extensive studies of the hydrology of the Falls of the Ohio in 1805, made a detailed survey of the area, sank shafts to investigate the character of the subsoil and rock strata, and prepared a map which clearly proved the best canal route lay along the Kentucky shore. Brooks laid out the route which was eventually followed by the Louisville and Portland Canal. The Kentucky legislature forwarded the report of Brooks to Congress along with a request for federal aid; and in 1806 a committee of the House reported that on the basis of Brooks' studies it would recommend federal aid for the canal project if the revenue of the United States had not been "already pledged" for other purposes.[9]

At the request of Henry Clay and other congressmen from the Ohio Valley, further study of the canal projects at the Falls was authorized as part of the comprehensive study of American transportation problems conducted under the direction of Secretary of Treasury Albert Gallatin in 1807. Jared Brooks provided the Secretary with maps of the Falls area and a lengthy report on the subject. According to Brooks, the "dormant wealth of this im-

portant section of the national domain can be brought into life and action only by a free and open navigation, and the assistance of water-works for the encouragement of manufactures." The canal at Louisville, he contended, would meet those two overriding needs. Secretary Gallatin was impressed by these arguments and by the fact that sea-going ships were regularly descending the Ohio at that time, and he recommended in his report of 1808 to Congress that three hundred thousand dollars in federal funds be apropriated to construct the canal project; but no action was taken on this, or on his other recommendations.[10]

Indiana Falls Canal Projects

After the War of 1812, the growth of steamboat commerce and the increasing economic development of the Ohio Valley led to renewed efforts to bypass the Falls with a canal. One of the first laws enacted by the first state legislature of Indiana in 1816 incorporated the Ohio Canal Company, but the company did not take advantage of its charter and in 1818 the state chartered a third Falls canal company. The Jeffersonville Ohio Canal Company, financed largely by Cincinnati capital, actually initiated canal excavation on the Indiana bank, but the clays of Clark County, Indiana, proved to be more durable than the funds available to the company. Studies of possible canal sites on the Indiana bank of the Falls of the Ohio continued until well after the Civil War, usually inspired by public displeasure with the limited size and high tolls of the canal completed on the Kentucky bank, but no such project was ever completed.[11]

Creation of Louisville and Portland Canal Company

Near the end of the War of 1812, Laommi Baldwin, a distinguished American civil engineer prepared plans for a canal for keelboats along the Kentucky bank, but the Kentucky canal company could not find the financial support necessary to initiate construction. The canal projects at the Falls were caught up in the economic rivalry between the Queen City, Cincinnati, and the Falls City, Louisville. A Cincinnati newspaper editor accused Louisville in 1818 of covert opposition to a canal, or at best support for the construction of an "inefficient" keelboat canal. He wrote: "the moment a canal is constructed sufficient to convey boats up and down the falls, that moment Louisville *sinks* to a level with other towns on the river. . . ." The editor of the Louisville *Public Advertiser* responded that Louisvillians were "really anxious" for construction of the canal, and accused Cincinnatians of supporting canal projects on the Indiana bank of the Falls because such a canal would be a blow to Louisville.[12]

There were some, chiefly those in the business of transporting freight around the Falls, who were opposed to canal projects in 1818, but support for the project was building. Henry McMurtrie, the Louisville historian, argued in 1819 that the construction of a canal around the Falls, that "formidable and intimidating spot, whose terrors have paralized the arm of enterprize," would be a boon to the commerce of Louisville and the entire Ohio Valley. He declared the canal was vital to the security of New Orleans and the Gulf Coast and suggested that the United States should establish a military depot at the Falls where the "munitions of war" might be speedily dispatched down the waterways by steamboat. McMurtrie urged the aid of the federal government in the canal project, and declared that the project would never be constructed with-

out aid from the United States, "whose aid and countenance in this undertaking every inhabitant of this section of the Union sincerely prays for."[13]

When the Commission representing Ohio Valley states reached the Falls of the Ohio at the end of the survey of the Upper Ohio in 1819, as directed by participating states, the members examined the Falls of the Ohio to compare the proposed Kentucky and Indiana canal projects. They collected previous engineering reports, resurveyed the Falls, and recommended the construction of a canal on the Kentucky side. They estimated the costs of the Kentucky canal at less than $400,000, while the Indiana canal might cost as much as $1,000,000. The Army Engineers, commanded by General Simon Bernard, who continued the survey of the Ohio in 1821, began their work with an examination of the Falls area and proposed canal routes. Because Congress had not directed it, they did not report their opinion of which might be the most desirable canal route, but their figures substantiated the previous reports of Jared Brooks and the Joint Commission of 1819.[14]

In 1823 the state of Ohio directed Judge David S. Bates, who had acquired his engineering expertise and experience on the Erie Canal project in New York state, and Alfred Kelly, an Ohio state canal commissioner, to reexamine the Falls. The two engineers reported the canal route on the Kentucky bank was most feasible and least expensive, commented that the "business of the country above the Falls annually, pays a tax to this rock of greater amount than it would cost to make the improvement," and estimated that benefits of the project would consist of savings of $150,000 in transportation costs annually. The report of the Ohio engineers, along with an offer from the state of Ohio to join Kentucky in funding a project, was presented to the Kentucky legislature in 1824. An extended debate ensued in the Kentucky legislature over whether the state should construct the project, or whether a state-chartered private corporation should be given that privilege. The controversy was settled in favor of the proponants of construction by a corporation; and a bill establishing the Louisville and Portland Canal Company was signed by the Governor of Kentucky on January 12, 1825.[15]

Initial Construction

Citizens of several states purchased stock in the new canal company, but private capital came principally from Philadelphians, who hoped to use a canal over the mountains to Pittsburgh and the Ohio River as a trade route to the West, competing with the Erie Canal in New York state which was completed in 1825. The Louisville and Portland Canal Company selected Judge David S. Bates as chief engineer of the project. He served concurrently as chief engineer for the canal system under construction in Ohio, and his son, John Bates, and Alfred Barrett, another former Erie Canal engineer, had immediate supervision of the Louisville project.[16]

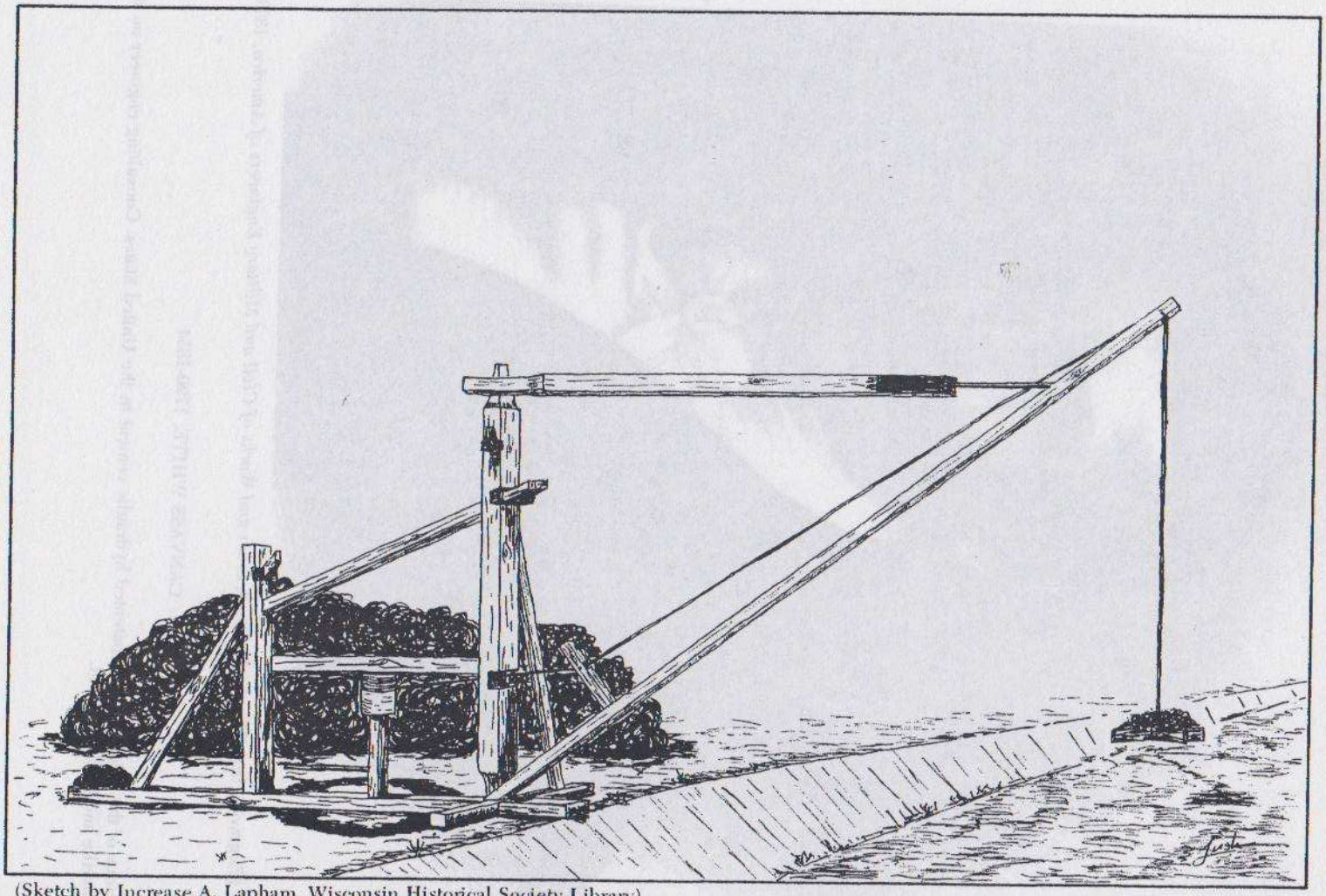
Judge Bates' plans called for a canal about two miles long from the harbor before Louisville through the Portland section to rejoin the river below Shippingport. He estimated that 112,000 cubic yards of rock and 633,358 cubic yards of earth would be excavated from the canal and lockpits. Three lift-locks, each to be 190 feet long, 50 feet wide, with a lift of eight feet, eight inches, were located at the lower end of the canal. A massive guard lock was to be constructed at the head of the lift-locks to protect them from

drift and silt during high water periods. Judge Bates estimated the locks would require the placement of some 30,000 perches (about 25 cubic feet per perch) of stone masonry. But the estimates were quite rough, specifications were not firm, and detailed plans were not in existence. It was the custom of pioneer canal engineers to prepare only general plans and work out the details as the project progressed; planning was flexible, usually on an empirical basis, and extensive modifications to the Louisville canal project were effected during the course of construction.[17]

The canal company advertised for bids from contractors on October 22, 1825, stating their intention to have the work completed in the "shortest possible time" and requesting that sealed bids be submitted by December 22, 1825. About twenty-five bids were received from contracting firms of several states; and in late December the contract was awarded to the lowest bidder, Chapman, Culver, Lathrop, Collins, Perrine, & Company, formerly contractors on the Erie Canal. Their bid was for about $370,000, nearly twenty percent less than the estimated costs, with completion scheduled for November 1, 1827. It appears the work was somewhat larger than the contractors could handle independently, for they subcontracted portions of the excavation to the firm of Southerland and Adams and lock construction to the Carney and Sayre Company. The first work began on March 1, 1826, but construction was held up for a month by continued high water. Only about 35 men and their teams were employed in grubbing and clearing the line of the canal during the first few months of construction, and considerable difficulty was met in employing laborers during the summer of 1826 because of a smallpox epidemic in the vicinity of the project. But by the end of the summer some 1000 hands were at work; and lock construction was initiated in September. To supervise construction of the locks, Judge Bates employed John R. Henry and young Increase A. Lapham, who had previously been employed on the Erie Canal in the design and construction of the elaborate five-flight lock structure at Lockport, New York. When John Bates and Alfred Barrett left the project, John R. Henry became resident engineer, with Lapham as his assistant.[18]

Excavation Methods

The techniques utilized for construction of the Louisville and Portland Canal in the late 1820s did not materially differ from those used on the Egyptian pyramids and Roman aqueducts milleniums before. The contractors at the canal, like the Ancient builders, relied on human and animal power. Excavation was accomplished with hand tools, oxen-drawn plows, and scrapers dragged by horses; and the excavated materials were removed by wheelbarrows and horse-drawn carts. The principle advance in excavation techniques between Roman times and the nineteenth century was the use of gunpowder for rock excavation. In the lockpits and canal cross-section, holes were drilled into the rock by men using sledgehammers and hand drills, the holes stuffed with black gunpowder, and clay tamped in atop the powder, leaving small apertures for priming powder and a fuse, which was ordinarily a twist of paper soaked in saltpetre. Holding a drill while men pounded it with sledgehammers and blasting rock with black powder was a dangerous business and accidents were frequent. The laborers employed on the project were a rough crew of Irishmen, many of whom came to the work from other canal projects, and a



(Sketch by Increase A. Lapham, Wisconsin Historical Society Library)
DIBBLE CRANE FOR RAISING MATERIALS FROM EXCAVATION AT LOUISVILLE AND PORTLAND CANAL, 1827

(Engraving from Charles B. Stuart, *Lives and Works of Civil and Military Engineers of America*, 1871)

CANVASS WHITE, 1790-1834

"Genius of the Erie Canal" — patented hydraulic cement in the United States. Consulting engineer on the Louisville and Portland Canal.

and lowered by chains running through windlasses, with boxes filled with stone, old grate bars, and other heavy materials as counterbalances.[22]

Contractor Failures and Federal Participation

Many citizens who pledged to purchase stock defaulted at the commencement of construction in 1826, but the project was saved by an appropriation of Congress for purchasing the forfeited stock. The United States became a major stockholder in the corporation, but it appears the federal government made no effort to influence company policies or aid construction in any other manner. When the original contractors failed in 1828, apparently because of the high costs of excavation and the necessity of paying high wages to attract workers, which considerably exceeded contract estimates, Congress again saved the project by purchasing the rest of the forfeited stock. The company renewed work, serving as its own general contractor and reducing costs by modifying a number of project features.

The width of the walls of the lift-locks was reduced and buttresses on the back side of the walls were eliminated. Rock excavation ceased and many projecting rocks were left to plague navigators at a later date. John R. Henry was retained as project engineer for the directors; Increase A. Lapham continued as assistant engineer; and a number of former subcontractors were hired as overseers. Seven new contracts were let for various unfinished sections of the project; and in the working season of 1830 the canal was completed.[23]

First Boats Through and Final Costs

On the first of December, 1830, water rose nearly to the top of the cofferdam at the head of the canal, and the dam was removed to permit filling of the canal. Flatboats passed through the canal in early December, and on December 21 the first steamboat, the *Uncas*, Captain Beer, with full cargo bound for Nashville, locked through. One of the first vessels to use the canal was a flatboat from Cleveland, Ohio, which had navigated the Ohio state canal system and the Muskingum River to Marietta and proceeded down the Ohio on its way to New Orleans.

Although the directors of the Louisville and Portland Canal Company listed construction costs at $742,869.94, actual costs, including interest on funds borrowed to complete the project, were $1,019,277.09. Captain Thomas Cram, Corps of Engineers, who investigated the project at the order of Congress in 1844, concluded that, though actual costs were nearly three times the original estimates:

> Considering the numerous difficulties experienced by the company in the outset, and during the progress of their undertaking, the want of confidence in the success of the work, evinced by the fact that almost all the subscribers living in its vicinity forfeited their stock after having paid installments thereon, it may be said on the whole that the cost of the Louisville and Portland canal was reasonable.[24]

Canal Operation

During the first 104 days of operation, 827 boats, 406 of them steamboats, locked through. The editor of *Niles' Weekly Register*, a journal with national circulation, commented: "And yet this noble and beneficent undertaking was thought by the advisers of the executive, to be too contracted and diminutive a concern to deserve the aid of the general government. If such works as these be not national, what shall we call so."[25]

Numerous problems which delayed navigation were experienced in operation

large member of slaves hired from their masters. It has been claimed that, because of their rough character, the sobriquet "Hoosier" was first applied to the workmen at the Louisville canal.[19]

Mechanization

Several efforts were made to mechanize construction methods, chiefly to facilitate removal of the excavated materials after the depth and side slopes of the canal were too great for easy handling. A stiff-legged timber crane, supposedly invented by Mr. Orange Dibble on the Erie Canal, was put into use in raising loads of material from the bottom of the excavation. Another device, invented by Mr. Oliver Phelps on the Welland Canal, was also put into use. It consisted of a windlass at the top of a timber railway running up the canal slope. A horse-drawn train of loaded carts at the bottom of the slope had a rope attached to its front; the rope ran up the slope, around the windlass, and was attached to the back of an empty cart train, also pulled by horses, going down the slope. The weight of the empty cars and the power of the teams pulling them was thus added to the power of the teams pulling the loaded carts up the slope.[20]

Lock Construction

The walls of the locks and canal were constructed of cut stone masonry, on the same principles developed by the Ancient builders. Stone for the project was quarried a few miles below the site and transported up river. In 1827 the canal company employed Canvass White, who had won the sobriquet 'Genius of the Erie Canal," as consulting engineer. White had studied canal and lock construction in Europe on behalf of the New York project, and during the construction of the Erie Canal had discovered "waterproof lime," actually the first hydraulic cement in America. He conducted experiments with various limestones and found a variety which, when burned, pulverized, and mixed with sand, formed a mortar which hardened in water. White found that the limestone excavated from lockpits at the Louisville canal would serve the same purpose. A steam mill was constructed to grind the stone to powder, for use in binding the masonry in the lock walls together — it was reported this grout soon became harder than the stone used in the construction. By 1874 eight hydraulic cement factories, with an annual production valued at a million dollars, were in business at Louisville.[21]

The total amount of masonry placed in the lock and canal walls and in the stone bridge over the canal was approximately 41,989 perches, equal to the amount used in thirty ordinary canal locks of the era. The guard lock and three lift-locks all had solid rock foundations. As completed, the guard lock was 190 feet long, 52 feet wide, and 42 feet high, containing 21,775 perches of masonry. The three lift-locks were the same width as the guard lock, 20 feet high, and 183 feet long, with a lift of eight feet, eight inches each. The length of the walls, from the head of the guard lock to the end of the outlet lock was 921 feet. Two bridges, one of stone and the other of wood, spanned the canal. The stone bridge, which had three arches, was 240 feet long and contained 5,741 perches of masonry, was erected by Carney and Sayre Company for $20,000. The wooden draw bridge, completed by a contractor named Tanner for $850, accommodated traffic between Portland and Shippingport. Built over the head of the guard lock in a position similar to that of the metal draw bridge at McAlpine Locks in 1975, it was in two parts (Bascule) and was raised

and lowered by chains running through windlasses, with boxes filled with stone, old grate bars, and other heavy materials as counterbalances.[22]

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CONDITION

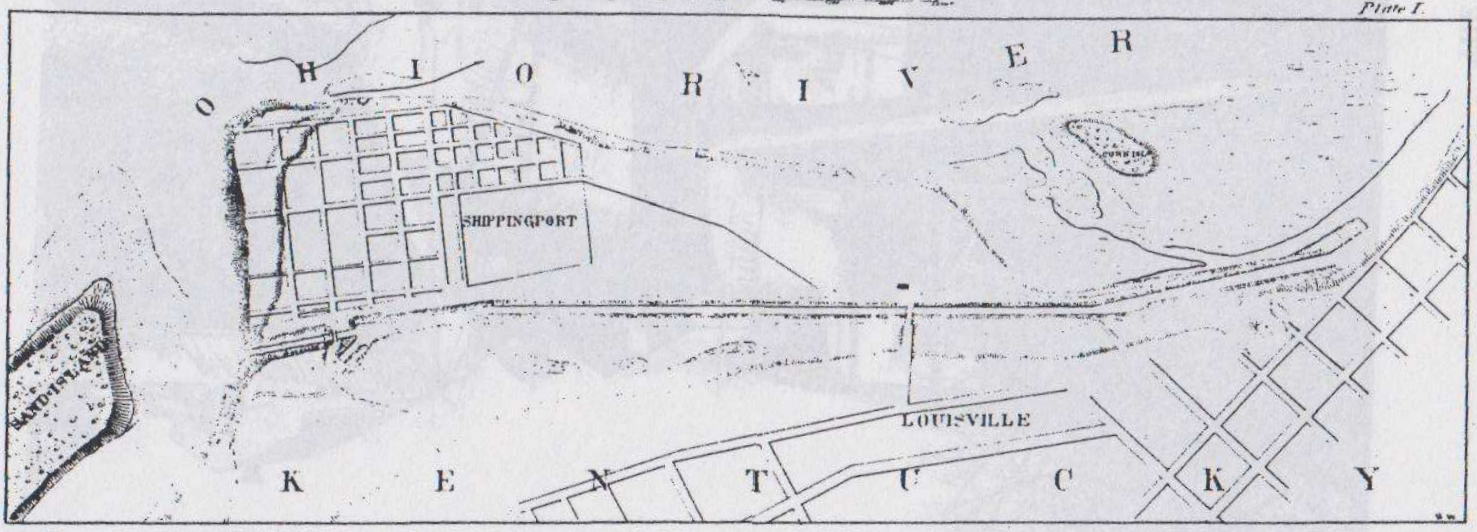
OF THE

LOUISVILLE AND PORTLAND CANAL.

BEFORE ENLARGEMENT

Scale

Plate I.



Note: From survey made by Lt-Col S.H.Long T.E 1841.

(Record Group 77, Natinal Archives)

Louisville and Portland Canal — Three flight locks completed by the Louisville and Portland Canal Company in 1830. Photo probably taken in 1874.

of the project. Extensive deposits of mud and debris were left in the locks and canal after each flood. The flood of 1832, which left a number of wrecked houses in the canal, required extensive repairs and alterations to the project. In 1833 a steam-powered dredge, of the "endless-chain-of-buckets" or ladder type, was built to remove mud and silt. Later dredges were the dipper type. The wooden lock-gates were opened by chains attached to manually operated capstans mounted on the esplanades. Lockmen turned the capstans, winding the chains around drums, to maneuver the gates. It was a slow process requiring an hour and a half to pass a single boat through the series of locks; delays as long as five hours in passing the canal and locks were frequent.[26]

The number of vessels using the canal still increased; more than a thousand vessels locked through in 1835, and an average of 1300 passed through every year thereafter until the onset of the Civil War. Tolls collected from this commerce made the canal a profitable enterprise from the first, and stockholders averaged a return of eight percent annually on their capital. The Governor of Kentucky lamented:

> It must be a subject of perpetual regret to every patriotic mind that the state did not, with her own resources, undertake the construction of the canal at Louisville. It would have been an imperishable fund — a source of revenue as lasting as the Ohio River itself — which would have enabled the government to accomplish the most extensive and useful plans without increasing the burdens of the people.[27]

But there were segments of the population of the Valley who did not appreciate the canal. On January 23, 1833, several kegs of gunpowder were deposited in the locks and detonated. One of the locks was heavily damaged, and the company offered a $5000 reward for the capture of the perpetuators, but the culprits were not found. There were also attempts to blow up the stone bridge; and boats loaded with coal were sunk at the head of the canal. It was suspected the saboteurs were disgruntled draymen whose business had been reduced by the opening of the canal.[28]

Limitations of the Canal

The principal value of the Louisville and Portland Canal was that it permitted shipment of goods from the Upper Ohio Valley without transferring cargoes at the Falls and reduced the delays which often resulted in alternate glutting and famine at the New Orleans and other downriver markets. But this value was limited by certain defects in planning. The stone bridge over the line of the canal had a clearance of sixty-eight feet at low water, and boats with high stacks had to lower them to pass under. The lock chambers, designed for vessels used on the rivers in the 1820s, limited hull dimensions to 183 feet long by 49½ feet beam; and by 1853 over forty percent of the steamboats on the Ohio were too large to pass through the canal. Steamboat designers increased the draft on vessels to enlarge cargo capacity, and steamboats were often seen backing through the canal, or "crabbing through," to thrust available water back under the hull and drag the boat across accumulated silt on the canal bottom. These limitations were often complained of by rivermen, but the principle objection was to the high tolls charged at the canal.[29]

The original toll was twenty cents per ton, but high maintenance and operation costs, chiefly due to the damages resulting from repeated floods, necessitated an increase to forty cents in 1833 and to sixty cents in 1837. These toll increases substantially reduced the savings in transpor-

tation costs for which the citizens of the Ohio Valley had hoped. At Pittsburgh, Cincinnati, St. Louis, and other ports on the inland rivers, navigation and mercantile interests held protest meetings and sent petitions to Congress, contending that collection of tolls at the canal was a burdensome monopoly, that the tolls were an excessive tax on Ohio Valley commerce, and that, because the Ohio River was a national highway, the project should be taken over and operated by the United States.[30]

The directors of the Louisville canal operation never sought to retain control over the project and were always ready to sell out to the United States, for Louisvillians were in accord with residents of other port cities on the subject of the tolls. The Louisville Chamber of Commerce resolved in 1840 that the tolls seriously retarded "commercial operations and the transportation of merchandise." And the president of the canal company wrote in 1844 that the United States should take over the project because:

> It cannot be controverted that this tax [tolls] is paid indirectly by the agricultural products of the west and south, and the manufactured goods of the east, as well as by passengers travelling on the Ohio from all parts of the Union. Were this tax entirely removed, the competition existing among steamboats for freight would soon cause them to consider it an expense to the carrying trade the less; and the result would be a proportionate reduction, to a great degree, on the cost of transportation. This fact, however, only proved the truly national character of this work — every citizen of the Union being more or less interested in the reduction of the toll; and that the saving would not be confined to steamboat owners alone.[31]

Three schools of thought had developed on the subject of the improvement of the Falls of the Ohio by 1840. The majority of those interested in the problem supported national ownership and operation in such a manner as to eliminate or substantially reduce the tolls at the existing canal. A second group supported the Falls pilots in efforts to gain federal aid for a project to improve navigation by open channel over the Falls. And a third group advocated the construction of a second canal along the Indiana bank — in 1836 Indiana chartered the Jeffersonville and New Albany Company, which proposed to construct such a canal to create two-way traffic around the Falls.[32]

The improvement of the open channels at the Falls was most vigorously supported by the Falls pilots who had to navigate them. In the 1830s the pilots expended some of their own funds in closing secondary channels and removing dangerous rocks from the Indiana Chute; and some small federal aid was provided for the work. Lieutenant Jacob A. Dumeste, by order of the Secretary of War, surveyed the channels over the Falls in 1830; and in 1834 Captain Henry M. Shreve, as agent for the Corps of Engineers, reported to Congress on open-river navigation at the Falls. Shreve advocated blasting rock from the Indiana Chute and placing it in dams across little-used channels to increase water volume through Indiana Chute and the Louisville Canal. But this work was left chiefly to the enterprise of the Falls pilots.[33]

Water Power at the Falls

The United States was very much interested in the water power available at the Falls, for after the War of 1812 considerable support for the construction of a national armory on a western river where watercraft could quickly distribute munitions to armies on the frontiers developed. In 1819 President James Monroe expressed his opinion that the Falls area would

be a most suitable location for an armory; and in 1825 the Kentucky legislature ceded, by joint resolution, jurisdiction over lands which might be acquired at the Louisville canal for a national armory to the United States. The hope that a national armory might be located alongside the canal may have given added impetus to the canal project in 1825; at least, an officer of Army Ordnance discussed the subject with the company in that year.

Colonel George Bomford of Ordnance negotiated an agreement with the Louisville and Portland Canal Company for use of the water power made available by the canal. Colonel Bomford estimated that a national armory would require about 200 acres of land and water power sufficient to work twelve pair of five-foot burr millstones for ten to twelve hours per day. The company agreed to furnish the necessary water power for $3600 annually, and the lands of Senator John Rowan along the canal line were available as a site. But no action was taken by Congress because the location of the national armory in the West became a controversial political issue. Citizens and their representatives near practically every water fall on the inland rivers urged that the armory should be constructed at their site, rather than at Louisville.[34]

In 1828 and 1829, Captain John L. Smith, Corps of Engineers, aided by Lieutenant George Whistler, examined potential armory sites throughout the Ohio Valley, and found acceptable locations on the Wabash and Big Blue rivers in Indiana, on the Licking River in Kentucky, and at the Falls of the Ohio. But Congress found itself unable to agree upon a single site, and in 1842 directed that another survey be conducted. General Walker K. Armistead and Colonel Stephen H. Long of the Army Engineers and Surgeon General Thomas Lawson again investigated numerous sites in the Ohio and Mississippi valleys. Because steam-powered machinery had been perfected, it was no longer necessary to locate the armory at a falls where water power was available, and the officers recommended the construction of a national armory at Fort Massac, Illinois, near the mouth of the Ohio, which was more centrally-located to navigation on the Mississippi River system than Louisville. But Congress again found it impossible to come to agreement on the site, and a national armory in the West was not constructed until the exigencies of civil war required it. The water power available at the Falls of the Ohio was thus left for private rather than public development.[35]

Politics and the Canal

Political controversy also prevented the acquisition and operation of the Louisville canal as a toll-free federal project. Though the directors of the canal, the legislature of Kentucky, and navigation interests on the inland waterways continually supported bills in Congress to convert the canal to a national project and remove the burdensome tolls, opposition came from two quarters. Indianians still hoped a canal would be constructed along the Indiana bank of the Falls and they supported federal construction of this canal, rather than federal acquisition of the Louisville canal. And many citizens throughout the United States maintained that federal control and operation of the canal was beyond the constitutional authority of the United States. This opposition successfully blocked every bill in Congress which would have established federal control of the Louisville and Portland Canal. By 1855, however, federal ownership of the canal was almost complete.[36]

During construction of the project, the United States had purchased and acquired 2,092 shares, at a cost of $233,500, in the canal corporation. During the first decade the canal was in operation, the United States was paid $257,778 in dividends on its stock — more than the original purchase price — while private stockholders received more than double that amount in dividends. In 1841, private stockholders proposed to buy themselves out, since Congress would not do so with appropriations, by applying dividends due the United States to purchases of the private stock; and the legislature of Kentucky authorized this procedure on January 21, 1842.[37]

Congress did not dissent, and by 1855 the United States was the owner of 9,995 shares of canal stock; nevertheless, Congress still refused to accept the canal as a government project, and five shares remained in private hands to qualify their holders as directors of the corporation. The Louisville and Portland Canal Company thus became a public corporation, owned by the United States but operated by directors independent of control by Congress. While perhaps politically advantageous, this administrative organization produced the paradox of the collection of a heavy tax on commerce at the Falls of the Ohio while the remainder of the river was under federal improvement with the purpose of reducing transportation costs — a situation which was to continue until 1880. Precise computations have not been made, but it appears the United States collected more in tolls at the Louisville canal prior to 1860 than it expended on the improvement of the entire Ohio River.[38]

Summary

The hydrographic studies of Thomas Hutchins first indicated the feasibility of a canal project to bypass the obstructions at the Falls of the Ohio, and the surveys of Jared Brooks, a former Army Engineer, proved that the shortest and most economical canal route at the Falls lay along the Kentucky bank. Later studies of the Falls conducted by the joint commission appointed by Ohio Valley states in 1819 and by an Army Engineer survey party in 1821 confirmed the findings of Jared Brooks. But, in the face of Congressional refusal to authorize and fund a definite federal project, proponents of canal projects on the Indiana and Kentucky banks of the Falls engaged in an extended political controversy which, in conjunction with limited capital, prevented any substantial improvement of navigation at the Falls of the Ohio until 1825.

The Louisville and Portland Canal Company, a state-chartered, private corporation, completed construction of the massive canal project on the Kentucky bank of the Falls in 1830, but it required federal and state financial support to accomplish the feat. And, in view of the crude construction methods of the era, the canal was an engineering feat of considerable magnitude, equal in scope to much larger projects constructed in the twentieth century with the aid of modern engineering technology and construction methods. The chief problems with the completed project were two: marine engineers on the inland rivers developed vessels much larger than the capacity of the locks of the Louisville canal; and the high tolls at the canal, which in the end were paid by consumers, materially reduced the value of the project to the Ohio Valley.

Political controversy and constitutional issues prevented federal construction and operation of the project and prevented the construction of a national armory to take

advantage of the water power at the site. The United States did not assume complete responsibility for the improvement of the Falls of the Ohio for navigation until 1874; nevertheless, its interest and limited participation in the construction of the pre-Civil War project did make possible the completion of the canal in 1830, and the United States became the principal stockholder in the corporation not long thereafter. The Louisville and Portland Canal project foreshadowed later projects for improving navigation and developing the latent power at the site, formed the foundation on which subsequent projects were based, and eventually led to the formation of the Louisville District, Corps of Engineers, United States Army.

CHAPTER VIII: LOUISVILLE CANAL AND DISTRICT, 1860-1900

Captain Henry M. Shreve and Colonel Stephen H. Long managed western river improvements from offices at Louisville for many years before the Civil War, but the history proper of the Louisville Engineer District actually began on May 11, 1867, when an Engineer officer was ordered to Louisville to direct completion of an enlarged canal around the Falls of the Ohio. The authority of this officer and his successors was gradually extended to the Lower Ohio River and tributary streams; and it became the custom to refer to the geographic area of responsibility of this officer and his staff as a "district." After 1888 it became officially the Louisville Engineer District.

The history of the formation and early development of the Louisville Engineer District is of special interest, encompassing several complex developments including final federal assumption of control of the Louisville and Portland Canal, the freeing of Ohio River commerce from tolls, and an extended struggle to free Louisville canal operations of political influences. Many vigorous, colorful officers served as District Engineer during the formulative years of the Louisville District, and their utmost ingenuity was required to deal with the complicated engineering and political problems confronting them.

Canal Enlargement, 1860-1866

It will be recalled that Congress authorized the Louisville and Portland Canal Company to borrow funds necessary to enlarge the canal on May 4, 1860, but, though the United States owned all but five shares of company stock, Congress was not prepared to assume any responsibility for the work. A convention of steamboat interests had met at Louisville in 1859, and at that convention Theodore R. Scowden, a hydraulic engineer who constructed water supply systems for Cincinnati and Cleveland, Ohio, and Louisville and Newport, Kentucky, presented a plan for enlargement of the canal and construction of additional locks that was endorsed by the convention. The canal corporation sold bonds to finance the project, employed Theodore Scowden as engineer, and initiated construction.[1]

Plans called for a ninety-foot wide canal, with two basins to permit boats to pass, and construction of the largest lock in the world at the time — a two-flight lock with a total lift of 26 feet and each chamber 80 feet wide and 350 feet long. The new lock was laid out in a new branch of the canal excavated from the head of the old lock in a southerly direction to enter the river a few hundred feet below the outlet of the old canal. The cornerstone of the new lock was laid on April 2, 1862; stone for the masonry was quarried 120 miles down river and transported to the site. The last stone in the massive masonry lock walls was set in place on October 18, 1865, after three-years construction, and canal excavation was about seventy-five percent completed by that date. An iron swing-bridge across the lock was completed; timber and iron for the lock-gates were stored in a warehouse ready for assembly. But, after an expenditure of $1,825,000, the project was suspended because the inflationary economy of the war had so increased the costs of labor and materials that the company simply did not have the financial reserves necessary to complete it.[2]

Shipping interests of the Upper Ohio Valley were outraged by the delays of

construction and suspension of the project. A delegation from Cincinnati was reported as saying: "And now the question recurs with awful significance, how are we going to get past Louisville? There are no balloons that we know of. There is no money in Kentucky that we ever heard of. If we don't finish that canal in some way, we may as well return to wheelbarrows." Perhaps a Congressman from Cincinnati best expressed the prevailing sentiment on the subject of the canal in the postwar years:

> Slavery is now abolished, the war is over, and considerations of patriotism and interest alike demand that we should address ourselves to the task of repairing the losses incurred and building up the places made desolate by the ravages of war. To that end we should encourage every work which tends to make communications between the two great sections of the country, lately estranged, free, and safe. Improve this canal, then, and make it free to the commerce of the valleys of the Ohio and Mississippi. Commerce is the great civilizer, it is the great agency of peace and prosperity.[3]

Government Surveys, 1866-1868

W. Milnor Roberts inspected the Louisville canal during his preliminary examination of the Ohio River in 1866. He estimated that, though lock masonry was completed, the enlargement project would cost another million dollars to complete. He declared, however, that speedy completion of the project was vital to Ohio and Mississippi valley commercial interests and recommended that the United States "take this important work in hand and complete it at the earliest period possible, under some arrangement that would be satisfactory to all parties concerned."[4]

Congress responded to this recommendation and to general public concern with a provision in the Rivers and Harbors Act of March 29, 1867, for a survey of a canal route on the Indiana bank and comparison of its costs with those of completing the Louisville canal. The Chief of Engineers collected previous survey reports of Thomas Cram, 1844, Stephen H. Long, 1849, and the Board of Engineers, 1853, delivered them to Major General Godfrey Weitzel, and ordered him, on May 11, 1867, to Louisville to complete the authorized survey.[5]

General Weitzel was a Cincinnati Rhinelander, born in Germany and characterized by an almost brutal honesty. Before the Civil War he constructed fortifications for the Engineers, and during the war took a commission in the volunteer army, rising to the command of a corps of the Army of the James. General Weitzel and his command had the honor of being the first Union forces in Richmond in April, 1865; and General Weitzel had taken President Lincoln on his famous tour of the home of Jefferson Davis and Libby Prison while Richmond was still aflame. After the war, Weitzel served on the Texas border with the troops who served notice of eviction on the French in Mexico, and then returned to the Corps of Engineers, reverting to his regular rank of Major, though he was ever afterwards addressed by his volunteer rank.[6]

The political sensitivity of Congress and the Chief of Engineers in handling the controversial Falls of the Ohio project should be recognized. Congress authorized *first* a survey of a canal route on the Indiana bank — considerable public support for such a project still existed in 1867 — and then comparison of its costs with those of completing the Louisville canal. And the Chief of Engineers appointed a famous *Cincinnatian* to direct the survey of the canal at Louisville and report its results.

General Weitzel traveled to Louisville, employed assistant engineers, surveyors,

and a chief draftsman named Colonel Philip J. Schopp. In July, 1867, Weitzel instructed his staff to survey first the proposed Indiana canal, then the riverbed of the Falls, and finally the Louisville canal. He traveled to a river convention at Cincinnati in October, solicited the opinions of the delegates on the Falls project, and took a vote on the best dimensions for locks at the new canal. The convention voted for locks 400 feet long and 110 feet wide, if a canal were constructed on the Indiana bank, but it recommended that the new two-flight lock at the Louisville canal, with chambers 350 by 80 feet, be first completed.[7]

At completion of surveys in 1868, General Weitzel submitted an elaborate report to Congress, stating it was his "positive conviction" that the entire Ohio River would eventually be improved and chiding Congress for neglecting the improvement of an "insurmountable obstruction," the Falls, across a national highway. "It was clearly the duty of the government to remove this obstruction," he said, "as it did and does almost everywhere else on the Atlantic coast and northern lakes; but instead of doing this duty, it became a stockholder, and made money in a company chartered by the State of Kentucky, which levied an onerous and unjust tax on the commerce of the country."[8]

General Weitzel estimated that, because of the limited size of the existing canal at the Falls, the United States had paid for transshipment of government freight around the Falls during the war a sum which would easily have paid for an entirely new canal. He had received the assurance of the canal directors that they would gladly sell their five shares at a hundred dollars per share and surrender all rights to the canal to the United States, providing the United States would also assume responsibility for payment of all bonds and debts of the company. General Weitzel recommended that Congress accept this offer, complete the Louisville canal, and also construct a second canal on the Indiana bank to accommodate growing river traffic.[9]

Completion of the Enlarged Canal, 1869-1872

Congress avoided the issue of control of the Louisville canal, but on July 25, 1868, appropriated $450,000 "toward completing the Louisville and Portland canal, in accordance with the plans and estimates made in the report of General Godfrey Weitzel." General Weitzel employed assistant engineers and a work force and launched a project to complete excavation of the canal, build masonry walls along the canal slope, assemble and install lock gates, install miter sills on the bottom of the lock chambers for the gates to lap against in closed position, and construct a guide wall (apron dam) at the head of the canal to facilitate the safe entrance of watercraft.[10]

Construction was delayed by frequent strikes by the workmen and by irregular appropriations — General Weitzel commented that had funds been provided in a more business-like manner the work could have beem completed for $100,000 less — but was otherwise free of incident until the date it was to open to traffic. At 7:30 p. m., November 22, 1871, the last rock was excavated from the canal; and at 8:00 a. m., November 23, traffic began to enter the new branch. But suddenly the miter-sills gave way and the lock-gates began to break loose from the walls under the strain. Weitzel closed the canal and labored three days and nights throwing a temporary cofferdam across the canal. Weitzel later explained that on the day be-

(Photo courtesy of the Cincinnati Historical Society)

MAJOR GENERAL GODFREY WEITZEL

fore opening the canal he inspected the gates and found the timber cushions along the miter sills lacked an inch of meeting and sealing the bottom of the gates. He directed the contractor to replace the timber cushions and it was done with lumber from the warehouse which had been stored for eight years. The General concluded that after water entered the lock the seasoned lumber in the cushions became saturated, expanded, and the resultant stress forced the miter sills out of position. He lamented to the Chief of Engineers:

> I wrote to Mr. Milnor Roberts, and he sent me two assistants of experience, and I have read every work I could reach on the subject of locks, even sending to Europe for two works, at a large expense. But the trouble is that no locks were probably ever built, where the gates are put together eight years after all their parts are framed, and all this assistance and information, to me thus gained, was of no practical value in this instance.[11]

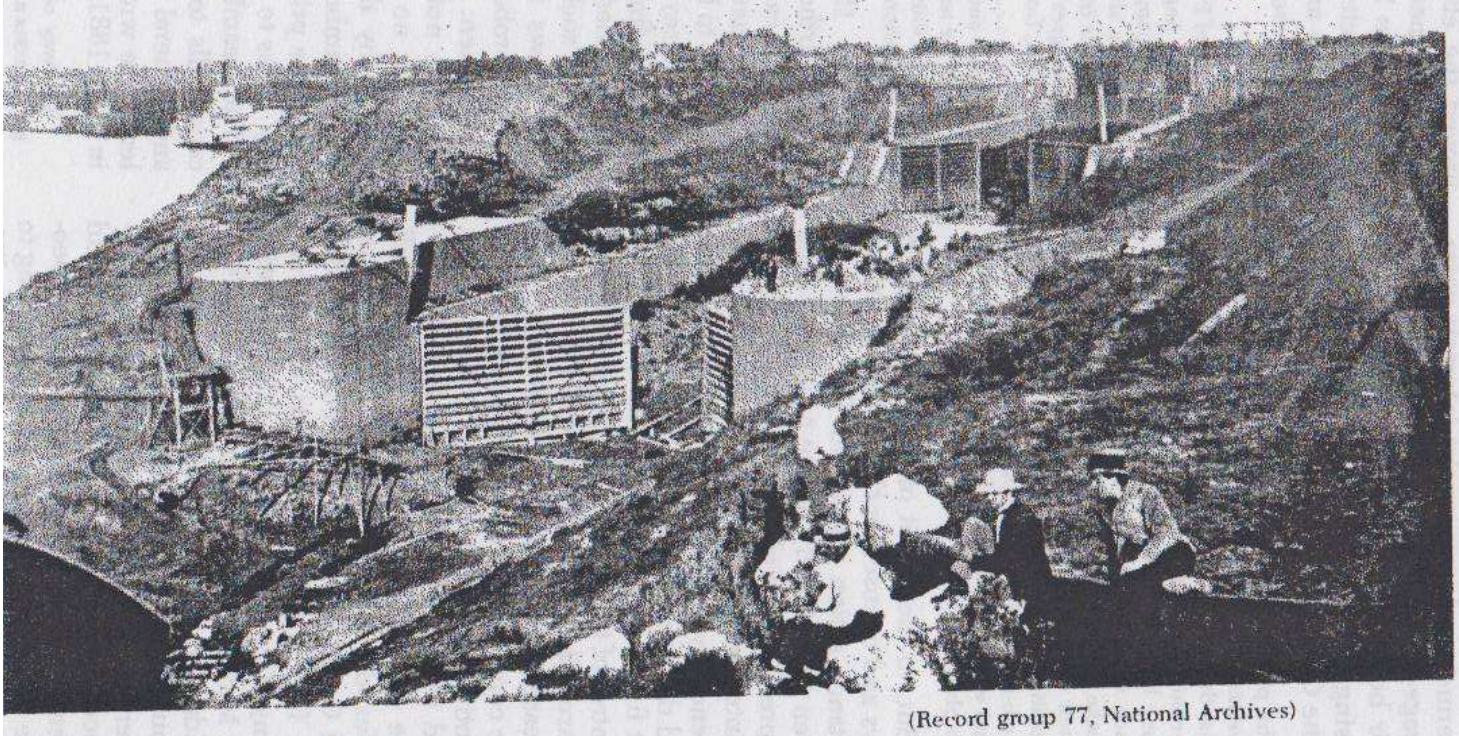
Two-inch bolts to anchor the sills to the rock foundation were installed; calking was added between the timber cushions and stone miter-sills; additional braces and "hog-chains" were installed to strengthen the huge lock-gates; and on February 26, 1872, the steamboat *Mollie Ebert*, followed by the *E. H. Durfee*, *Esperanza*, and *Potomac* locked through. The *Courier-Journal* reported that Louisvillians rejoiced at the opening of the enlarged canal and locks and fully supported the removal of tolls for its use at an early date.[12]

Freeing the Canal, 1872-1880

In 42 years, 1831-1872, the Louisville and Portland Canal Company collected tolls substantially in excess of five million dollars. Receipts were $180,925,40 in 1866, (the highest amount collected on the old canal and lock), were $159,838.90 in 1871, and increased to $207,025.19 in 1872, the year the enlarged canal completed with federal funds opened. Congress was finally prepared to extend the jurisdiction of the United States to the Louisville canal, and in the Rivers and Harbors Act of June 10, 1872, it provided $300,000 for further improvements at the canal and directed the Secretary of War to report the steps necessary to free Ohio River commerce at the canal, except for a five-cent per ton toll to fund continued operation and maintenance.[13]

General Weitzel informed the directors of the canal corporation of the terms of the act, but a legal snarl ensued. The directors informed the General that the United States had no power to fix tolls and the company would not permit continued work on the canal project with the $300,000 appropriation, if it were contingent upon reduction of tolls to five-cents per ton, which would be insufficient to retire the bonds of the company. Weitzel replied that suspending work at the canal would do great injury to the commerce of the United States and informed the directors: "As the representative of the people, I consider it my duty to guard against any such consequences, and I will therefore carry on the work until I am ordered by my superiors to stop; and I request that you do not interfere until I can hear from them."[14]

The corporation was uncertain of the proper procedures for bringing suit against the United States; therefore it determined to force the issue. When General Weitzel renewed work on a landfill section at the project site, the company sent its dredge to the scene and as fast as the Engineers put earth in the fill the dredge-boat picked it up and threw it back. Weitzel was forced to take court action to obtain the privilege of expending



(Record group 77, National Archives)

Louisville and Portland Canal—New locks under construction, 1871

the $300,000 appropriation for the canal. Rivermen and commercial interests were outraged by the delay at the project, for their boats and freight ran daily risks in passing the canal. One letter, for instance, in the *Courier-Journal* contended:

> The principal source of difficulty between Gen. Weitzel and the Canal Company consists in this: that the latter look at the matter entirely from the technical stand-point of the lawyer, and for the time being have abdicated the use of their common sense. As for lawyers, they nearly always make matters worse. What with their subtleties, their quibbling, hair-splitting constructions, their fanatical regard for formulas, and their love for time-consuming processes, everything goes slow, and wrong, and injuriously the moment you have to place it in a lawyer's hand.[15]

But, to the credit of government attorneys and counsel for the company, in this instance action was swift. The case was taken immediately before a Justice of the Supreme Court of the United States, who granted an injunction against further interference by the company with the project and declared that the United States could not fix the amount of tolls until it had full control of the canal. Congress directed on March 3, 1873, that the Secretary of Treasury purchase the remaining stock of the company in private hands, assume full control of the canal for the United States, and reduce tolls immediately to twenty-five cents per ton. But the directors still refused to surrender the company charter till Congress legally asumed responsibility for the bonds and debts of the company. Congress assumed this obligation on May 11, 1874; and on June 10, 1874, at midnight, the United States took over the Louisville and Portland Canal. Shortly thereafter a boat passed through at reduced toll-rates, thus accomplishing, said General Weitzel, "a thing which the people of the West have been endeavoring to effect during the last thirty-four years."[16]

As the Engineer staff at the canal improved the efficiency of canal operation and maintenance, tolls were further reduced, but in 1880 a nominal toll was still being collected. The House Committee on Railways and Canals reported a bill in 1880 to remove all tolls, and it commented:

> The treaty of Paris, negotiated in 1783; the treaty with Spain negotiated in 1795; the ordinance of 1787, and many subsequent acts of Congress, provide for the absolute freedom of the Mississippi River and its tributaries, and dedicate them to the world as great national highways, to be kept forever free from any toll, tax, or duty of any kind whatever ..... These various treaties, reports, acts, and official declarations clearly indicate that for nearly half a century it has been the desire and intent of the government to secure the free navigation of the Ohio at this point.[17]

On May 18, 1880, Congress directed that no further tolls be collected at the Louisville canal after midnight, July 1, 1880, and that operation and maintenance costs were to be paid from Treasury funds. Strange to say, there was little public reaction to the final end to tolls. Will S. Hays, the wit, balladeer — author of many familiar lyrics, such as those of "Dixie" — and river news reporter for the *Courier-Journal*, probably summed up the reaction of rivermen: "Now as the canal is free, why can not wharfage be made free? There is no reasonable excuse in the world why the wharfage should not be free. Steamboats should at least have the same free privileges that our 'big-hearted city' gives to railroads."[18]

The steamboatmen had moved from the canal tolls to other increasing problems, and General Weitzel also had new problems. He wrote in confidence to a friend in early 1881:

> The way of lawyers are truly wonderful. Congress passes a law and the President signs it saying that the canal at Louisville shall be operated and

kept in repair by making monthly drafts on the Treasury.

The First Comptroller of the Treasury, after thinking over the matter about six months, says that the law makes no appropriation for operating or keeping the canal in repair. The same law directs the Canal to be free after midnight July 1, 1880.

If this decision of the First Comptroller stands as sound, and Congress does not correct the matter, I am personally liable for the whole $17933.22 which I have so far expended.

The wisdom of some of our Solons passeth my understanding.[19]

Congress, however, did not leave General Weitzel out on the proverbial limb. It provided funding arrangements in the Rivers and Harbors Act of 1881 for continued operation of the canal.

Canal Administration

At completion of the canal enlargement project in 1872 General Weitzel had been ordered to Michigan to direct a similar project at the St. Mary's Falls Canal, but he retained overall responsibility for the Louisville canal, with a deputy, Captain Milton B. Adams, Corps of Engineers, in immediate charge. Weitzel recommended in 1873 that when the United States took over operation of the Louisville canal, "the persons should all be employed during good behavior, for it will work serious if not fatal injury to the best interests of commerce if experienced men are not continually employed on the work especially in opening and closing these enormous gates." He was given authority to appoint the Louisville canal staff in 1874, and he retained most of the company personnel previously employed and selected his assistant, Colonel Philip J. Schopp, as superintendent. Captain Adams, deputy to General Weitzel at the canal, was relieved by Captain Alexander Mackenzie (later Major General and Chief of Engineers, 1905-1908) at the end of July, 1874; Captain Mackenzie had immediate charge of the canal until November 22, 1877, when relieved by Captain A. Nesbitt Lee, who died of a stroke at the project on October 31, 1879. Because no junior officer was then available for assignment, Superintendent Philip J. Schopp was assigned full responsibility for the canal under General Weitzel's orders.[20]

Dam at the Falls

In his report on the improvement of the Falls of the Ohio in 1868, General Weitzel recommended construction of a dam across the Falls to increase the depth of Louisville harbor three feet, prevent boats from wrecking on the Falls when seeking to enter the canal, increase water depth in the canal, and, through an opening in the dam at the head of Indiana Chute, increase the navigable depth for traffic passing over the Falls instead of through the canal. A timber-crib, stone-filled dam — that is, large timber boxes, similar in construction to a log-cabin, securely bolted at the corners and filled with irregular run-of-the-quarry stones — was authorized and placed under construction in 1868. In 1870 an apron dam, running north from the entrance of the canal and serving as a guide wall, was complete and about a third of the cross-river dam was in place. But construction was constantly interrupted by high water and runaway barges. For example, a barge rammed the cofferdam protecting the work area in 1875, destroyed a hundred feet of the coffer and flooded the work. By the time the cofferdam was repaired the river was rising and no further work could be undertaken until the following year.[21]

The cross-river dam was completed in 1881; 2,532 feet long from the head of the canal to the Indiana Chute and 210 feet from the Indiana Chute to the bank on the

Indiana side. Rock was blasted from the Indiana Chute to facilitate navigation and plans were instituted to install a movable metal Boulé navigable pass to close the Chute at low water and collapse against the bottom of the river at high-water to permit open-channel navigation. Numerous modifications, as experience indicated, were made in the dam across the Falls until the early twentieth century, when planning to construct a new dam at the Falls as part of the Ohio River Canalization project (it became Dam No. 41) was initiated.[22]

Canal Operation

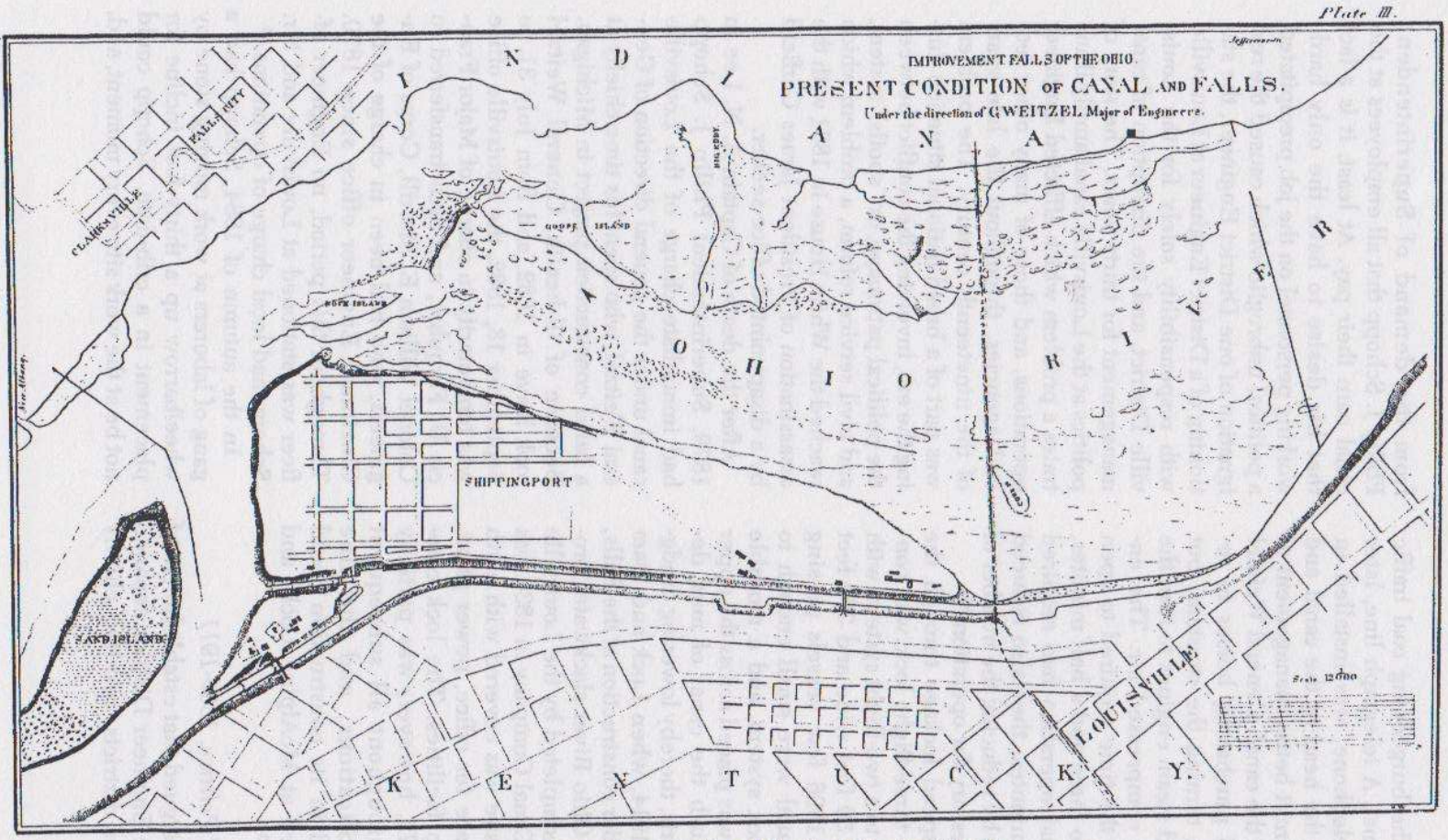
In 1874 the Louisville project consisted of a canal about two miles long and eighty-five feet wide, with two basins for boats to pass when in the canal. It had two sets of locks in two different outlets at the lower end of the canal. In addition, a dam was under construction across the crest of the Falls to provide better navigation through the Indiana Chute. The old lock, completed in 1830, was a three-flight structure, with an eight and two-third foot lift in each of the three chambers; and the new lock, completed in 1872, was two-flight, with a fourteen-foot lift in one chamber and twelve in the other. Because the locks were built in flights, like stairsteps, without intermediary basins, each boat has to pass through the entire series of three or two chambers before another could enter, and navigation, consequently, suffered many delays. General Weitzel said in 1879:

> The chambers of the new locks of the Louisville and Portland canal are 372 feet long and 80 feet wide. There are two lifts of 14 and 12 feet. The gates are very heavy. One leaf of the middle gates weighs over 90 tons. The machinery for operating the gates is worked by hand. Yet we have made 29 lockages in 21¼ hours.[23]

Lockhands at the Louisville canal necessarily had strong legs and backs, for the gates were opened and closed by turning capstans attached to the gates by chains. Lockhands seized handles extending from the capstans and walked and pushed in circles to wind the chains on the capstans. In 1876 they opened and closed the gates 8,406 times for 1,401 lockages. In turning the capstans and walking from gate to gate, each lockman walked about 2,604.85 miles during the year, or an average of 7.14 miles per day. It required five hours, forty-five minutes to pass the steamboat *Sam Brown* and its tow of sixteen coal barges through in six sections on December 3, 1875. On May 27, 1876, the lock force moved four steamboats and forty-six barges transporting 800,000 bushels of coal through the locks, which was just about the peak of human capability. As many as five coal tows with up to twenty barges each were frequently waiting at the canal for lockage, and problems naturally ensued.[24]

Each steamboat captain was, or at least thought he was, the king of the river; races to the canal were common, brawls were frequent, and the lockmen often bore the brunt of much ill-humor. In what was a vast understatement of the facts, Captain A. N. Lee officially reported in 1878 the work of the lock force was "often rendered very difficult by the conflicting interests and opinions of steamboat-men, some of whom have, during the past year as well as during previous years, ever been ready to find fault and condemn without reason, when the decision or order of the superintendent was not in accordance with their individual opinions and for their special benefit."[25]

Several measures were taken to mechanize lock operation, and attention was given to other plans for expediting



1872 Map of the Louisville and Portland Canal and Locks

movement of the burgeoning coal traffic through the canal. A telegraph line, later replaced by telephone, was installed in 1876 between the head of the canal and the locks to permit better management of traffic entering the canal. General Weitzel first suggested purchasing horses to replace the men turning the capstans, but finally installed steam engines to turn the capstans with compressed air. The engines reduced the time required to open the lock gate to three and a half minutes, whereas manual operation had required up to twenty minutes; they also reduced operating costs by reducing the number of personnel necessary for operation.[26]

To further speed lockage through the canal, the old three-flight lock was converted in 1880 to a two-flight system, with each chamber 50 feet wide and 300 feet long. But by 1896 few vessels passing through the canal were small enough to use the old lock system, and a movable bear-trap dam was placed across the upper chamber to flush the canal of mud deposits and debris, thereby lowering dredging costs. In 1914, when Lock and Dam No. 41 was under construction at the Falls, as part of the Ohio River slackwater project, the lock completed by the Louisville and Portland Canal Company in 1830 was filled and its site was covered with earth to provide space for office, power plant, and workshop facilities. The lock completed in 1872, however, was partially preserved throughout all subsequent project modifications, and the fine masonry used in its construction could still be viewed at McAlpine Locks and Dam in 1975.[27]

Canal Politics, 1880-1911

It could be argued that establishment of the Louisville Engineer District, separate from all other districts, resulted chiefly from the demand of Superintendent Philip J. Schopp that all employees at the canal earn their pay. At least, it is a fact that his desire to have the only hard-working personnel on the job precipitated a political imbroglio which caused the resignation of one District Engineer, the stationing of a District Engineer at Louisville with responsibility solely for the Louisville District, and the disruption of canal management for thirty years. The story of politics at the Louisville canal amply illustrates a problem which afflicted Engineer operations, and those of many other federal agencies, throughout the late years of the nineteenth century. The problem was part of a broad national situation during the era, involving the conflict between the political patronage, or "spoils" system, and civil service reform, a problem which reached the White House in 1881 with the assassination of President James Garfield by a disappointed office-seeker.

After the death of Captain A. N. Lee in 1879, Superintendent Philip J. Schopp had immediate charge of the Louisville canal under the general direction of General Weitzel, who spent his time chiefly at a canal construction project in Michigan. Because of ill-health, General Weitzel took leave in 1882, and from July 31, to September 18, 1882, the Louisville office was temporarily in charge of Major Francis U. Farquhar, and then transferred to Colonel William E. Merrill, Corps of Engineers, who had been in charge of the Cincinnati Engineer office since 1870. Throughout this period, no Engineer officer was stationed at Louisville and Mr. Schopp had local charge of operations.[28]

In the autumn of 1884, Schopp had a gang of laborers at work moving stone by wheelbarrow up a thirty-foot incline for placement in a crib-dam. Schopp could not be at the work site every moment, and,

after observing the amount of work completed in his absence, he concluded the laborers were loafing on the job. At his office, about a quarter-mile from the work-site, he picked up a field glass and found his suspicion was justified. Schopp lectured the men on their short-comings, told them they were "not earning their money," and threatened to discharge them. He did not fire them, but refused to rehire them during the next working season and thereby made several enemies who went to local politicains with their complaint and contacted an attorney.[29]

The Democratic administration of President Grover Cleveland took office in March, 1885, and, in June, O. H. Stratton, a Louisville attorney, brought charges against Schopp and others of the canal management, contending that all canal personnel had been Democrats in 1874, when the United States took it over, but all were Republican in 1885. Schopp was specifically charged with the "use of money, cigars and liquors at a coffee house, adjacent to said old locks to influence and corrupt voters at the election in 1878 to vote the republican ticket."[30]

The Chief of Engineers ordered an investigation, and Colonel Merrill held an inquiry at the Louisville office, with Congressman Albert S. Willis, Democrat of Louisville and also Chairman of the House Committee on Rivers and Harbors, present and O. H. Stratton acting as prosecutor. Accusations were made by the employees Schopp had refused to rehire, but Merrill discovered the election of 1878, referred to in the charges, was between two Democrats — Republicans were not involved — and one of the laborers who had been refused employment on "account of laziness" refused to corroborate the stories of the other laborers. Merrill exonerated Schopp and other canal employees of all charges.[31]

O. H. Stratton, the attorney, who also had hopes of finding employment as timekeeper on the project, engaged in vitriolic attacks on Merrill in local newspapers. One of his letters, for example, stated that Colonel Merrill "cracked his royal official whip over the heads of his superiors, and gloried in the spectacle that he had temporarily interred the reform movement .... Thus our distinguished army cuttle fish folded his paternal arms around the Ohio river improvements, and stood on the supposed reform debris, proudly waved the banner ... and shouted 'Big Injun, Me!' " Colonel Merrill insisted that no man should be appointed to a supervisory post at the Louisville canal who was not an experienced engineer. River news reporter Will S. Hays of the Louisville *Courier-Journal* commented:

> It is said that a man can't be Superintendent of the canal here unless he is a scientific, practical engineer. That's what's the matter with Ohio river improvements. Uncle Sam wants less "engineering" and more good, hard, horse, common sense, and he'll save money and have better improvements. A teaspoonful of common sense is sometimes worth a barrel of science.[32]

Political pressures in Washington increased, and in December, 1885, the Chief of Engineers ordered Colonel Merrill to forward a list of all canal employees showing their political affiliation. Merrill replied that of the personnel on duty at the canal, who had been on the job since the United States took over in 1874, three were Democrats and fourteen Republicans; of the twenty-five men employed after 1874, six were Democrats, eighteen Republican, and one independent. By early 1886 the word had gotten out that Schopp was to be dismissed, and Colonel Merrill and the Office of the Chief of Engineers were flooded with applications.

One interesting application came from a man who claimed he deserved the job because he was a Democrat and wanted the position because it "pays as well as drumming through Arkansas with two or three large trunks."[33]

A Louisville newspaper reported on February 3, 1886, that Superintendent Schopp had been fired and replaced by General Thomas Hart Taylor, a former Confederate officer who served as Louisville Chief of Police for eleven years, at the insistence of Kentucky Governor Simon B. Buckner, a Democrat and also a former Confederate General. Colonel Merrill was not informed of the Taylor appointment until after the news appeared in the paper. Merrill angrily wrote the Chief of Engineers that, although he knew General Taylor personally and liked him, Taylor was not an engineer and was not competent for the position:

> Inasmuch as the Department has ordered me to appoint as my chief assistant on this great work a gentleman whom I consider incompetent, and a due regard for my reputation as an Engineer, compels me to request that I be relieved from the charge of the Louisville and Portland Canal.[34]

A few days later, Colonel Merrill received an application from Mr. J. P. Claybrook for the position of assistant to General Taylor. Merrill advised Claybrook that if he wanted a job he should do as others had done and "get it through politicians." Claybrook accepted the good advice and got the position he wanted. Colonel Merrill was relieved from command of the Louisville office as requested on March 15, 1886, by Major Amos Stickney, but Merrill retained charge of the Cincinnati Engineer office and employed Schopp in that district. Whereas General Weitzel had charge of two waterways projects, the Louisville canal and the St. Mary's Falls canal, and Colonel Merrill concurrently directed the Louisville and Cincinnati offices, Major Stickney had charge only of the Louisville office and established his headquarters in downtown Louisville. He was still in charge at Louisville when Engineer Districts and Divisions were formally established in 1888, and technically was the first Louisville District Engineer.[35]

Congressman Albert Willis of Louisville continued to exert his political influence in Washington to get Democrats appointed to the Louisville canal. He wrote the Secretary of War in 1886, complaining that Major Stickney was just as obstinate as his predecessor about personnel changes at the canal and reminding the Secretary that "just prior to my departure from Washington you will recollect that the removal of offensive partisans from the Louisville and Portland Canal was determined upon and that it would be done on *your* return to Washington." It is not clear that this pressure had any great effect, however, on canal management.[36]

After the Republican administration of President Benjamin Harrison took office in 1889, Major Stickney decided to rid the canal of Superintendent Thomas H. Taylor, who, in the opinion of Stickney, had upset the entire canal work force by creating the impression that he would replace them with his friends. Stickney recommended dispensing with the positions of Canal Superintendent and Assistant Superintendent and substituting the positions of Master Lock Manager and Deputy Lock Manager. Holders of the two new positions would have only the duties of supervising canal operation, while all construction and other duties requiring engineering abilities would be performed by United States Assistant Engineers (a title used to refer to any civil engineer employed by the Corps). The Chief approved

this arrangement, Superintendent Taylor and his assistant resigned, William M. Ekin and J. A. Needy were appointed to the new positions; and U. S. Assistant Engineer Robert R. Jones took over construction and engineering functions at the canal and Assistant Engineer Granville W. Shaw was assigned responsibility for open-river improvements over the Falls.[37]

But the new arrangement did not work quite as well as Major Stickney had expected. Robert R. Jones, because he hired most temporary labor employed on the project, soon was attacked for "hiring democrats and ex-confederate soldiers to perform the work on said canal to the exclusion of ex-federal soldiers and republicans who have done good service for their party." A flood of petitions descended on the Republican President, Benjamin Harrison, and the War Department, claiming that Jones was a South Carolina Democrat, and that he and canal employees had torn down the campaign posters of Harrison and stamped on them, or merely daubed them with mud. One letter to the President baldly claimed that "To the victors, belong the spoils," and asserted:

> Mr. Cleveland appointed Gen'l Taylor, a rebel, as superintendent and no kick was made. Since Cleveland left office the same crowd has been running the canal. All the leaders of the Republican party in Louisville, New Albany and Jeffersonville want Mr. Jones removed.[38]

The District Engineer investigated and reported that R. R. Jones was a New Jersey Republican, that only a few canal employees were Democrats, and suggested, doubtless with tongue-in-cheek, that these employees ought to be left on the job where they might be converted by the Republican majority. He complained to the Chief that politics was interfering with more important duties and represented efforts of local politicians to secure control of appointments at the canal. But the Secretary of War ordered the dismissal of R. R. Jones and William Ekin, the Lock Manager, and the employment of Hart Vance and Josephus W. Pell, both "good" Republicans. Colonel Merrill employed Jones in the Cincinnati District, and Jones had immediate charge of the Ohio River slackwater survey of 1911-1914 and became Cincinnati District Engineer in 1917. He wrote many valuable accounts of the early history of the Ohio Valley and early waterways projects in the region.[39]

At the appointment of Vance and Pell, the District Engineer at Louisville tendered his resignation because of their "highly prejucicial" character, but it was not accepted. In 1892, however, there was another election and another change in the national administration. Democrat Grover Cleveland again took office, and the District Engineer removed Hart Vance and J. W. Pell and did not refill their positions; instead, he arranged the appointment of Lieutenant Hiram M. Chittenden, Corps of Engineers, as his deputy and assigned the previous duties of Vance and Pell to the Lieutenant. The new administration was flooded with petitions from navigation interests in the Ohio Valley requesting that the Louisville canal be placed under civil service laws to prevent the appointment of incompetents for political reasons. This was done in 1896, but before it was accomplished a good Democrat, Eugene M. Terry, was appointed Master Lock Manager.[40]

The Master Lock Manager had occupied a government-owned house at the canal prior to 1893, when Lieutenant Hiram M. Chittenden moved into it. Mr. Terry, the new Lock Manager demanded occupany of the house as part of his compensation, and the Secretary of War ordered Lieutenant Chittenden, by then the

District Engineer, to vacate the premises for the use of Mr. Terry. Chittenden sought and received reassignment. He surveyed a canal in Ohio, then went west to direct projects on the Upper Missouri River and administer the development of Yellowstone National Park; he became an unusually prolific author and historian and became the Corps' earliest proponent of federal flood control projects and multipurpose water resource development.[41]

Politics continued as usual at the Louisville canal. In 1897 the Republican administration of President William McKinley succeeded the second Cleveland administration, and Mr. Terry, Democrat, went the way of all previous Lock Managers. The Republican administration agreed to the abolition of the positions of Master and Deputy Lock Manager, but arranged the reappointment of Josephus W. Pell, Republican leader of the Louisville post of the Grand Army of the Republic (Union Civil War veteran organization), to the canal as Assistant Traffic Manager (there was no Traffic Manager) in 1897. Civil service regulations had been extended to canal personnel in 1896, and under these laws Mr. Pell remained at his post until his retirement in 1920.[42]

Political efforts to control patronage at the Louisville canal persisted throughout the first decade of the twentieth century, and the standard rule was that the Louisville District Engineer first cleared any change in canal staff with the Secretary of War. Operations at the canal during that period were directed chiefly by Assistant Engineers J. H. Casey and Granville W. Shaw. There were several efforts to obtain their removal but none were successful.[43]

In 1911 Senator William Bradley of Kentucky, a former Governor of the state, sought to arrange an appointment at the canal of a new Master Lock Manager; there had been none for over a decade. The District Engineer and the Chief of Engineers made a complete report on the long history of politics at the canal, explained that the position of Master Lock Manager had been a "source of constant trouble and contention from the time of its creation," and carried high pay for nominal services. Reestablishment of the position was, in their opinion, unnecessary and would "upset the present good organization and invite a return of former troubles."[44]

President William H. Taft, a former Secretary of War with intimate knowledge of the problems created by the patronage system, read the lengthy report and returned it with a notation for the attention of the Secretary of War:

> Don't worry about the master lock manager, I am not going to reestablish an office like that.[45]

Summary

The tax on commerce charged by the canal company prior to 1874 was indeed onerous, but the canal corporation was free of the influences of local politics. The conversion of the Louisville canal to a federal project in 1874 subjected the management of the canal to patronage politics at its very worst — politics so rife that it seriously interfered with proper administration and operation of the project. Patronage problems were common on many Engineer projects during the last quarter of the nineteenth century. The extension of civil service regulations to the Louisville canal, as to other Engineer installations, was beneficial both to Engineer personnel and to the proper administration of waterways projects.

Politics ideally expresses the will of the sovereign of the United States — its citizens — and the modern Corps of En-

gineers takes considerable pride in its responsiveness to the needs of Americans, as expressed at open public hearings and through elected representatives. Major General Lytle Brown, Chief of Engineers, 1929-1933, who had been Louisville District Engineer when President Taft finally closed the book on patronage at the Louisville canal, summarized the Engineers' position on the subject of politics in 1935:

> It may be said with equal truth that politics may further the adoption of a project, and may prevent it. Furthermore, as may be claimed without disturbing the equanimity of a citizen or his faith in his government, politics is involved in everything that affects the welfare of the people of the Republic. Otherwise there would be no democratic principle in government.[46]

But the story of the struggle of the early District Engineers with patronage politics should not obscure the major developments at the canal during that era. Though the passenger-freight business of the steamboat packets, for which the canal was originally designed, dwindled during the last quarter of the nineteenth century, use of the river as a medium for economical transportation of bulky, low-value industrial materials was increasing, and the barge-towing system placed new burdens on the Louisville canal. Through continued mechanization and modification of the canal project, the early Louisville District Engineers and their staffs accomplished sbstantial improvement in handling the new traffic, in spite of meager funding policies and rampant political interference.

Improvement of the Falls of the Ohio, 1897-1914

From 1881 to 1901, 135,630 boats transporting cargoes aggregating 37,081,078 tons locked through the Louisville canal; the annual average was 6,780 boats and 1,854,053 tons. About 75 percent of this tonnage was coal; next in importance was lumber, followed by steel and iron products, sugar and molasses, salt, and agricultural produce. Traffic congestion was a major problem. On July 6, 1902, for instance, towboats pushing 461 barges arrived at the canal. By operating the canal full-speed around the clock, the canal staff completed 213 lockages to pass the coal fleet through by July 17.[3]

To enable coal-tow passage over the Falls and avoid the delays of lockage, rock excavation was undertaken at Indiana Chute at each low-water season prior to 1897, but this was an unsatisfactory process. A cofferdam was constructed in 1897 across the Indiana Chute to reveal the actual condition of the channel. The engineer in charge reported: "We have now an accurate knowledge of what has been done and what remains to be done, and in addition will be enabled to dispel the cloud of mystery which has for years made the Indiana Chute a terror to steamboat men." Sufficient excavation was accomplished to provide relatively safe navigation through Indiana Chute, and traffic continued to use the Chute at high water after Lock No. 41 was completed in 1921.[4]

The original timber-crib dam across the Falls, completed under the direction of General Weitzel in 1881, raised the pool above the Falls approximately three feet. A project to provide nine-foot navigation above the Falls to Madison, Indiana (the site of proposed Lock and Dam No. 40), was completed about 1910. The completed dam along the crest of the Falls consisted of eleven sections of Boulé gates, Chanoine wickets, and masonry weirs. The District Engineer commented in 1914: "No other movable dam of as great width or contending against such adverse conditions is known to exist anywhere. The work was therefore more or less experimental and in view of the knowledge available at that time is very successful." The project had one major defect: the piers separating the dam sections, instead of being flush with the upstream edge of the dam, projected 42 feet upstream from the dam to serve as icebreakers. The maneuver boats operating the movable dam sections experienced difficulties in moving around the piers and on several occasions went over the dam and Falls and were lost.[5]

Lock and Dam No. 41: Construction

The Lockwood Board, when planning the Ohio River Canalization Project in 1906, proposed raising the dam across the Falls, widening the Louisville canal to 170 feet to permit traffic to pass while in the canal, and constructing a new lock, No. 41 of the Ohio River series, with dimensions of 85 by 600 feet. Major Lytle Brown, Louisville District Engineer, pointed out that the 85-foot wide lock would be the only one on the Ohio with less than the standard 110-foot width. He suggested that the Louisville lock be also 110-feet wide and the canal prism be widened to 200 feet, predicting that these changes would avert the "bottleneck" sure to develop when inland marine engineers designed floating equipment for the standard 110-foot wide Ohio River lock. The Secretary of war approved Major Brown's suggestions in 1911, and con-

struction of a standard Ohio River lock on the southwest side of the old double-lift Weitzel lock began in 1911.[6]

The Merrill rolling-gate had been used on locks on the Upper Ohio because of the engineering problems of constructing satisfactory mitering-gates for a 110-foot wide lock chamber. Rolling gates had several operational defects — the tracks and wheels required expensive maintenance and the gate recesses were badly silted up in high water. At Lock No. 37 just below Cincinnati, for instance, the lock recesses were filled with 2500 cubic yards of silt by the record flood of 1913. This was serious, for it required 28 days of round-the-clock work to get the lock back in operation. The problem of designing satisfactory 110-foot-wide mitering-gates was solved at Lock No. 41 by the Louisville District engineering staff — Principal Engineer William H. McAlpine, Assistant Engineers Paul Grunwell, Whitney I. Gergory, Frank I. Louckes, Robert A. Strecker, and Malcolm Elliott. Malcolm Elliott had charge of gate design, and the improved gates were chiefly the results of his work. Elliott later accepted a commission in the Corps of Engineers and became first District Engineer at Huntington, West Virginia, District in 1922.[7]

Construction of Lock No. 41 and enlargement of the Louisville canal were plagued by delays and accidents. The flood of 1913 filled the excavations with silt and debris, and recurrent floods substantially delayed progress. The lock contractor (Ohio River Contract Company) failed in 1915 and went into receivership; and during the first World War, 1917-1918, great difficulties were encountered in employing labor and purchasing materials. The old canal continued in service during enlargement, with a portion of the rock ledge and old stone-masonry wall serving as a cofferdam between the old canal and the excavation. On October 5, 1915, a section of the old wall and rock ledge collapsed, releasing a wall of water into the new excavation. Work was then underway about 3,000 feet from the break, and locomotive and boat whistles gave warning. Before the water hit the work site, all workers, save one who drowned, managed to scramble out of the excavation. Floods, accidents, contractor failure, and limited funding delayed the opening of Lock No. 41 till May 1, 1921.[8]

Power Development at the Falls

While Lock No. 41 was under construction, interest in developing potential hydroelectric power at the Falls of the Ohio was increasing. To produce hydroelectric power economically it is necessary that adequate water and fall, or "head," be available a substantial percentage of the time. The movable dams of the canalization project seldom had sufficient "head" for commercial power production, but the Falls of the Ohio had been used to power water mills for many years and hydroelectric power production appeared feasible.

Perhaps George Rogers Clark was the first to recognize the water-power potential of the Falls; in 1807 he sold property on the Indiana side for the construction of a water-powered flour mill. The Tarascons of Shippingport erected a six-story flour mill powered by water wheels about 1815; the Army Ordnance Department considered constructing an armory at the Louisville Canal in 1823 to take advantage of available water power; water mills to crush limestone into Louisville hydraulic cement operated at the Falls until 1892; and the Ohio Falls Hydraulic and Manufacturing Company operated a large flour mill near Jeffersonville until 1902. When their flour mill burned in 1902, the Ohio

Falls Company developed plans for a million-dollar dam across the Falls to maintain a pool level of 12.7 feet at low water and facilitate power production.[9]

Major George McC. Derby, Louisville District Engineer, strongly supported the company's plans in 1903, pointing out that such a dam would provide a long slackwater pool for navigation and that improvements in electric power transmission made such a project feasible. He predicted:

> The construction of a dam at Louisville that will make this water power available for commercial purposes is a probability of the near future that should be reckoned with in connection with the improvement of navigation, the more so as the two interests need not necessarily conflict with each other, but, on the contrary, might readily be so adjusted as to be mutually advantageous.[10]

But the company never matured its plans and the subject was dropped until 1912, when District Engineer Lytle Brown (Chief of Engineers, U. S. Army, 1929-1933) and his chief assistant, William H. McAlpine, restudied the project. Major Brown published several articles in engineering journals which clearly demonstrated that improved low-head hydroelectric turbines and the growing industrial market at Louisville made the development of power at the Falls of the Ohio practicable. The Army Ordnance Department studied the Falls in 1917 as a possible location for nitrate plants for munition production, but eventually selected sites near Muscle Shoals on the Tennessee River.[11]

District Engineer George M. Hoffman reviewed the power situation at the Falls in 1920. He found that a coal-shortage, chiefly caused by traffic congestion on railways during and after the war, had multiplied the price of coal and the power produced at steam-electric plants. Louisville also suffered annual losses of three million dollars as a result of coal-smoke air pollution. Colonel Hoffman believed that these problems could be alleviated and Ohio River navigation could be benefited by the construction of a higher, combined power and navigation dam at the Falls, which reduced the costs of the canalization project by eliminating the necessity for constructing proposed Dam No. 40 at Madison, Indiana.[12]

The existing dam at the Falls in 1920 was designed to maintain an upper pool elevation at 412 feet, providing a minimum depth for navigation upriver to the proposed site of Dam No. 40. In 1921 the Louisville District initiated planning to raise Dam No. 41 to furnish a stable pool eight feet deeper; that is, to raise the upper pool to elevation 420, thereby eliminating Dam No. 40. The District also publicized the fact that the higher pool elevation would provide sufficient "head" for economic production of secondary hydroelectric power.[13]

After Major Lytle Brown had published his study of the power potential at the Falls in 1912, John William Link, Hydraulic Engineer for Byllesby Engineering and Management Corporation, of which Louisville Gas and Electric Company was a subsidiary, had begun studies of the project. Byllesby Engineering organized the Louisville Hydro-Electric Company and in 1923 applied to the Federal Power Commission (FPC) for a license for a power project connected to Dam No. 41. Municipal authorities of Louisville also became interested in the project, employed Major General William L. Sibert to make the engineering studies, and applied for a license.[14]

General "Goliath" Sibert had left the Ohio Valley in 1907 to join General George W. Goethals (who, like Sibert, had

acquired his first civil works experience in the Ohio Valley as assistant to Colonel Merrill) in completing the Panama Canal. General Sibert had served as first Chief of Chemical Warfare Service during the First World War and returned to the Green River Valley in 1920, settling at Bowling Green to pursue his fox-hunting hobby and a career as consulting engineer during retirement.[15]

Because Louisville would have had to build its own power distribution lines, or take over the Louisville Gas and Electric Company through condemnation proceedings, and in either case would have exceeded its bonding limitations, the FPC awarded the license for power development at the Falls to Byllesby Engineering on December 4, 1923. Construction of a new dam and powerhouse on the Falls began in 1925 and was completed in late 1927. New Dam No. 41 was an "L" shaped structure, eight feet higher than the old dam and 8,652.6 feet long, consisting of 3,832 feet of fixed dam, 3,740.6 feet of movable Boulé dam, 220 feet of bear-traps and bear-trap piers, and 860 feet of Chanoine wicket navigable pass. The concrete powerhouse had eight turbine power units, with 108,000 horse-power capacity. After testing, power production began on October 10, 1927, and the low-head turbines performed well. In fiscal year 1931, for instance, power production was suspended because of lack of "head" for only nine days and total production amounted 257,467,300 kilowatt hours.[16]

No noticeable hiatus in the growth of commerce on the Ohio occurred in the postwar years. The average annual increase in tonnage was about 15% and ton-mileage increase was greater. The Ohio River Canalization Project was authorized in 1910 on a projected traffic forecast of thirteen million tons; by 1950 traffic amounted to 48,598,000 tons and a massive traffic jam was developing. Much of this increase in traffic was generated by new steel, aluminum, chemical, and steam-electric plants which located at riverside to take advantage of low-cost waterways transportation and reliable water supply; and their location in the Ohio Valley had a "rippling" effect, attracting secondary industry to the region to use the primary products and power produced at riverside.[15]

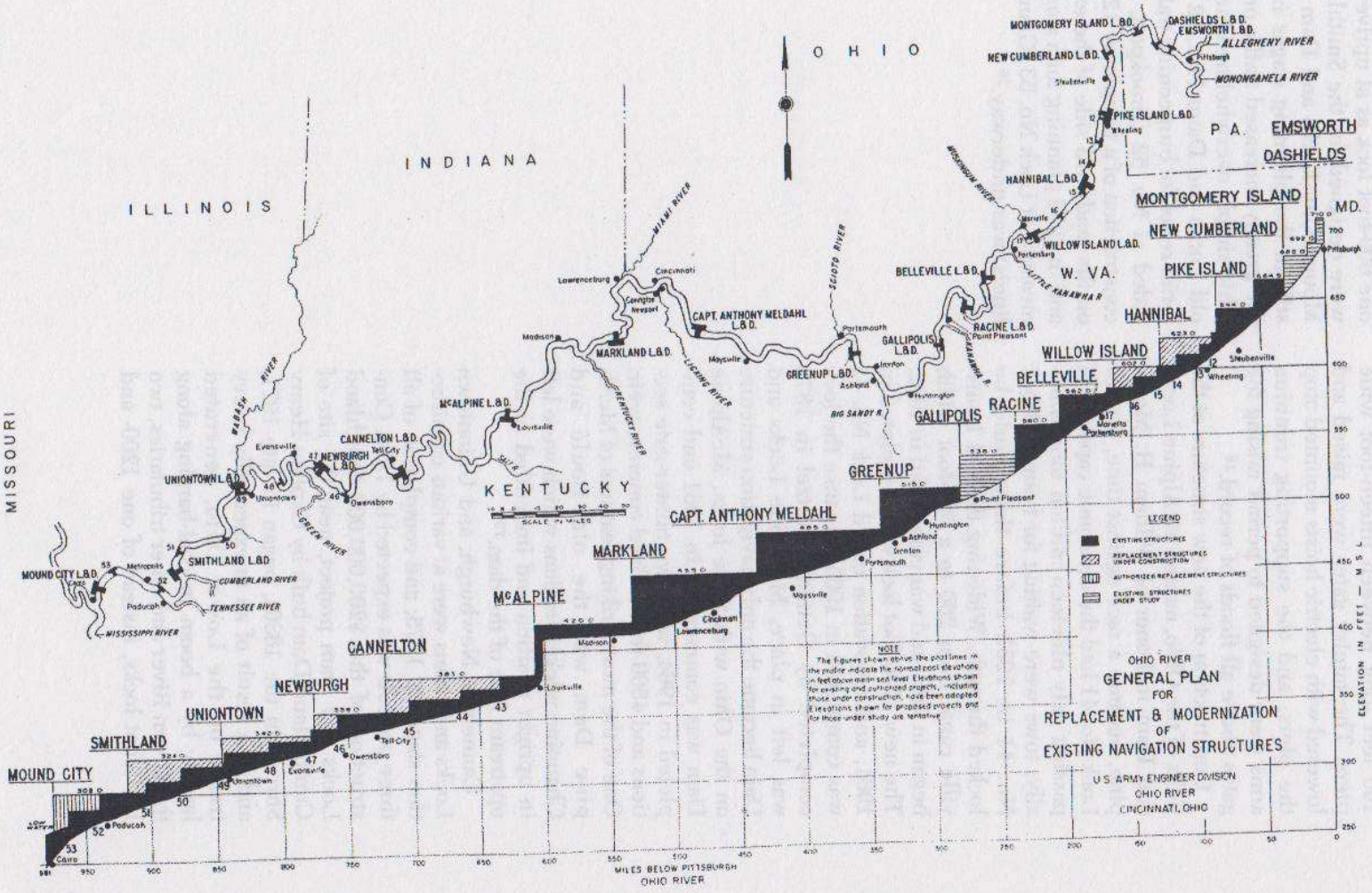
Navigation Modernization

The Corps began planning during the early 1950s to modernize navigation facilities on the Ohio. Nineteen new navigation structures were planned to supercede the old movable dams and 110- by 600-foot locks. Project designs called for non-navigable dams with low fixed sills, and movable tainter gates — metal gates with long trunnion arms to rotate the gates high enough to clear maximum high water. The consensus of river navigators was that a 110- by 1200-foot lock could handle the largest barge tow which could be operated efficiently on the Ohio, and the new locks were designed with these dimensions. An auxiliary 110- by 600-foot lock was also planned to give additional flexibility and capacity at each structure. Whereas the old locks had an average seven-foot lift, the new locks were designed with lifts ranging from 12 to 37 feet.[16]

The modernization project had multiple advantages. The maintenance costs of the old system were rising; the new structures would reduce these costs. Greater dam-height and lock-lift would provide longer slackwater pools, reducing the resistance to barge propulsion met in shallow pools and the number of lockages. The larger lock-chamber dimensions would end the double-lockage necessary when tows exceeded the 600-foot length of the old locks; and the new locks were designed with an improved valve and outlet system which permitted filling in about eight minutes, as compared to eighteen minutes at the old locks.[17]

Seven of the nineteen new navigation structures — Markland, McAlpine, Cannelton, Newburgh, Uniontown, Smithland, and Mound City Locks and Dams — were tentatively located in the Louisville District. Construction of the project in the Louisville District proceeded in a general downstream order after approval for the modernization program was extended on March 11, 1953.

The District commenced construction of Markland Locks and Dam, about halfway between Louisville and Cincinnati (to eliminate old Locks and Dams Nos. 35, 36, 37, 38, and 39), on April 25, 1956, and completed the locks in 1959 and the dam in 1963. Noteworthy features of the locks were the positioning of the 1200-foot locks riverward of the auxiliary 600-foot locks to facilitate the entry of large tows; the split filling and emptying system permitting rapid operation; and riverside lock discharge outlets, in contrast to the old system of emptying below the lower lock-gates, to minimize turbulence in the lower-lock entrance. The fixed dam had twelve tainter gates, each 42 feet high by


OHIO
INDIANA
ILLINOIS
KENTUCKY
MISSOURI
W. VA.
P A.
MD.
MONTGOMERY ISLAND L.&D.
DASHIELDS L.&D.
EMSWORTH L.&D.
NEW CUMBERLAND L.&D.
PIKE ISLAND L.&D.
HANNIBAL L.&D.
WILLOW ISLAND L.&D.
BELLEVILLE L.&D.
RACINE L.&D.
GALLIPOLIS L.&D.
CAPT. ANTHONY MELDAHL L.&D.
MARKLAND L.&D.
McALPINE L.&D.
CANNELTON L.&D.
NEWBURGH L.&D.
UNIONTOWN L.&D.
SMITHLAND L.&D.
MOUND CITY L.&D.
GREENUP L.&D.
ALLEGHENY RIVER
MONONGAHELA RIVER
KANAWHA R.
SCIOTO RIVER
MIAMI RIVER
WABASH RIVER
GREEN RIVER
CUMBERLAND RIVER
TENNESSEE RIVER
MISSISSIPPI RIVER
BIG SANDY R.
LICKING RIVER
MUSKINGUM RIVER
LITTLE KANAWHA R
EMSWORTH
DASHIELDS
MONTGOMERY ISLAND
NEW CUMBERLAND
PIKE ISLAND
HANNIBAL
WILLOW ISLAND
BELLEVILLE
RACINE
GALLIPOLIS
GREENUP
CAPT. ANTHONY MELDAHL
MARKLAND
McALPINE
CANNELTON
NEWBURGH
UNIONTOWN
SMITHLAND
MOUND CITY
LEGEND
EXISTING STRUCTURES
REPLACEMENT STRUCTURES UNDER CONSTRUCTION
AUTHORIZED REPLACEMENT STRUCTURES
EXISTING STRUCTURES UNDER STUDY
NOTE
The figures shown above the pool lines in the pools indicate the normal pool elevations in feet above mean sea level. Elevations shown for existing and authorized projects, including those under construction, have been adopted. Elevations shown for proposed projects and for those under study are tentative.
OHIO RIVER
GENERAL PLAN
FOR
REPLACEMENT & MODERNIZATION
OF
EXISTING NAVIGATION STRUCTURES
U.S. ARMY ENGINEER DIVISION
OHIO RIVER
CINCINNATI, OHIO
MILES BELOW PITTSBURGH
OHIO RIVER
ELEVATION IN FEET — M.S.L.

100 feet long between fifteen-foot wide piers. The tainter gates were raised and lowered with electric hoists mounted atop the piers; and the supporting trunnion arms were designed to permit raising the gates above all floods of record.[18]

Construction of the new structure at the Falls of the Ohio, named McAlpine Locks and Dam in honor of William H. McAlpine, became a race against time, for old Lock No. 41 had the economic capacity of passing only nineteen million tons annually; tows were waiting for hours at Lock No. 41 in 1955 before they could be locked through. Widening the old Louisville canal from 200 to a 500-foot width began in 1959 and was completed in 1962. The new 1200-foot lock was completed in 1961; and renovation of old Lock No. 41 was completed in 1965. Because the lock completed by General Weitzel in 1872 was left in place, McAlpine Locks and Dam became the only navigation structure on the Ohio with three locks. McAlpine Dam was commenced in 1961 and completed in 1964, with two tainter-gate sections and 4500 feet of fixed concrete weir. One of the most striking features of McAlpine Dam was the old Boulé and Chanoine wicket sections which were left in upright position and imbedded in the upstream face of the dam.[19]

Cannelton, Newburgh, and Uniontown Locks and Dams were at various construction stages in 1975; and completion of all three projects was expected by 1976. Construction of the $200,000,000 Smithland Locks and Dam project, near the site of Cumberland Dam built by Captain Henry Shreve in the 1830s, began in late 1971, and as a result of an unexpectedly heavy traffic on the Lower Ohio, generated largely by a boom in coal-barging along the Green River and other tributaries, two 1200-foot locks, instead of one 1200- and one 600-foot lock as at upriver structures, were designed for the Smithland project. Mound City Locks and Dam project was still in the planning stages in 1975, and the greatly increased traffic on the Lower Ohio simply overwhelmed the capacity of old Locks and Dams Nos. 52 and 53. Interim relief for burgeoning traffic was provided at No. 52 (Brookport, Illinois) by construction of a temporary 1200-foot lock on the landward side of the existing lock; and in 1973 planning for a similar stopgap measure at Lock No. 53 (Grand Chain, Illinois) was underway.[20]

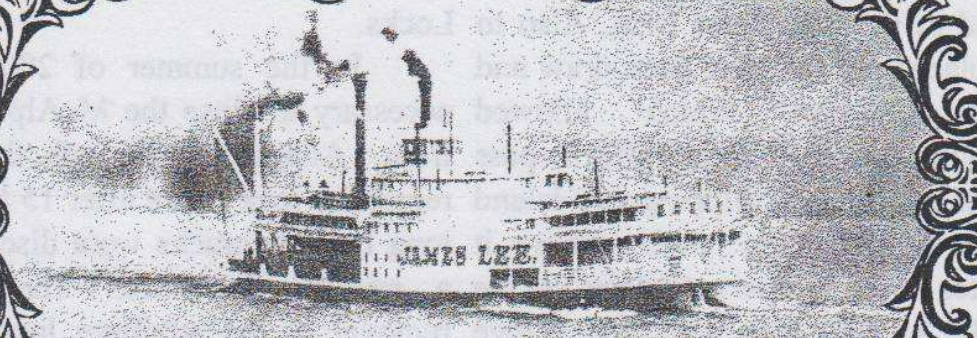
In the late 1990's Congress authorized an eight year, $300 million renovation of the McAlpine Locks. The Corps of Engineers commenced construction in 1999. The 56' by 600' auxiliary lock (opened in 1921) as well as the inactive 56' by 360' stone lock (opened in 1876), were removed. In their place, a new 110' by 1200' "super lock" is presently being constructed in the location of the two former locks. This will be the second dam on the river with parallel 1200' locks. The other is located at the Smithland Dam. Also to be replaced are the steel truss draw and bascule bridges which allowed Louisville Gas & Electric traffic to pass over the locks to Shippingport Island and the hydroelectric power stations it operates at the tainter gate dams on the island. A high rise concrete bridge structure, designed to allow all types of boat traffic to pass under it, is presently rising over the site. Due to federal budgetary shortfalls, the completion date has been delayed to 2010.

The McAlpine Locks and Dam rate as one of the busiest on the Ohio River. According to the Corps, in 2001 more than 55 million tons of commodities passed through the lock. These shipments had a value of 11.7 billion dollars. Included were 20 million tons of coal headed for 30 power plants in 8 states. The steel industry shipped 5.5 tons of iron ore, pig iron and other such raw materials as well as 2.5 million tons of finished steel products.

The McAlpine project will feature construction of the world's largest floating crane which will be based at McAlpine. This crane is designed to lift lock gates as needed at the various locks and dams on the Ohio River. Also planned is a visitor center which will feature preserved sections of the stone lock and the steel truss bridges. Some of the lock stones will be also be used in the Louisville park system. The museum at the visitor will focus on the historic Portland Ship Canal and McAlpine Locks.

In the summer of 2004 it was necessary to close the McAlpine Locks from August 9th through the 22d to repair the lock doors after 15 to 18 inch long hairline cracks were discovered in a routine inspection. The previous removal of the auxiliary locks for the renovation project necessitated the closing of the entire lock complex to complete the repairs. One hundred workers were imported to work 12 hour shifts around the clock to complete the repair work. The repair project cost over $1 million. Prior planning was successful in minimizing traffic congestion at the dam site during the repairs.

THE HOWARD SHIPYARDS



JEFFERSONVILLE, INDIANA 1834

On the northern shore of the Ohio River in Jeffersonville, Indiana, the 52-acre shipyard home of Jeffboat, Inc., boasts a history of shipbuilding which reaches back to 1834. Shortly after his arrival in Louisville, Kentucky in the spring of that year, 19-year-old James Howard founded the Howard shipyards on a spot "across the river and above the Falls (of the Ohio)" and began to build his first boat, the *Hyperion*. Since that spring more than 130 years ago, the Howard yards and its successor, Jeffboat, have produced an almost continuous flow of vessels for river commerce, boats and barges which have enjoyed an uninterrupted reputation of being the finest to be found anywhere for any price.

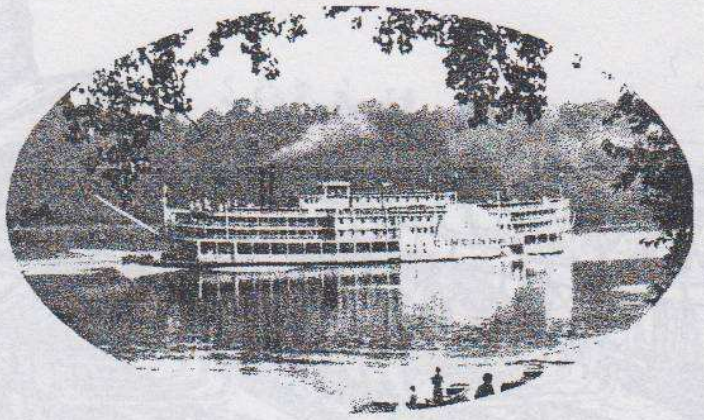
The first paddlewheel was very likely simply only that — an axle with paddles radiating outward and adequately braced to exert thrust when the axle was rotated by any suitable means. It was an improvement upon the six perpendicular paddles on either side of his boat that John Fitch had first hitched to steam power on July 20, 1786. The paddlewheel's innovation may perhaps be credited to Samuel Mory of Connecticut, who certainly used one on the eighth steamboat built in the United States in 1797. Robert Fulton, with the *Clermont* in 1807, constructed the twelfth steampropelled boat in America and utilized two paddlewheels — the first of the sidewheelers that moved the world.

As a boy in Cincinnati, James Howard could scarcely have escaped the lure of the lordly sidewheelers that lined the river banks when Cincinnati was the Queen City. Although he worked in his father's wool mill until he was fifteen, he had heard the call of those early steamboats and had himself apprenticed as a ship's carpenter.

In the year 1830, the days of rapid innovation and change in the river steamboat had about ended. The major changes had been made that adapted an ocean-going sailing vessel into the practical Western Rivers sidewheeler. It was by then a shallow draft, flat-bottomed boat, with boilers and engines on deck and not in the hold as on an ocean-going steamship. Above the boilers, engines,

(Continued on next page)

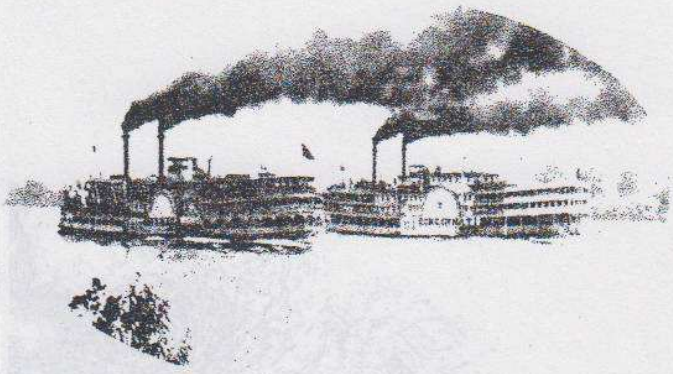
and woodpiles, was placed the cabin with its flanking staterooms, and on top of that a pilot house surmounting the officers' cabin. The cargo was carried in the hold where it had to be placed by deckhands in and around the structural timbers that the shallow hull required — the keelsons, longitudinal and transverse trusses, the poles for the hog chains and the bulkheads. Cargo was also carried on the guards, those huge aprons that were cantilevered out from the hull and that carried the main deck to just beyond the paddlewheels and their housings. The boats young Jim Howard was set to working on were like these; with only minor changes Jim Howard was to build his name making them.

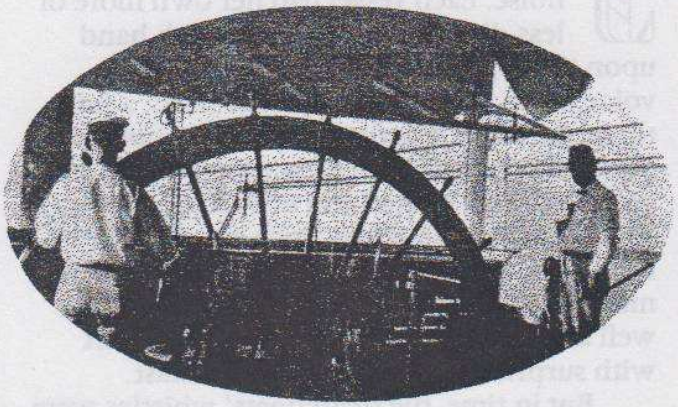


The old Howard mansion, built across the street from the yards, now houses the Howard National Steamboat Museum.

Throughout the wood boat era, log rafts were floated down river to the Howard yards, rafts of the finest quality hardwoods from along the Ohio Valley. At their destination in Jeffersonville, they were plucked from the water with oxen teams, dragged to the sawmill which was an integral part of the shipyard and cut into three-inch planks. From the mill, these planks were distributed to various areas in the yard, again using oxen. Animal power was the essential motive power in the construction process and remained so, even after the advent of steel-hulled vessels.

Jim Howard got his lumber from the knolls and river bottoms of Clark County, Indiana, or the neighboring country in Kentucky. Then in the seventies he began to buy from lumbermen in Pennsylvania along the Allegheny River; some white pine came from the Clarion River. The Kanawha and Big Sandy riverbanks provided the hardwood needed until the very end; but good, knot-free pine began to be scarce and orders were sent as far as Alabama, Georgia, and Florida by the end of the century. In 1902 a carload or two of lumber from the state of Washington came in. Then came World War I with its inflation and increased demand for wood — hardwood, softwood, any wood would do — and by 1915, Southern pine had increased 40 percent in price. The impact on boat building was immediate, for in 1910 tank steel for boats was $35.10 per ton. By 1915, it had increased but seven percent. Virtually overnight, then, wood was supplanted entirely by steel. In 1916 only two wood hulls were launched; in 1917 one 60-foot towboat. The last wooden hulls to leave the Jeffersonville ways, save for some motorboats and a barge, were the towboat and a dozen barges for the Kentucky Rock Asphalt Company in Louisville in 1918. All were but





90 feet in length. For commercial use, no one mourned the passing of wood; steel was simply superior. In fact, the steel-hulled *A. Baldwin,* launched by the Howards in 1905, still floats and serves as a ferryboat in New Orleans.

For the early steel hulls, which were riveted, not welded, supplies were shipped by rail from the great mills in the North and the East. Teams of six horses met the trains at the siding and hauled the steel on flatbed wagons back to the yard. During construction, horses were used constantly, moving steel to the different boats under construction at the time. A major development, the horse-operated, track-mounted crane, eased the burden on man and animal alike.

One operation, however, was entirely on the backs of the men, placing the bottom plate on a hull. They couldn't do as modern shipwrights do, building the hull upside down, then cutting it apart and turning it over, and there was no way to get the horses and oxen to help. So they did it with sheer manpower.

Horse teams hooked to the steel and dragged it into place beneath the hull. Then as many men as could got under the steel plate, lifted it and held it in place until riveters could tack the seams. With back-breaking methods like that, compared to today's, it is hardly any wonder that in the Howard yards, three or four months was good time for completing a simple barge.

Eighteen-sixty-one came in with the usual accompaniment of steamboat whistles and bells along the river. The Yards commenced work on a good-sized hull for the Louisville and Cincinnati Mail Line Company that was to be 245 feet overall. But business was slow and the Mail Line people got a good price for her 436 tons. With an $8,600 estimate, she cost them but $20 per ton. She was launched in April.

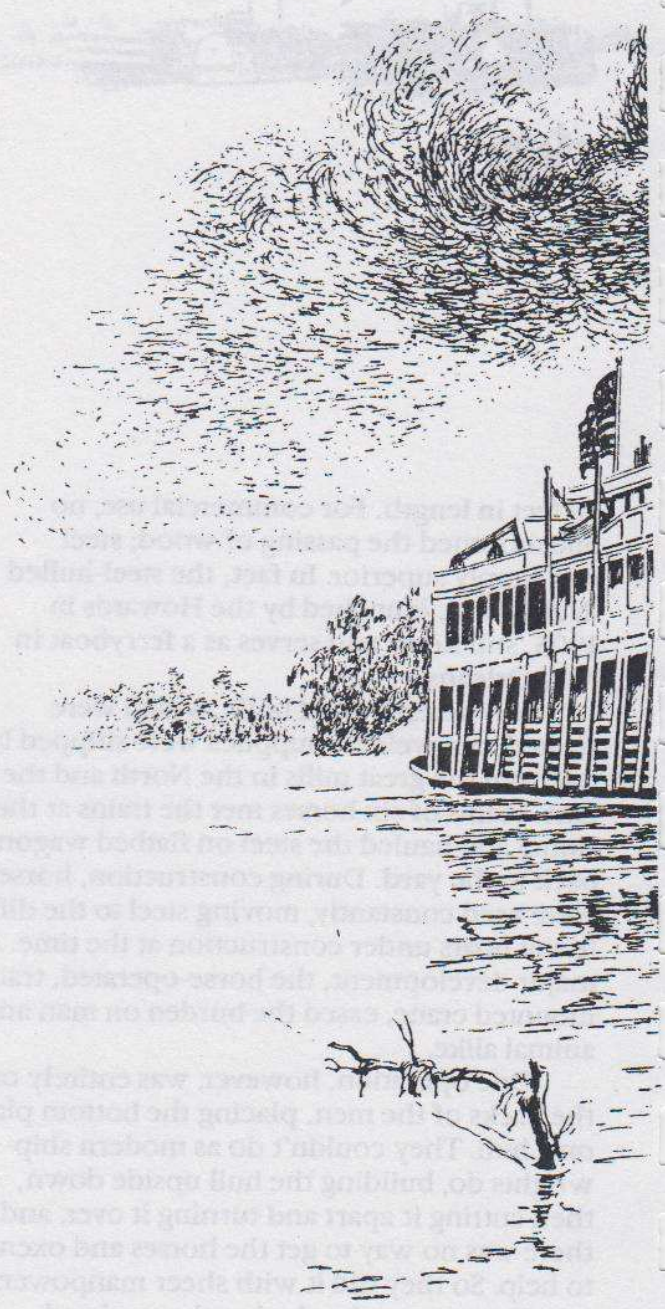
The Howards had sent out the usual replies and estimates during the winter, but no other boats lay on the ways when April 12, 1861, dawned. After the fall of Fort Sumter, the new Mail Line boat was called the *Major Anderson.* By the first of May, the Yards employed only the watchman! The War Years had begun.

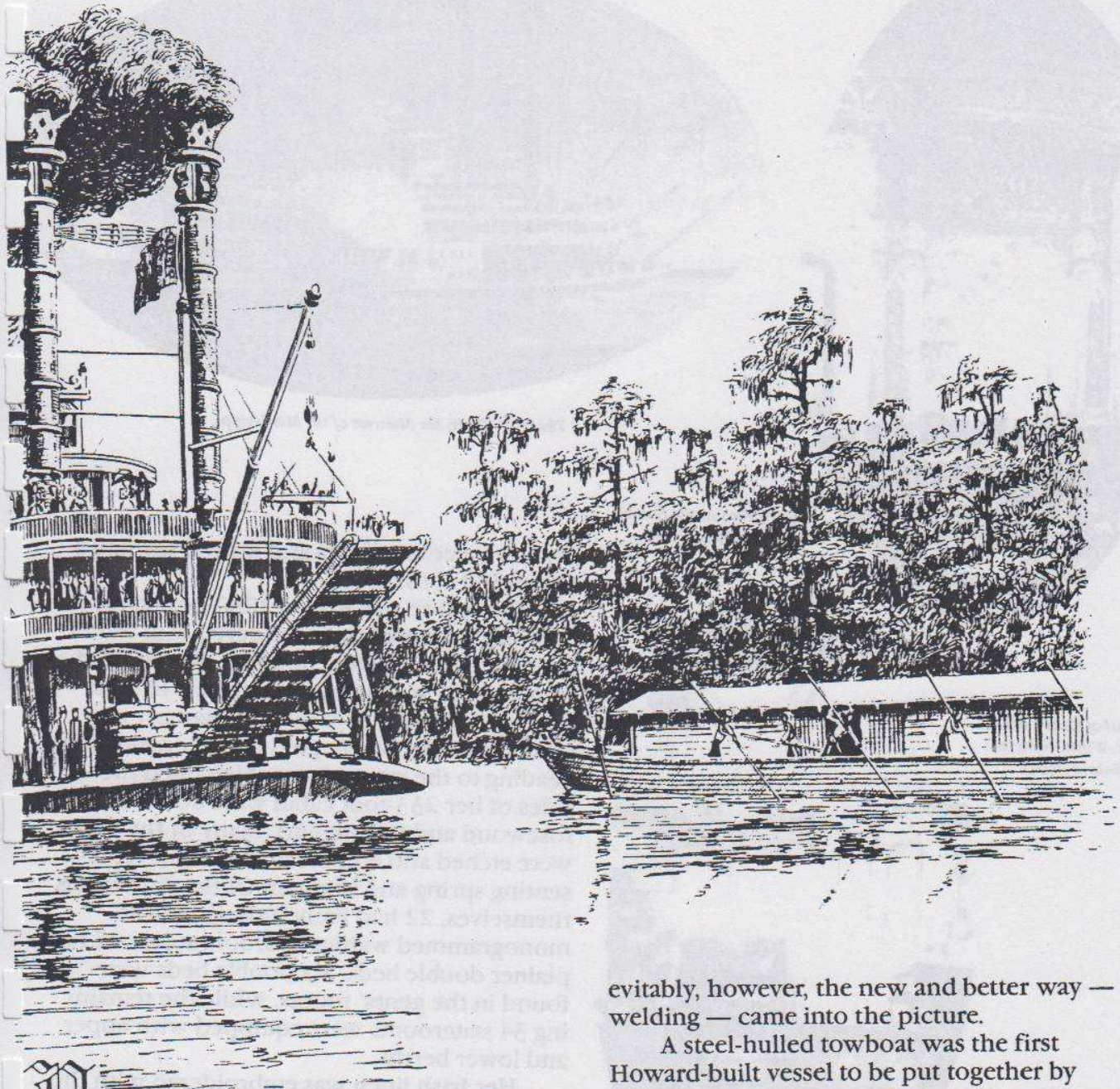
It should not be surprising that the ways were idle after April, for trade and customers had been disrupted with increasing frequency and severity in the months between South Carolina's sucession and the seizing of Fort Sumter. Southerners tried to take Northerner's property when it was within their borders. Likewise, Northerners took powder and shot, at least, as it passed down the rivers to Memphis or New Orleans. A well-organized force of Secessionist vigilantes could effectively commandeer a vessel, appropriate her cargo, and leave the crew and passengers to drift or swim to shore just as effectively as Blackbeard himself had done. And they did it!

Steamboat whistles made a beautiful noise. Each vessel had her own more or less distinctive notes, and each hand upon the rope could pull forth a different voice: now a friendly nod of the head; a full tip of the hat; a screaming blast of annoyance punctuated with short silences; or a long, stentorian call that ranged and echoed o'er the valley. To the uninitiated, such as a visiting backwoods cousin, the sounds of river commerce were startling: sudden, shrill, felt as well as heard. Even a blase pilot could start with surprise at a quick, powerful blast.

But in time, the steamboats' whistles were but the sound of commerce and enterprise. They promised excitement enough to call out a whole town and the somnolent would be energized to lift a bale, roll a hogs-head, tote a bag or two and catch a bit of gossip if not news. The young would gawk and find their ideal, a cub pilot, lolling against a gilt pillar, twenty feet or more above the hubbub on the main deck. Then the engine bells would sound, the paddlewheels would revolve and roil the water, and majestically the river between boat and bank would widen until in mid-stream, with a puff of steam and a whistle-blast, the vessel would set her course and disappear slowly, tantalizing those who remained on the humdrum shore. Up and down the meandering western rivers, whistles were the sound of civilization.

By the end of the Civil War, the whistles of the steamboats were a prosaic noise, probably heard only by those especially listening for them. The awe the steamboat had created a decade or more before was quelled by the knowledge the War's disruptions had dissipated. To those who had known only a log cabin, mud-chinked, earthen-floored, cold and silently lonely, the white and gold steamboat with its lights, its fires, its ization. A steamboat was everything the hand of man had hewn out of the wilderness. Its ostentation, its gewgaws and curliques masking and excusing its flimsiness, were but an honest expression of skills and craft. From the hog-chains through the engine-room to the black walnut bar and the cabins with every door an oil painting, the steamboat echoed the small boy's honest boast, "Hey, Ma, look at me. See what I can do!" But having pioneered and captured the pioneers' spirit, when the frontier moved on and civilization filled the banks of the rivers, when the log cabins were finally replaced with brick and frame houses, the steamboat lost its preeminence.



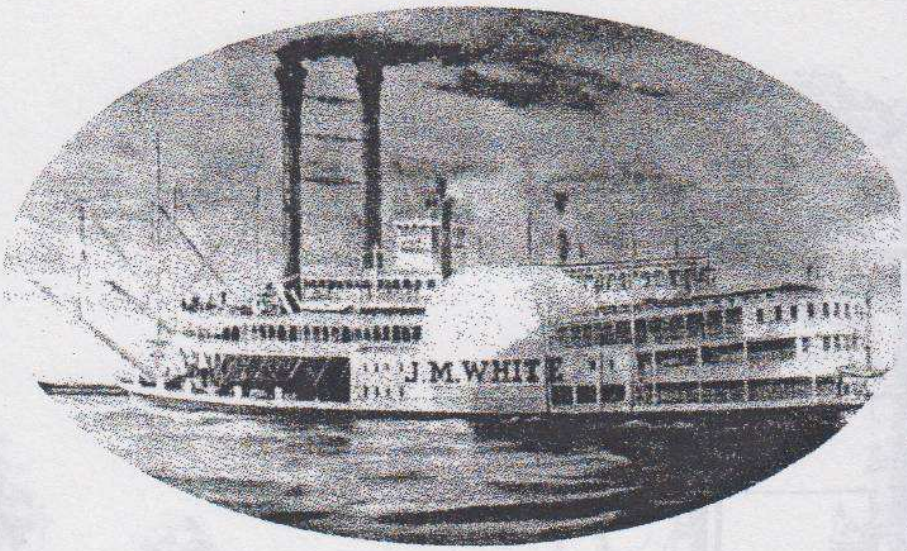


Resistance and skepticism have been the bane of almost all progress made in the history of man. The unwillingness to accept new ways has become even more pronounced in this century when advancing technology brings about change on a daily, sometimes even hourly, basis. With an eye to this quirk of mankind, it is amusing to look back on an incident in the Howard yards.

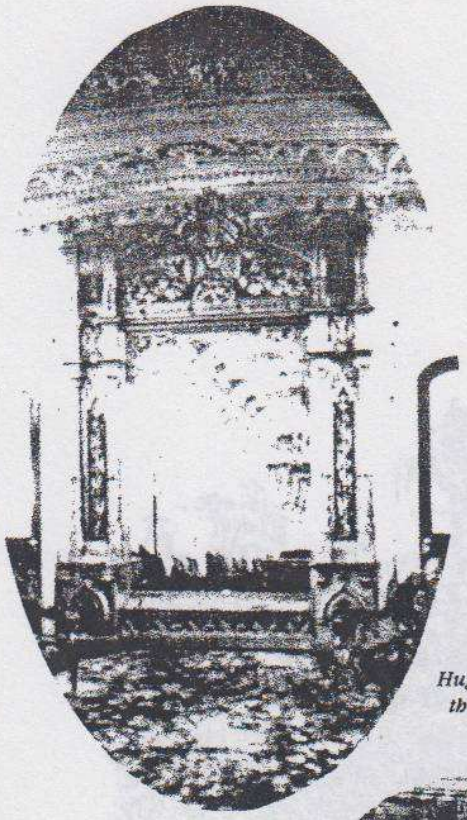
With the advent to steel-hulled boats in the latter part of last century, rivets achieved an important position. Welding had not been perfected to any extent, and rivets held the scene for a number of years. Finally and inevitably, however, the new and better way — welding — came into the picture.

A steel-hulled towboat was the first Howard-built vessel to be put together by the new-fangled method of welding. It was greeted with about as much skepticism as an innovation which called for gluing together barges might meet today. The old salts in the yard cocked an eyebrow and mumbled something about never holding up. But, weld it together they did! That's what the order called for.

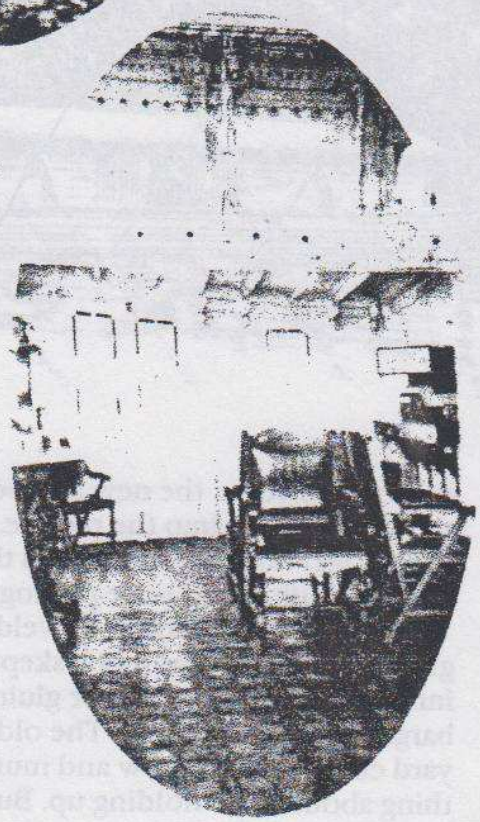
Order or no order, though, these men, these shipwrights with a reputation to protect, didn't want one of their boats to sink and make them the laughing stock of the river. So, along every welded seam in the boat, at nine-inch intervals, they placed rivets . . . just in case.



The J. M. White, the Mistress of the Mississippi.



Huge Mirror at the End of the J. M. White's Cabin.



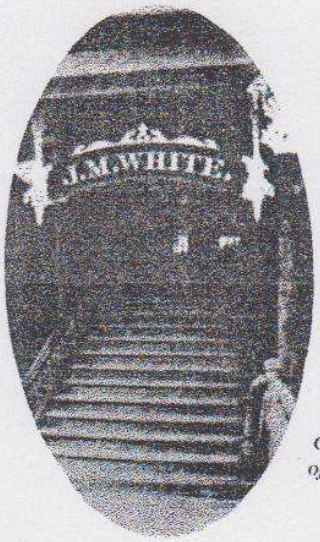
Detail of Cabin of the J. M. White. Note the inlaid floors.

Of the hundreds of sidewheelers to come from the Howard Shipyards at Jeffersonville, undoubtedly the finest was the *J. M. White.* The *White,* which cost her owners some $350,000, left the Howard Yards in 1878. She was the most opulent boat ever to ply the American rivers and indeed she had a reputation abroad.

She had an oak keel, a 2880-pound roof bell, a five-tone whistle and seven-foot leaves atop her 80-foot twin chimneys. She sported an octagonal barroom, stained glass in both interior and exterior windows, statuary and seven Egyptian design gold-plated chandeliers. Leading to the staterooms which lined the sides of her 233-foot cabin were doors of rosewood and walnut burl. Many of the doors were etched and embossed in designs representing spring and summer. Of the staterooms themselves, 22 had French-designed and monogrammed walnut bedroom suites, 14 had plainer double beds. Six double beds were found in the gents' rooms, while the remaining 34 staterooms were equipped with upper and lower berths.

Her Irish linen was embroidered with the JWM monogram. Her Haviland china was decorated with her picture and the Gorham silver was engraved with her silhouette. A Chickering grand piano sat in the lounge.

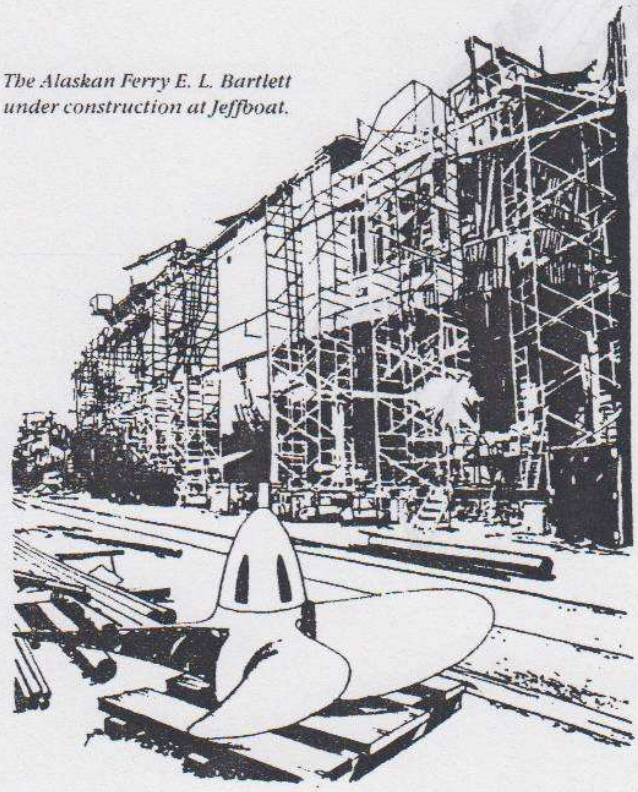
On the night of December 13, 1886, the undisputed Queen of the rivers was defeated by fire. A blaze, which started in the cotton bales on the Texas deck, quickly spread to kegs of gunpowder in the forward hold. By morning, the greatest steamboat of all times was gone. All that remained were memories, blackened boilers and a derelict hull which the river silt soon covered.



Grand Stairway of the J. M. White.

In 1969, 135 years after the Howard yards were founded, Jeffboat, Inc., launched the sea-going Alaskan ferry *E. L. Bartlett.* It may seem strange to some that the far away state of Alaska would come to the heart of the midwest, to a shipyard on the Ohio River to have a sea-going ferry built. Stranger still is the fact that this isn't the first time it has happened.

The Alaskan Ferry E. L. Bartlett under construction at Jeffboat.



In 1898, at the height of the Yukon gold rush, a company from Alaska, then a territory, asked Ed Howard of the Howard shipyards, Jeffboat's predecessor, to build four boats for operation on the Yukon River. With the gold rush at its peak there was money to make in river transportation, and the Alaska Commercial Company needed boats to cash in on the traffic. So, they approached the Howard shipyard.

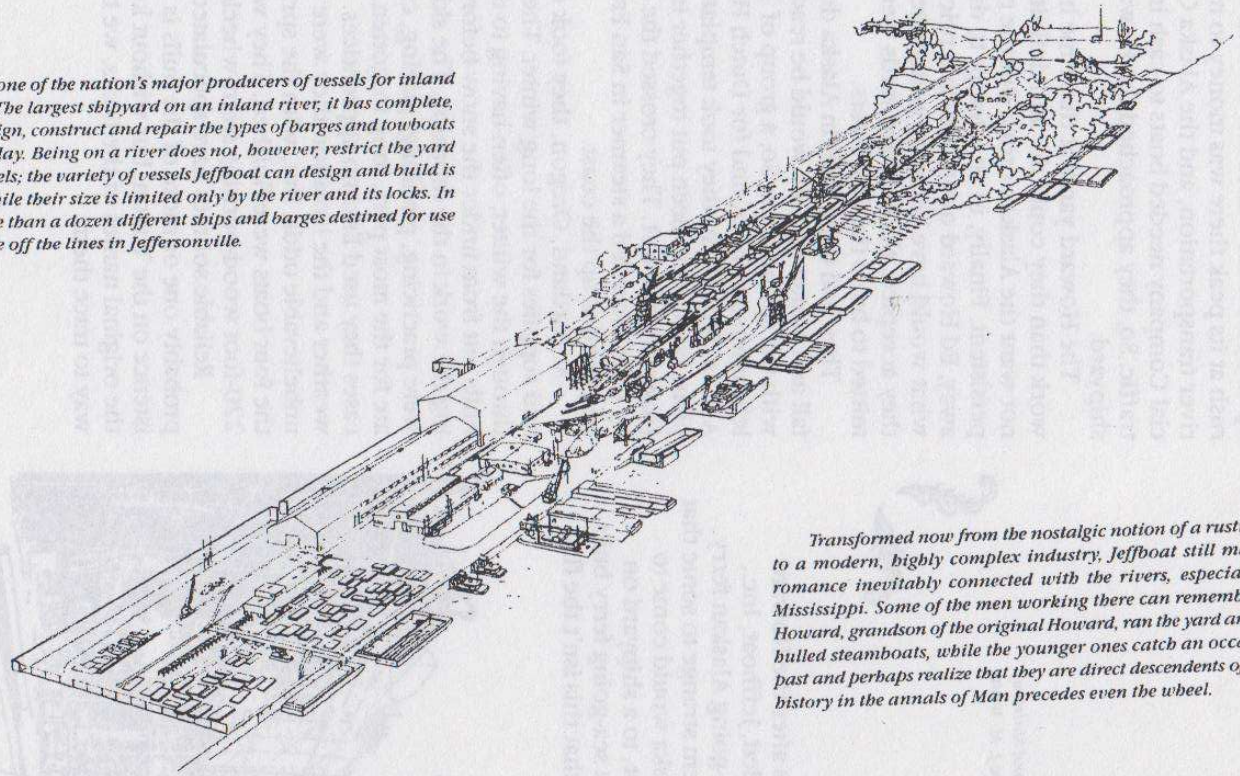
The Howard yards at that time had more work than they could do, and definitely did not want the Alaskan order. But the men were persistent. Finally, in an attempt to drive them away, Ed Howard quoted them a price triple what would have been the going rate. When they accepted, the Howard yards were committed to build the four boats.

They had to be built in Alaska during the fall and winter so they would be ready to go with the spring thaw. So, a group of 112 men left Jeffersonville bound for Dutch Harbor, Alaska. With them they took templates and plans which had been put together in the Howard mold loft. They crossed the country by train, boarded a steamer in San Francisco and headed up the coast.

At Portland, Oregon, they took on lumber and supplies for the long winter. They worked through the winter, often having to dig the hulls out from under the snow before beginning the work in the morning. The skills they were practicing, planking, glazing, caulking, are for the most part, long forgotten. In some cases they used Eskimo apprentices. With the weather and the isolation they were fighting unbelievable odds. But, with the spring thaw, the four boats were finished. They were 220-foot wood-burning stern-wheelers.

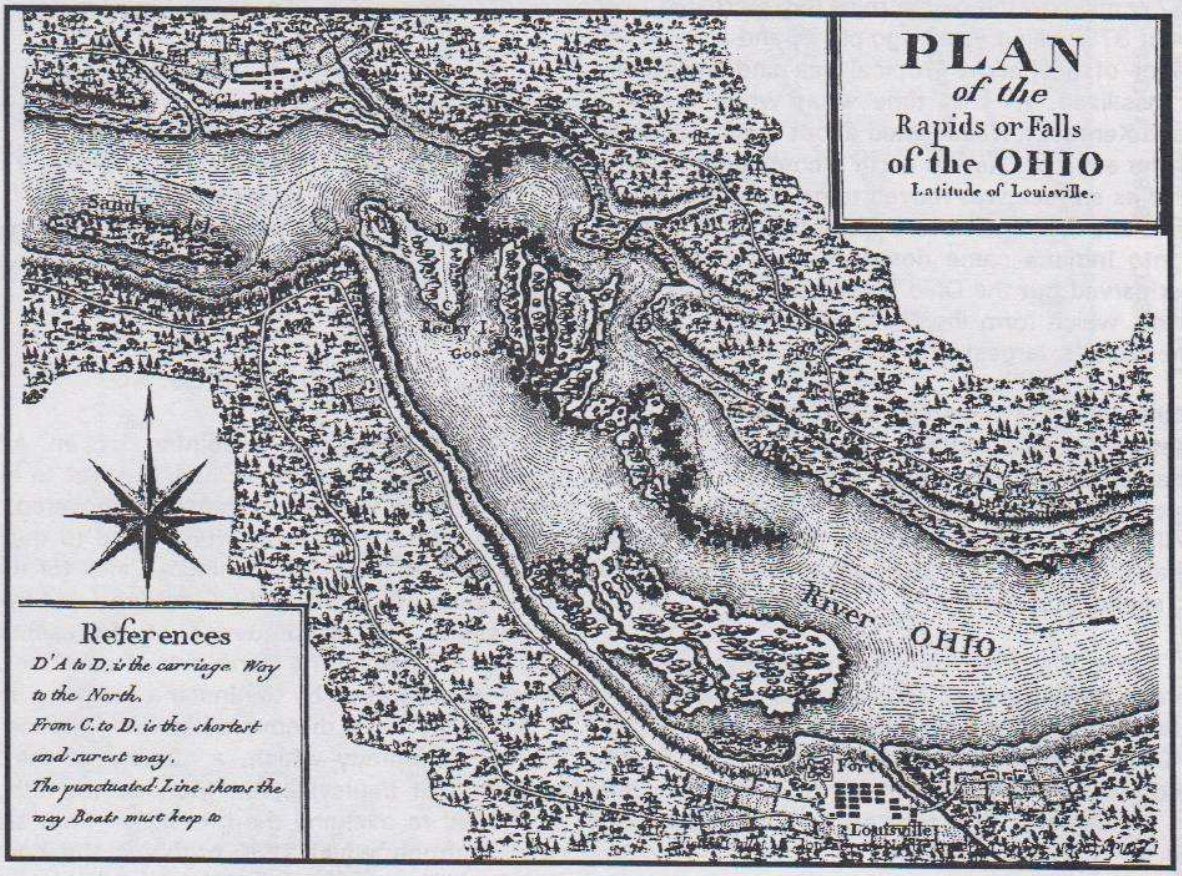
Reliable sources have speculated that probably one or more of the hulls is still in existence on the Yukon, but without knowing the original names of the boats, we have no way to trace them.

Jeffboat, today, is one of the nation's major producers of vessels for inland waterway commerce. The largest shipyard on an inland river, it has complete, modern facilities to design, construct and repair the types of barges and towboats which ply the rivers today. Being on a river does not, however, restrict the yard to river commerce vessels; the variety of vessels Jeffboat can design and build is virtually unlimited while their size is limited only by the river and its locks. In the past few years, more than a dozen different ships and barges destined for use in the ocean have come off the lines in Jeffersonville.



Transformed now from the nostalgic notion of a rustic steamboat shipyard to a modern, highly complex industry, Jeffboat still maintains much of the romance inevitably connected with the rivers, especially the Ohio and the Mississippi. Some of the men working there can remember when Captain Jim Howard, grandson of the original Howard, ran the yard and turned out wooden-hulled steamboats, while the younger ones catch an occasional glimpse of the past and perhaps realize that they are direct descendents of a breed of men whose history in the annals of Man precedes even the wheel.

The Falls of the Ohio at Clarksville/Jeffersonville



"Overcoming Obstacles"

CSI - CSO Fall Tour

October 1, 2 & 3, 2004

This is the back of the cover page.
The following page numbers are inconsistent because they are copies of various articles in *The Hoosier Packet.*

OHIO FALLS CANAL

INDIANA'S FIRST ATTEMPTED CANAL

The Ohio river was an important trade route for early Americans. However, passage through the rapids or falls in the river near present day Jeffersonville, IN and Louisville, KY was dangerous for those navigating the river, often resulting in loss of boats, cargo, and sometimes lives. These cascading rapids, which drop 26 feet in a 2½ mile stretch of the river, were created over time. About 375 million years ago plants and animals fell to the floor of a shallow tropical sea and eventually became fossilized. At that time what would become Indiana and Kentucky was located about twenty degrees south of the equator. As the earth's continents shifted, this part of its surface was moved to its current location. The climate changed and several glaciers stretching from Canada into Indiana came down and retreated. Their meltwater carved out the Ohio River Valley and exposed these beds, which form the "Falls of the Ohio" and are one of the world's largest exposed Devonian fossil beds.

By the time the Indiana Territory was formed in 1800, settlement had already begun along the larger rivers. Settlements often were established at natural stopping places such as the falls. Native Americans built their villages where they had drinking water, transportation and plenty of fish, game and materials for clothing, shelter and tools.

In 1778 the first permanent English-speaking settlement in the Northwest Territory was established by George Rogers Clark on Corn Island at the falls. In 1803 William Clark, the younger brother of George Rogers Clark, and Meriwether Lewis set out from there on their mission to explore the territory of the Louisiana Purchase.

In 1805, eleven years before Indiana became a state in 1816, a three mile canal was proposed around the rapids or falls of the Ohio river near Jeffersonville, IN. This canal was to be called the Ohio Falls Canal. Three ventures at building the canal on the Indiana side of the falls were attempted (1805, 1817-19, and 1824-25), but all failed. The first Indiana lottery was held to raise the needed capital for the second of the ventures. The Library of Congress has an 1818 lottery ticket for the Jeffersonville Ohio Canal Lottery. Finally in 1826 Congress helped Kentucky fund its Louisville & Portland Canal, which remains in use today.

Information about the Ohio Falls Canal is difficult to find. The Filson Historical Society in Louisville, Kentucky, owns a copy of a map and a report made by the managers of the Ohio Canal Company in 1805. It is presented online under "First American West: The Ohio River Valley, 1750-1820" and may be used without fee unless it is used in a commercial publication. The report shows how much research was made in determining the location of this canal and the various arguments as to where it should be built. Even though it seemed to be a political contest between Indiana and Kentucky as to which state would build it and recieve the most benefits, there was no doubt that such a canal was needed.

PROCEEDING OF THE MANAGERS OF THE OHIO CANAL COMPANY,

AT LOUISVILLE, ON WEDNESDAY, THE 11th DAY OF SEPTEMBER, 1805

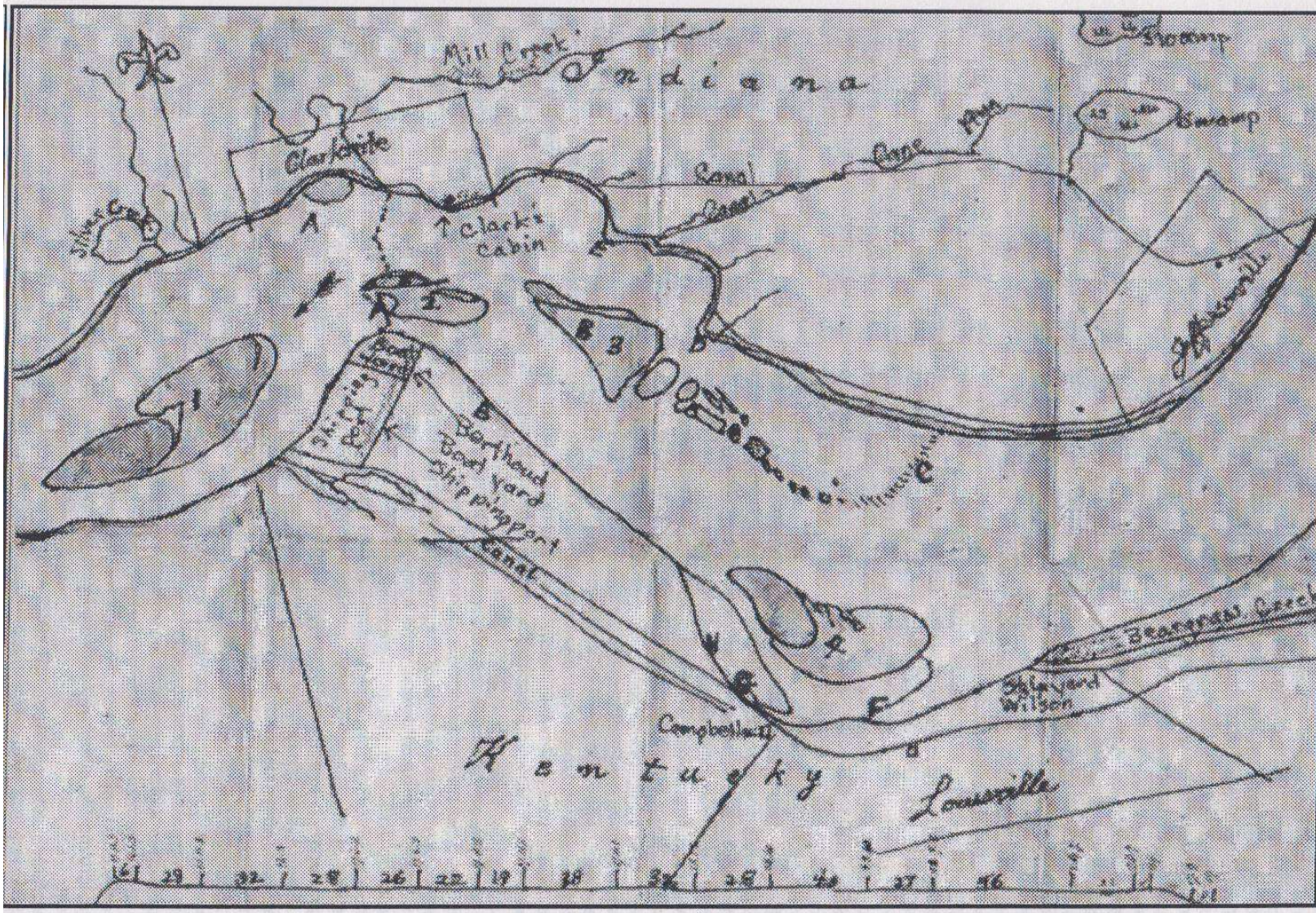
LEXINGTON: PRINTED BY DANIEL BRADFORD, ON MAIN STREET. 1805

PROCEEDINGS, &C.

THE Managers appointed by an Act of the Legislature of Kentucky, entitled "An Act to incorporate the Ohio Canal Company," having discovered, that from want of information, both with regard to the utility, as well as practicability of opening a Canal for the purpose of navigating the Falls of the Ohio river; and from various impressions, in consequence of an association for opening a Canal on the North side of said river, under an act of incorporation by the Indiana Territory, the citizens of Kentucky have discovered an indifference to taking shares: to remedy which, a number of the Managers convened at Louisville, on Monday the 9th inst. and proceeded to examine the ground on both sides of the river, through which it is probable the contemplated Canals will pass. To assist them in their examinations, they made use of the annexed draught and notes, made out by Mr. Brooks, from actual survey, and as far as the said draught and notes respect the situation of the ground on each side of the river, as well as the different currents, rocks and shoals in the Falls, the Managers feel confident they are correct, and may be relied on.

Managers.

THOMAS PRATHER,
GEO. WILSON,
JAS. HUNTER,
ALEXR. PARKER,
JOHN BRADFORD,
JAMES CRAWFORD,
NICHOLAS CLARK,
ADAM STEELE,
WINGFIELD BULLOCK.



This map for the Falls of the Ohio Canal was made by surveyor Jared Brooks of Louisville for the Ohio Canal Company and presented on July 4, 1805. Your editor has penned over the objects and letters so they would be easier to see. Courtesy of Louisville Filson Historical Society

Louisville, Sept. 11TH, 1805

WE the Subscribers, Pilots of the Rapids of the river Ohio, do hereby certify, that Mr. J. Brooks, while making his survey on the said Rapids, and his plot thereof, did frequently call on us for our opinions, and information, particularly when he was about to finish the same.--And that it is our opinions, that the chart made out by said Brooks, of the said Rapids, is correct, as to the water, currents, counter-currents, islands and bars.--Given under our hands in Louisville, this 3d day of August, 1805.

James Patton,
John Nelson,
Asahel Linn.

Witness present,
Geo. Wilson
J. Berthoud,
Wm. F. Simrall.

TO THE MANAGERS OF THE OHIO CANAL COMPANY,

GENTLEMEN:

HAVING from actual observation, survey and measuration, agreeable to your request, completed a draught of that part of the Ohio river which includes the Rapids, and of the country on each side, so as to include the routes contemplated for canal navigation; I take the liberty of presenting it for your information; which will enable you to conclude on the pre-eminence of one route over others that have been contemplated.

The vast importance of a canal at that place, to a great part of the world, and the certain profits it would afford to the proprietors from the moment of its completion, are too well known to require comment at this time.

I shall therefore only describe the nature of the ground, and the facts as they actually exist, connected with the undertaking so far, as the state of the water has yet enabled me to do. The draught represents a middle stage of water in the Ohio.

Attached to the draught, is a section of the ground on the line of the Kentucky canal; except, that instead of beginning at G, it begins at H, and joins at the bend nearest them; which makes the distance on the profile 176 yards less, than that from G on the draught.

The numbers on the perpendicular posts, tell the height in feet, inches and quarters, of the surface, from the level drawn below. The numbers on the surface, tell the distance in perches, from post to post--the dotted line is the face of the rock--and the break from the level near the end of the section, shows what part of four six-feet locks will be formed in the rock. Three locks may be sufficient in ground like that--the fall is upwards of twenty-four feet.

Scale of the section--Length, 30 perches one inch--height, 50 feet 1 inch

Scale of the chart--66 2/3 perches 1 inch

I. Is Sandy Island--2. Rock Island--3. Goose Island--4. Corn Island. The lines on which *canal* is written, are routes contemplated.

Between the dotted line crossing the Ohio obliquely above Corn Island, and that crossing below Rock Island, are included the whole of what are termed the Rapids of Ohio.

Sandy Island properly so called, lies upon a bed of rock, which extends to both shores of the main. The Northern course is passable for boats only in time of high water; at low water, it is traversed dry shod. The Southern course is the main channel, above which, to Rock Harbor, A, is excellent mooring ground, and there is a sufficiency of water in the harbor for vessels of any burthen, and safety at all seasons.

The great shoal of rock North, and the narrow channel South of Sandy Island, account in a great measure, for the unequal rife of water above and below the Falls; which is in sudden swells, at least three feet below, to one above; so that in highest water, they show an even surface.

The course between Rock Island and Kentucky main, is called the Kentucky chute, which is left in Rock Harbor, and is passable for boats only in time of high water.

The course between Rock and Goose Islands, is called the middle chute, and is the most safe and easy passage in water above the middle stage.

The course North of Goose Island, is called the Indian chute, which is the main channel.

On the South side of Goose Island, more than half of the whole fall is below a line from B on the main, to B on the island: above which line, the water would be nearly plane with the surface above the Rapids, was it not for the great waste through the breaks of Goose Island, thro' which it falls from one, to twelve feet into the Indian chute. That part of the river South of Goose Island, lies upon a bed of rock far higher than the Indian chute, and is less rapid, until it passes the line from B to B.

The draught of the Falls reaches to the dotted line above, from whence the velocity of the current increases to the great break of the Indian chute at C; from thence to D, the current rates ten miles and 1066 yards an hour--from D to opposite the point E, thirteen and a half miles an hour; thence to the lower end of Rock Island, nine miles and 990 yards an hour--in all, 3366 yards in ten minutes and 35 seconds, equal to ten miles and 1482 yards an hour. From Rock Island to Shipping-port, oars must be well plied to gain the channel South of Sandy Island.

The course South of Corn Island is passable only in time of high water, which falling to a middle stage, recedes to a very small stream close under the island, and low water leaves a dry bed of rock as far as the basin at F, in front of Louisville, and a shoal of dry rock

which bounds the basin on the North side, to opposite Beargrass point--This shoal, and the reef of Goose Island, between which is shallow water, break the draught of the Indian chute, and protect a safe and easy approach to Beargrass Harbor at all seasons.

This harbor is of the utmost importance to the navigators of the Ohio, being one of the best on the Western waters, and at the most critical place; no other harbor offers for several miles above the Rapids; the natural force of the current throws the descending craft towards Beargrass, in like manner as it drifts towards all outward bends of the shore--here the current seems diligent to catch and waft the unwary navigator into safety and from inevitable destruction, in the Indian chute.

This harbor is safe and commodious for vessels of any burthen under five hundred tons, at all season, secure from the danger of drifting into the Falls from loss of cable, mooring, neglect, or misjudgment.--Mr. James Berthoud's ship, of near 400 tons, and many small crafts, found a secure birth there last winter, during the great wreck of boats, and loss of property on the Ohio.

The surface of the basin, or Beargrass Harbor, as far as F, and that of the Ohio above the Falls, are plane--at F there is more than twelve feet at lowest water, which depth extends to Beargrass, and out into the Ohio,

A canal to avoid the whole Falls, and answer every other desired purpose, may be supplied with water from F, in such quantity, as may be chosen, either by entering the land there, or improving the river to C, or even to H; which may be done without the loss of head water.

The length of a canal from F, will be 588 perches; from G, 468 perches.

From F 400 yards, the shore is of modern ground, lying upon a flat surface of rock; 260 yards farther to G, the ground is like that hereafter described.

A canal entering the land at G, will be 19 feet deep, upon a level that will be three feet below the surface of water at F,--that is as near as can be ascertained at the present state of the water.

From G forwards, on the route 176 yards, the height of land is 29 feet,--this is the highest ground; and its slope meeting that of Louisville eminence, forms a beautiful valley, which continues with wonderful uniformity, to the lower landing. The average depth of the canal will be less than 20 feet six inches.

The flat rocks that fill the space between Corn Island and the main, at the head of the canal, and all Corn Island shoal, are so regularly broken, that they resemble large flags, artificially laid, and may be wrought in any quantity without blowing.

This surface of flat rocks extends through the ground at a proper and convenient depth, under the whole course of the canal, seemingly intended for its floor, provision for walling, and the perfection of the locks to all intents and purposes.

The ground of the whole route, is of exceeding strong clay, dark colored, somewhat of a copper hue, to within two feet of the rock generally; thence a blue clay to the rock, except in some places, a small quantity of light gray sand appears within a few inches of the face of the rock, in thin strata, with blue clay.

The average height of the rock, above the floor of the canal, agreeable to the level before mentioned, is between 36 and 40 inches, on the course from G 1901 yards, where it falls a little below the floor for 473 yards, which being 200 yards from the foot, is near the place of the uppermost lock, which is more than 6 feet break, will meet the rock in which all the lower locks must be formed; from whence the rock descends immediately to the bed of the main channel of the Ohio.

Not a water course, ravine or rain-branch, falls into the valley on either side, to interrupt its uniformity, or annoy the facility of completing the work, or to injure the banks when completed. A great part of the ground is now under high cultivation, and is delightful to view.

It has been idly reported by some, who are unfriendly to the interests of the Ohio Canal Company, that the ground on the side of Kentucky is too low--was that even the case, agreeable to the section, there is higher ground immediately on each side of it, and any height may be chosen to that of fifty feet, without varying materially the course or distance. At the foot of the canal, the bank of the river is upwards of forty feet high from low water, and immediately on each side much higher--That part of Shippingport towards the canal, is fifty feet high. The bank is uniformly of strong clay, lying upon a high rock, which forms a bold and permanent shore, and which is washed by the main channel of the Ohio; so that boats and vessels may lay alongside, and unlade into the mills, warehouses and manufactories when established, and receive lading, therefrom, with the greatest imaginable convenience.

It cannot be denied, that approach to the head of a canal on the South side, will be more safe and easy, than on the North side--that the length and depth will be less, by more than one third--that the approach to the foot will be more easy, by the difference of ascending a considerable distance, and crossing the Ohio in a rapid current--and that it will answer every desired purpose when completed, more effectually, than a canal on the North side can possibly be made to do.

In fact nature has arranged the ground so perfectly appropriate, for the grand purpose of a canal on the South side, that considering the facility with which it may be effected, and the immense advantage to the whole western country, of the water works that may be thereto applied, it may be acknowledged, that she had made ample amends, for the trouble caused by the obstructions thrown in the way of navigation at the Rapids.

Should any be disposed to doubt the accuracy of so favorable a description of this ground, the shafts are

secured, and left open for the inspection of those who may please to examine, during which time the face of the ground will show itself.

Previously to my applying instruments, to ascertain precisely the position of this ground, I traversed and examined it thorough on both sides of the Ohio, and used every endeavor to discover some ground for reports in favor of the north side, but the great length and forbidding aspect of the country, thro which a canal should necessarily be carried, and the danger and difficulty of approach with boats, to the places where the head and foot of a canal should be, fully evinced to me of the utter impracticability of effecting it, until many years had elapsed, and brought into existence far more, and greater encouragement for public and private enterprise, than are at present connected with that point: even admitting there to be no other more practicable route for a canal.

Therefore, with few remarks upon that side, I should have dropped a description of it, in confidence that whoever might view the best ground on both sides ever so cursorily, would be of my opinion, as to the pre-eminence of the opposite side asserted.

In consequence of which, I consider it proper, and even my duty, to give a more particular description of that side, than otherwise would have been necessary; that the public so materially interested as they are in this case, may be enabled to conclude where to bestow their interests and patronage, uninfluenced by the malversation of an individual.

A pamphlet on this subject has recently appeared, which sufficiently exposes the scheme out of which it grew, and the lameness of the projector--of which here follows a copy.

B

"COMMUNICATION from General Benjamin Hovey to his Associates, relative to opening a Canal Navigation near the Rapids of Ohio River; with sundry documents therein referred to, marked from No. 1 to 7.

"AT a meeting of sundry associates of the company proposed for operating a canal navigation near the rapids of the Ohio river, at Stelle's tavern in the City of Washington, January 28th, 1803.

"The following communication from general Benjamin Hovey, was read:

"Gentlemen,

"WHEN I first viewed the rapids of the Ohio, it was my object to open a canal on the side of Louisville, but on examination, I discovered such advantages on the opposite side, that I at once decided in favor of it.

"In the course of my inquiries, I procured the certificates from Messrs. Floyd and Gwathney, and the surveyor general of the state of Ohio and the Indiana territory, marked No. 1 and 2, and herein enclosed, which will speak for themselves.

"On my way home I obtained the opinions of the secretary of the treasury on this subject, which you will find in No. 3; and on my arrival here, I held the correspondence which is covered by No. 4, subsequent to which, I petitioned congress agreeable to the copy No. 5, and latter No. 6, on which a committee of the senate has been pleased to report conformably to the transcript No. 7.

"In this state of our business, permit me to submit to your consideration the expedience of a general meeting, with a view to organize a plan for the future regulation and government of the society, and the promotion of its interests.

"I am, respectfully Gentleman

"Your obedient servant,

"BENJAMIN HOVEY.

"Whereupon,

"It was proposed to appoint a chairman and secretary for the more regular and convenient management of the business of this meeting, and accordingly,

"General John Patterson was appointed chairman, James Glover esq. secretary.

"The board being then formed on the motion of general Hovey, it was

"*Resolved*, that general Hovey be requested to give his personal attentions and support to this petition.

"*Resolved,* that it is expedient to commence working on the canal as speedily as possible.

"*Resolved,* that all expenses incurred in the prosecution of this work, be defrayed by the associates in fair and equal proportion.

"*Resolved,* that until the act of incorporation shall be obtained, Benjamin Hovey, Daniel Hudson, Josiah Stephens, William Craghan, and Davis Floyd, constitute a board of directors to superintend the proposed works.

"*Resolved*, that Samuel Gwathney be appointed treasurer, pro tem to receive, disburse and account, under the orders of the board of directors, for all the monies which may be expended.

"*Resolved,* that the secretary communicate these proceedings to the absent associates and to such gentlemen as he may think proper.

"Which resolutions being severally adopted, the meeting adjourned (? nine).

"Attest, JAMES GLOVER, Sec

No. 1.

'WE the subscribers, having lived several years at the falls of the Ohio, and viewed with attention the

vast importance of a canal at this place, not only for the passage of boats, but for all kind of waterworks; and having viewed with attention the many projects of foreigners as well as citizens, do give it as our opinion, that the project proposed by general Benjamin Hovey, is in our opinion, by far superior to any that we have heard heretofore proposed: under these impressions we have exerted ourselves to the utmost, to procure for him and his associates the *fee* of the soil,* necessary for carrying his proposed project into execution. We do not, therefore, hesitate to say, that if he gives us reasonable testimony, between this and the first day of June one thousand eight hundred and five, that this great and important object will be, by him and his associates, commenced and progressing, as fast as reason and economy shall dictate, we will do every thing within our powers to aid his plan, and that between this time, and the said 1st day of June, 1805, we will not assist any other man, relative to this object.

"DAVID FLOYD,

"SAMUEL GWATHNEY.

"Jeffersonville, 15th September, 1804.

*Which has been done by subsequent contracts ready for your examination.

No. 2.

"LOUISVILLE, Oct. 1, 1804.

"As the removal of the obstacles to the navigation of the Ohio, would be one of the most valuable improvements, which could be effected in the United States, being at the falls I was naturally led to the consideration of this subject.

"The place pointed out by general Hovey, appears to me to posses advantages above any other which I have examined, either for canal navigation, or private enterprise in erecting mills of every kind; two natural ravines nearly meeting each other in contrary directions from shore and below the falls. I have no doubt that a canal for these important purposes would be practicable, as there is no appearance of rocks at the greatest depth of the ravines, and if rocks be found they cannot be much above the lowest water. From the consideration of the great number of boats and other craft constantly passing on the Ohio, and the immense quantity of them which must in future pass by this place (at present not without great difficulty and danger for more than three fourths of the year) I am of opinion that the opening of the navigation at this place, would be of the greatest advantage to the individuals concerned as well as the public.

"JARED MANSFIELD.

No. 3.

"WASHINGTON, 27th Nov. 1804.

"SIR,

"IN answer to your letter of this day I beg leave to observe, that having never been down the Ohio as far as the falls, I cannot form any opinion of the practicability, expense or incidental advantages of cutting a canal at that place. But I have no hesitation in saying, that the proposed work, if effected, will be of great public utility; and such is the immense amount of produce which necessarily must be taken to market that way, that, unless the obstacles to the undertaking shall be found much greater than is apprehended, there is, in my opinion, every reason to believe that the tolls on vessels and boats passing through the intended canal will afford adequate profits to its proprietors.

"I have the honor to be, with consideration,

"Sir, you obedient servant,

"ALBERT GALLATIN.

"GENERAL HOVEY.

No. 4.

"WASHINGTON, January 11th, 1805.

"SIR,

"I have received your letter of yesterday, covering a memorandum from Jared Mansfield, esq. surveyor general of the state of Ohio and the Indiana territory, on the subject of a canal to avoid the rapids of the Ohio river, and I am happy to find this most necessary and long expected __cration has attracted the enterprise of New England.

"I take pleasure in offering you my opinion on a question which has frequently occupied my attention, during nine years of active life in Kentucky, pending which period I had occasion to pass hundreds of boats over these rapids, subject to heavy losses of property, from the difficulties and uncertainty of the navigation.

"A canal with suitable locks being once opened at a moderate toll, I take it for granted no vessel will pass through the rapids; and those inundations which swell the river to an even surface, over the declivity they occupy, occur but seldom and then continue for a short time only; we may therefore safely calculate that four vessels out of five will pass by the canal.

"To speak freely of the ultimate advantages of such an establishment to the proprietors, unshackled by legal or political restraints, might expose one to suspicions of enthusiasm, since these advantages must keep pace with the population and improvements of the country above, watered by the Ohio and its countless tributaries, and who will undertake to number them, or to measure their extent? for if we compare the present settlements with the unimproved territory, we shall find them barely in embryo. The following single fact may

perhaps furnish you data on which to farm some satisfactory calculation. The first boat, charged with the produce of Kentucky, which descended the Mississippi to New Orleans, was owned and navigated by myself, and commenced her voyage in the month of May, 1787: compare the exports of that year with those of the last four, and you will discover an increase progressing with an almost incredible rapidity.

"But your profits will not be confined to this source; our improvidence with respect to our forests, and the destructive waste of timber, even in our oldest settlements, (the effects of habits which appear invincible) will at an early period discourage ship building on the Ohio, and finally will put an end not only to this mode of transport, but to that of flats or chalons which descent the stream never to return.

"How then will the products of the country be carried to market? Necessarily, as in other countries, by boats constructed for the purpose of plying between intermediate depots, and it is destined that the people of the Ohio are to be furnished by this chain of connection, with every weighty, brittle and bulky article of importation. This position may seem at first questionable, but the practicability of the communication has been ascertained by means early as the year 1789, by the ascent of a boat of fifteen tons burthen from the city of New Orleans to Frankfort on Kentucky river, and repeated voyages have been since made by others.

"The existing impediments are sufficient to frighten cursory observers, and to condemn the idea of a familiar, convenient and profitable communication from New Orleans to Louisville by water. A voyage of two thousand miles, with the same boat and crew, against a heavy current, appears sufficient to exhaust the strongest physical force, and to appall the most ardent enterprise; delays and extra-ordinary expenses are inseparable, and the necessity of taking on board your provisions for the voyage at New Orleans, diminishes your freight sensibly and reduces your profits. But when our expanding settlements have peopled the banks of the Mississippi to furnish refreshments to our barge men; when intermediate depots are established at suitable distances, and boats and crews are employed to ply between them, the obstacles which at present dismay strangers and travelers will vanish like the mists of morning, and the intercourse will become regular, prompt and expeditious.

"I am fully convinced, that the west bank of the Ohio is more favorable to the opening of a canal, to avoid the rapids, than the east bank; I speak from personal observation, and ground my opinions on the following facts, viz.

"1st. The distance will be shortened one third.

"2nd. The approximation of two deep ravines, the one discharging its waters into the Ohio, above the head of the rapids, and the other below the steepest fall, will aid the operation powerfully, and must save great labor and expense.

"3d. The approach to the head of a canal on the west side will be found more easy and safe than on the opposite bank, from the depth of the water and the placidity of the current.

"4th. A capacious basin, in which we find slack water, will receive the descending vessels at the foot of the canal and form a deep and secure harbor at all seasons, and

"5thly. The canal will furnish a constant and inexhaustible supply of water for machinery of every species; the ground is favorable to the erection of mills, furnaces or forges on a most extensive scale, and iron ore is to be found in its vicinity in vast abundance; nor will the pre-eminence of this spot, in point of locality and fitness for the grand emporium of internal commerce, be controverted; its position at the head of easy navigation, and its central relation to the most extensive, luxuriant and productive tract within the national limits, or perhaps in the universe, will, at the first glance, decide, that commercial enterprise is to find its way to this point from the ocean, and that here the primary exchange of products for imports is to take place.

"Should these crude ideas stimulate your exertions or promote your views in the smallest degree, my end will be answered, as I take a strong interest in whatever has a tendency to demonstrate nation spirit and personal enterprise, or to combine public utility with individual accommodation.

"With respect, I am,

"Sir, you obedient servant,

"JAMES WILKINSON.

"GENERAL BENJAMIN HOVEY.

No. 5

** To the honorable the Congress of the United States, the memorial of the subscriber on his own behalf and that of his associates,*

"HUMBLY SHEWETH,

"THAT your memorialist has formed an association for the laudable but laborious and expensive work of opening a passage from the head to the foot of the rapids of the Ohio river, by a canal and locks on the west side of said river, whereby the exports and imports of the most opulent, populous and thriving trans-montane settlements of the United States, may be facilitated and secured at all seasons of the year.

"That an undertaking of such magnitude, at a point so remote, where labor produces the highest prize, will expose your memorialist to extraordinary and unusual expences, which in the outset may baffle all correct calculation.

"That the work contemplated, in which your memorialist and his associates are about to hazard their fortunes, when substantially completed, will increase the value not only of the lands immediately adjacent, but the whole extensive region, watered by the Ohio river and its innumerable tributary streams.

"That by this operation of your memorialist the demands for the public lands will be accelerated, population will be invited, and the national revenues will be increased.

"That your memorialist being convinced, that the enterprize in which he has embarked, must sensibly enhance the value of the national domains, is emboldened to approach your honorable body, in the ground of reciprocity, and to solicit from the government of the United States, such protection as may give effect to the undertaking, and secure the great objects to which it is directed.

"He therefore prays the co-operation of your honoralbe body, for securing to him and his associates, after they shall have completed the canal, on which they are about to commence working, a grant of twenty-five thousand acres of land, within the Indiana territory, or a pre-emption to one hundred thousand acres within the said territory, or otherwise that you may be pleased to aid and assist him and his associates, in such manner and to such extent, as may give encouragement to the views herein submitted to your consideration.

"And your memorialist as in duty bound will ever pray.

"BENJAMIN HOVEY,
"For himslef and his associates.

"Washington, January 17th, 1804.

No. 6

WASHINGTON, January 19th, 1805.

"GENTLEMEN,

"THERE are some words in the petition of the subscriber, in behalf of himself and his associates, which has been referred to your consideration by the senate of the United States, which are capable of misconstruction.

"The petition asks for a pre-emption, without location, limits or condition, which would subject the petitioners to the usual terms of payment, and to take the whole tract in a body; which will defeat what congress must intend, if they see fit to grant relief by the location.

"Such an unqualified grant would destroy the views of the petitioners; because individuals are selling lands in that country, of equal goodness, for a lower price than the rate established by the acts of congress on that subject.

"If, therefore, congress intends to give us aid by pre-emption only it is respectfully submitted whether it ought not to be by enabling us to divide our right into several parts, and that before all the best of the lands are sold, with the remittance of part of either principal or interest, and on longer than usual credit, because it is to be expected, that by the time our canal is done our funds will be exhausted, and if even then we were obliged to sell those lands for cash, or on a short credit, it will still defeat the object,

"The earliest opportunity, therefore, gentlemen, which your convenience will permit us to prove to you the natural advantages that the north side posses over the other side of the river, as it respects the utility of the canal, as well as the benefits that may accrue to the United States by the building of vessels fit for sea, above the falls of the said river, and other matters relating thereto, which are too tedious to detail in a petition, will be acknowledged by,

"Gentlemen,

"Your most obedient and very humble servant,
"BENJAMIN HOVEY,
"In behalf of himself and his associates.

"The honorable Jonathan Dayton.

No. 7.

"IN SENATE OF THE UNITED STATES,
"January 28th, 1805.

"GENERAL DAYTON, from the committee* to whom was referred the memorial of Benjamin Hovey, in behalf of himself and his associates, reported, that it appears from the representation of the said memorialists, that they have formed an association for commencing, and so far as in their power, for completing a work of no less magnitude than that of opening a passage for vessels of burthen, from the head to the foot of the rapids of the Ohio river, by a canal and locks on the west side thereof; and their prayer is, that congress would be pleased to afford them such aid and encouragement as may be deemed commensurate to the undertaking, either by a donation of twenty-five thousand acres of land, or the privilege of a right of pre-emption to one hundred thousand acres, to be located in four several tracts within the Indiana territory, at the same prices for which the other lands of the United States are sold, but upon more liberal terms of credit, & without demand of interest. Your committee, all of whom have personally visited and paid some attention formerly to this difficult and dangerous part of the navigation of the Ohio, impressed with a belief of the practicability of the undertaking, of its vast benefit and importance to our whole country, especially to that part of it which is connected with the western waters, and that it must necessarily enhance the value and greatly increase the sales of the public lands, feel no hesitation in recommending a compliance with the request of the

memorialists, by either making to them a gratuitous donation, or granting a right of pre-emption on the terms and to the extent prayed for. As, however, these associates, although believed to be highly respectable in point of numbers, character and property, have not yet been regularly organized and incorporated, your committee forbear to offer any specific proposition upon the subject as the foundation of an act of the legislature, believing that such a measure would be premature and improper, until those necessary preliminary steps have been taken "Attest,

"SAMUEL A. OTIS, Secretary

"*Committee--General Dayton, Senator from New Jersey; Mr. John Smith, do. Ohio; Mr. Brown, do. Kentucky

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Editor's note: Here ends the phamplet that was being circulated by those favoring a canal on the Indiana side of the Falls of the Ohio. The surveyor Jared Brooks continues with his presentation of his survey and map.

General Hovey says, "when I first viewed the Rapids of the Ohio, it was my object to open a canal on the side of Louisville; but on examination, I discovered such advantages on the opposite side, that I at once decided in favor of it." As nature has not given a single advantage to the opposite, over the side of Louisville, 'tis presumed, that those advantages which he discovered so suddenly will as suddenly disappear, upon the refusal of Government to grant his petition.

In document No. 2. of the pamphlet, it is mentioned, "the place pointed out by General Hovey, appears to me to possess advantages above any other which I have examined." It is presumed therefore, that he had not examined the side of Kentucky.

In document No. 4, it is observed, "the West bank of the Ohio is more favorable to the opening of a canal, to avoid the Rapids, than the East bank." -- Further, "the approximation of two deep ravines, the one discharging its waters into the Ohio, above the head of the Rapids, and the other below the *steepest fall,* will aid the operation powerfully, and must save great labor and expense." One of those ravines here mentioned, can be no other than Cane Run; and not the ravine remarked in document No. 2, which avoids the whole Falls.

To talk of avoiding the Falls by a canal on the route of Cane Run, is as inconsistent, as to talk or saving a boatman's life, by drowning him below the steepest fall.

It is also asserted, that on the West bank "the distance will be shortened by one third."

From a statement so lame and inaccurate, and the bad shifts made use of to comprise something in the pamphlet of communication, recommendatory of the West side, as the petitioner improperly calls it; it may be concluded, that neither the petitioner, nor his associates, had ever properly examined the ground on either side of the river, or determined on any route for a canal. This also is evident from document No. 6. where it is observed, "the earliest opportunity, therefore, Gentlemen, which your convenience will permit us to prove to you the natural advantages that the North side possesses over the other side of the river, as respects the utility of the canal," &c.

Those incorrect statements being backed by reports industriously circulated, might induce a person who had not seen the ground, to believe, that nature has already completed half the work, at least, on the North side--may be she has--I cannot assert the contrary, not knowing where she began; but I well know where she ended, as if sick of the job, and can safely asset, that she had left a very handsome configuration for the amusement of those, who may undertake to do the rest.

Those boasted ravines, by which the Falls can be avoided, can be no other than Mill Creek, and a short ravine above Jeffersonville--The approximation of those ravines is denied; their heads cannot be brought to a given point, without cutting nearly a mile through a high land of ridges and swamps.

The upper ravine is not more than seven hundred and twenty yards in length, and is unintitled to the term ravine, more than half that length, near its mouth, the looseness of the ground has suffered it to wash deep--this being only a rain-branch, is dry, except in wet seasons.

Mill Creek, after leaving an extensive, high, swampy wilderness, meanders through a broken country, in a circuitous route, and falls into the Ohio at the foot of the Rapids. Some distance back from the mouth of Mill Creek, the bank is about 50 feet high; but near its mouth, the ground is low, and is washed through as low as the bed of the river; and immediately off the creek's mouth, are large sand bars, which vary their forms in every fresh; one fills the whole of that bend in the shore below.

A canal on the North side, must necessarily commence as high as the ravine immediately above Jeffersonville, to avoid in some measure, the dangerous draught of the Indian chute; and the grand purpose of a canal cannot be effected, unless it avoids the whole Falls--therefore, it should not enter the Ohio above Mill Creek, which is a part of the most eligible route for a canal on the North side, although the distance by availing of the advantage of the lowest ground, cannot fall short of three and a half miles.

A route down Cane Run, into the basin between D and E, has been proposed. The rate of the current past that place, is thirteen and a half miles an hour, ("slack water,") below it is the most tremendous and dangerous cataract of the whole Rapids, and such a canal would escape but little more than half the Falls.

A route branching from that of Cane Run,

through a high land of at least 60 feet to the basin below, E, has been contemplated. That route would escape the great cataract, but not the Rapids by half a mile. A part of this basin is an eddy at certain stages of the water, past which, the current is greater than nine and a half miles an hour; which shoots against those cliffs, which bind the whole of that projecting shore of the East end of Clarksville: except in the time of low water, when a reef projecting from beneath those cliffs, obstructs the passage of a very narrow channel, close under the North of Rock Island.

I leave it to those, who may please to consider the difficulty of ascending past that range of battered cliffs, and gaining the foot of a canal in that basin; and whether a laden boat, such as are used to descend the Ohio, can be taken from that basin, and escape those cliffs; the current allowing less than two minutes of time--Further, all ascending boats must cross from Shippingport channel, which will be no small task, if not at certain stages of water, utterly impossible.

From far above the ravine, near Jeffersonville, to opposite the bend of the front of that town, is one high bank of loose ground, which is washed by the Ohio, as steep as it will stand. From that bend to near point D, are a first and second banks of most delightful form and situation--At D, the high land closes upon the river with a steep bank, which recedes not materially, until near Silver Creek.

A long stretch of the shore above C, and somewhat below, is a high ledge of rock.

From D to Cane Run, the shore is formed of irregular piles of rock, of abrupt descent into deep water--From Cane Run to I, is a rock beach, high over which, the rock shoots from the bank in various forms--From I to that prominence of the East end of Clarksville, the bank recedes a little, and leaves a low, uneven ground.

The whole of that prominence is supported by a high shelving rock, upwards of 300 yards in length, by which the whole force of the Rapids is rebutted.

C.

From Mill Creek to Silver Creek, the bank is washed like that of Jeffersonville.

Should the rock continue its surface through the ground of the contemplated canal, at the height it flows from the bank; and that it does, I see no reason to doubt; the bulk to be excavated in forming a canal, would be immense.

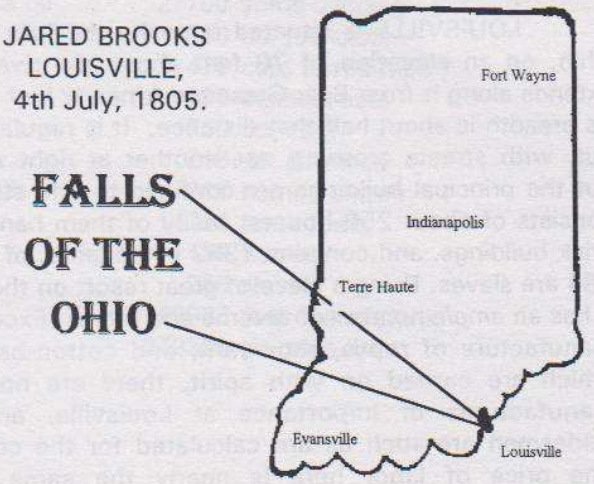
Rock is essentially necessary at the head and foot of a canal; if not naturally there, it must be put there; but there, a loose sand and gravel lies a few feet below the surface, and continues to the depth of forty feet; and may be much farther; agreeable to the well marked on the map. That well when thirty-five feet deep, went dry in time of low water in the Ohio; it was then sunk to forty feet, and received two feet water; consequently, that well may be supposed to be supplied from the Ohio, through the loose gravel--as the well is not by far, in the highest ground, the average depth of a canal from that place, whatever route, cannot fall for short of forty feet, although some of the ground is low.

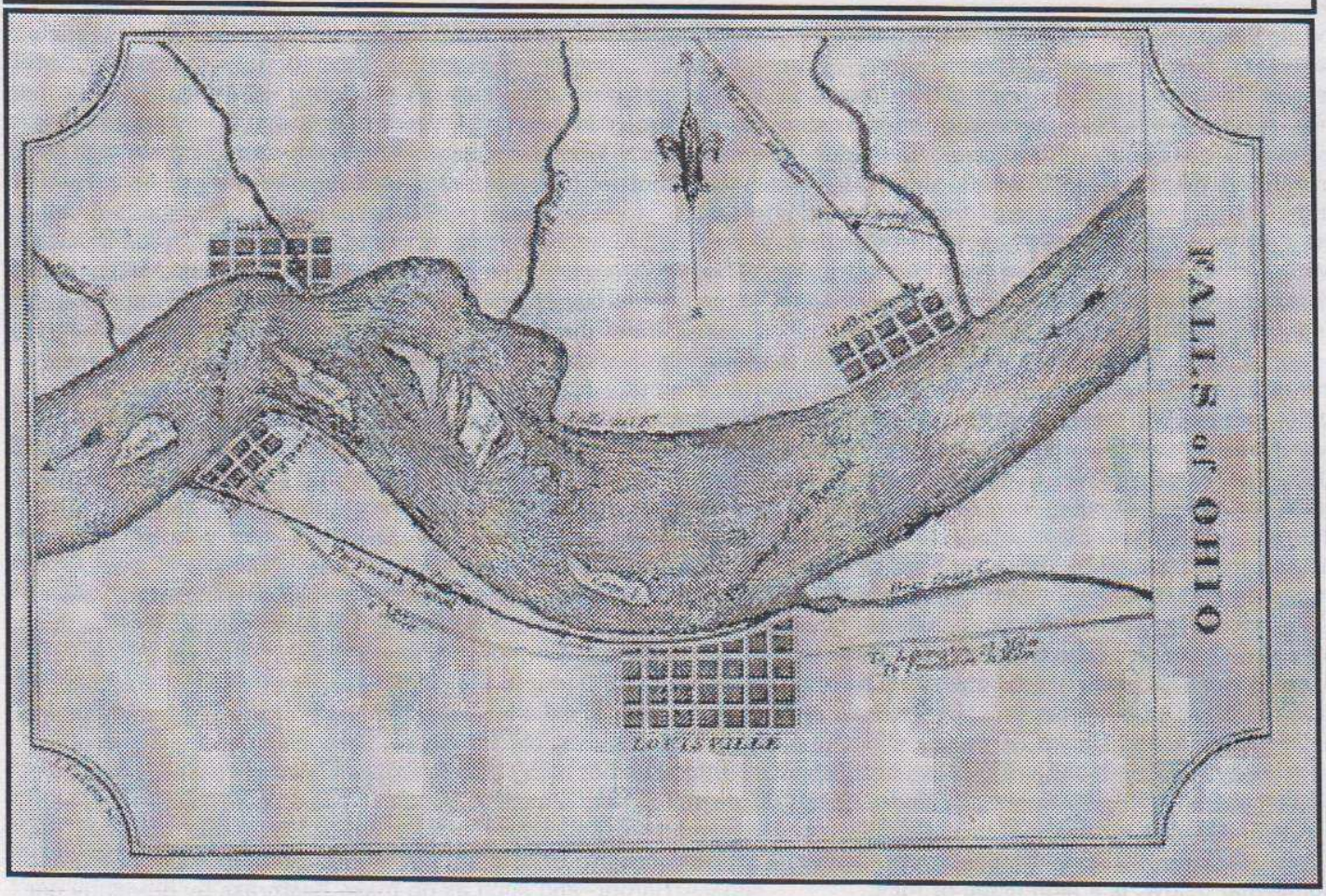
The bank between the point at D and Mill Creek, is broken with many chasms, through which the ravines discharge their waters.--Those ravines and their numerous branches, wind among the high ridges, and render the face of the country back from the river, very broken: a canal must necessarily intersect those ravines,--and I leave it to others to consider the difficulty of dispersing the immense bodies of water collected by them from so wide a country as they possess. Those torrents would assail the works irregularly, not only in wet seasons, but in every shower of rain, and bring down with them all the filth and rubbish of the wilderness that falls in their way.

The difficulty of forming, keeping open and in order, a suitable harbor, at the head of the canal, in that bold sandy shore above Jeffersonville, would be very great. During a considerable part of the cold seasons, a sheet of ice adheres to the shore of the river, and renders it inaccessible for boats. This being the case, and the boat not being able to enter the narrow passage designed for her, should it be even possible to keep one open; there could be hardly a possibility of her escaping the draught of the Indian chute, and gaining Beargrass Harbor--and such as do make Beargrass by prudently not venturing too near the Indiana shore at this critical place, cannot afterwards be benefited by a canal on the North side.

In fact, so many powerful obstacles, to the undertaking to complete a canal navigation on the North side, present themselves to the mind in rapid succession, that they appear insurmountable, and baffle all correct calculations of the expense of money, and time necessary to the undertaking---therefore, to the pre-eminence of the side of Kentucky, all competition must yield, however might may be the struggle of speculation.

JARED BROOKS
LOUISVILLE,
4th July, 1805.





FALLS OF THE OHIO

As we approach the time for the CSI tour "Overcoming Obstacles" at the Falls of the Ohio on October 1-3, 2004, a book written in 1812 sheds light on what was happening in the area. We thank the University of Chicago Library for the one time use of Melish, John. **Travels in the United States of America, in the years 1806 & 1807, and 1809, 1810, & 1811.** Philadelphia, PA: Thomas & George Palmer. 1812. Chapter XVII.

Louisville, Jeffersonvillle, Clarksville, Falls of the Ohio

LOUISVILLE is situated opposite the falls of the Ohio, on an elevation of 70 feet above the river, and extends along it from Bear Grass creek nearly half a mile. Its breadth is about half that distance. It is regularly laid out, with streets crossing one another at right angles; but the principal buildings are confined to one street. It consists of about 250 houses, many of them handsome brick buildings, and contains 1357 inhabitants, of whom 484 are slaves. Being a place of great resort on the river, it has an *ample* number of taverns and stores. Except the manufacture of ropes, rope-yarn, and cotton-bagging, which are carried on with spirit, there are no other manufactures of importance at Louisville, and the tradesmen are such as are calculated for the country. The price of labor here is nearly the same as at Cincinnati. Some articles of provision are dearer, this being a more convenient port for shipping than any above it. When I was there, flour sold for 5 dollars 50 cents per barrel; meal 50 cents per cwt. Boarding was from 1 dollar 25 cents to 2 dollars per week.

Louisville, being the principal port of the western part of the state of Kentucky, is a market for the purchase of all kinds of produce, and the quantity that is annually shipped down the river is immense. A few of the articles, with the prices at the time that I was there, may be noticed. Flour and meal have been quoted. Wheat was 62½ cents per bushel; corn 50; rye 42; oats 25; hemp 4 dollars 50 cents per cwt.; tobacco 2 dollars. Horses 25 to 100 dollars; *negroes* about 400 dollars; cotton bagging 31¼ cents per yard.

As to the state of society I cannot say much. The place is composed of people from all quarters, who are principally engaged in commerce; and a great number of the traders on the Ohio are constantly at this place, whose example will be nothing in favor of the young; and slavery is against society every where. There are several schools, but none of them are under public patronage; and education seems to be but indifferently attended to. Upon the whole, I must say, that the state of public morals admits of considerable improvement here; but,

indeed, I saw Louisville at a season, when a number of the most respectable people were out of the place. Those with whom I had business were gentlemen, and I hope there are a sufficient number of them to check the progress of *gaming* and *drinking*, and to teach the young and the thoughtless, that mankind, without virtue and industry, cannot be happy.

JEFFERSONVILLE is situated on the opposite side of the river, a little above Louisville, and is the capital of Clark county, in the Indiana territory. It was laid out in 1802; and now contains about 200 inhabitants, among whom are some useful mechanics. The United States have a land office at this place, but the principal objects of my inquiry being more to the eastward, I did not visit it. There is a good landing at Jeffersonville, and, as the best passage is through what is called the Indian Shute (Chute), it is probable that this place will materially interfere with the travel of Louisville, unless it be prevented by a plan to be hereafter noticed, in which case, each side will have its own share of the valuable commerce of this river; which, as it is yearly increasing, cannot fail to convert both sides of the Ohio here into great settlements.

CLARKSVILLE, a small village, is situated at the foot of the falls on the Indiana side, as is SHIPPINGPORT, on the Kentucky side; and both answer for re-shipping produce after vessels pass the falls.

THE FALLS, or rather RAPIDS OF THE OHIO, are occasioned by a ledge of rocks, which stretches quite across the river; and through which it has forced a passage by several channels. The descent is only 22 feet in the course of two miles, and in high water is only to be perceived in the increased velocity of the current, when the largest vessels pass over it in safety. When I was there, the water was low, and I observed three different passages, of which that on the Indiana side, called Indian Shute (Chute), is said to be the best; the middle one next best; the one on the Kentucky side cannot be passed, except when the water is pretty full. But when the water is very low, they are all attended with danger, less or more, of which we saw an instance in a boat that came down the river along with us. Her cargo was unloaded at Louisville, and she proceeded down the river; but, on taking the stream, she struck on the rocks, and lay there a wreck, when I came away. Good pilots have been appointed to carry vessels over the falls.

On visiting this place, a question immediately occurs: Why is a canal not cut here, which would remove the only obstruction to the trade of this fine

Commerce of the Ohio from November 24th, 1810, to January 24th, 1811.

In these two months 197 flat-boats, and 14 keel-boats, descended the falls of the Ohio, carrying the following items. Also, a large quantity of potter's ware, iron-mongery, cabinet-work, shoes, boots, and saddlery; the amount of which could not be correctly ascertained.The following table, exhibiting the commerce on the Ohio, is extracted from the Pittsburgh Navigator, and shows the importance of this place, and the vast utility of a canal.

18611 bls. flour	200 groce bottled porter	20784 do. bale-rope
520 do. pork	260 gallons Seneca oil	27700 yards bagging
2373 do. whisky	1526 lbs. butter	4619 do. tow-cloth
3759 do. apples	180 do. tallow	479 coils tarred rope
1085 do, cyder (cider)	64750 do. lard	500 bushels oats
721 do. do. royal	6300 do. beef	1700 do. corn
43 do. do. wine	4433 do. cheese	216 do. potatoes
323 do. peach-brandy	681900 lbs. pork in bulk	817 hams venison
46 do. cherry-bounce	4609 do. bacon	14390 tame fowls
17 do. vinegar	59 lbs. soap	155 horses
143 do. porter	300 do. feathers	286 slaves
62 do. beans	400 do. hemp	18000 feet cherry plank
67 do. onions	1484 do. thread	279300 do. pine do.
20 do. ginseng	154000 do. rope-yarn	

river? It appears that the subject has been long in contemplation, and a company was incorporated by the legislature of Kentucky to carry it into effect. The ground has been surveyed, and no impediment has been suggested to the execution of the plan, except that there is a danger of the locks being injured by the freshets in the river, which, however, can be guarded against. But sufficient funds have not yet been raised, and it is said that an opinion prevails here, that the execution of a canal would hurt the trade of Louisville. As to funds, there should be no lack, for this is an object of *national utility,* in which the rich states of Kentucky, Virginia, Pennsylvania and Ohio are particularly interested. No very great sum can be wanted to cut a canal, with only 22 feet fall, the distance of two miles, in a situation where stones are plenty; and if it is found the individuals would not wish to embark their capital in it, there is no question but the United States, and the individual states notices, would fill up the subscription, were the matter judiciously laid before them. As to the supposition that it would hurt the trade of Louisville, if it exists, it is founded on very narrow policy, and is just as correct an idea, as that a good turnpike road leading through a town, will hurt the trade of that town. A free communication through a country is favorable to every portion of that country; and were a canal cut upon the Kentucky side here, it would not only counterbalance the benefit arising to the other side from the Indian Shute (Chute), but would be productive of advantages to Louisville, that at present cannot be estimated. The mills along that might be erected, and set in motion, by a judicious application of the water, would be of more intrinsic value than a gold mine.

The country round Louisville is rich, but it is not well drained nor cultivated, and is consequently subject to fever and ague in the fall. There are a great many ponds in the neighborhood of the town; at one of them I observed a rope-walk erecting, and the people were draining the pond, by sinking a deep well, and letting the water run into it, which answered the purpose remarkably well. It would appear hence, that the water filtrates to the river below ground, and perhaps this plan might be generally adopted. I am persuaded that nothing but draining is wanted to render Louisville quite healthy, and one of the most agreeable situation on the Ohio river.

REPORT OF THE COMMITTEE APPOINTED ON THE TENTH ULTIMO, ON THE MEMORIAL OF THE LEGISLATURE OF KENTUCKY

MARCH 19, 1806

Read, and referred to the committee of the whole House, to whom was committed, on the 5th instant, the report of a select committee, on the petition of the president and directors of the Chesapeake and Delaware canal company.

CITY OF WASHINGTON:
A. & G. WAY, PRINTERS.
1806

REPORT

The committee, to whom was referred the memorial of the legislature of Kentucky, soliciting the co-operation and aid of the United States in opening a canal to avoid the rapids of the river Ohio,

REPORT.....

THAT of the practicability of opening the proposed canal, and of its preference to one contemplated on the opposite side of the river, as well on account of the greater facility of its accomplishment, as of the superior advantages that would result to the navigation of the river when accomplished, may, in the opinion of the committee, be correctly estimated by reference to a draught of part of the river, and notes explanatory thereof, which accompany the memorial. Of the immense utility of the proposed canal no one can doubt who reflects for a moment upon the vast extent of fertile country which is watered by the Ohio and its tributary streams, and upon the incalculable amount of produce which must, of course, necessarily find its way to market by descending that river, and encountering the danger and difficulties of passing its rapids. But besides the general advantages which would result from the completion of the proposed canal, it is, in the opinion of the committee, particularly interesting to the United States, inasmuch as it would greatly enhance the value of the public lands north west of the Ohio. There can be but little doubt that by the additional value it would give to the public lands, the United States would be more than remunerated for the aid which the legislature of Kentucky have solicited.

From these considerations the committee would not hesitate to recommend a donation, or subscription of shares, to the amount contemplated by the law of the legislature of Kentucky incorporating the Ohio canal company, if they believed the state of the public finances were such as to justify it. But from the applications already made for aid in opening canals, it is probable that if the United States enter upon expenses of this kind, those expenses cannot be inconsiderable. And as the revenue of the United States is already pledged, almost to the full amount, for purposes, thought not more useful, yet more urgent, the committee are induced to submit the following resolution:

Resolved, That is is inexpedient to grant, at present, the aid solicited by the legislature of Kentucky in opening a canal to avoid the rapids of the Ohio.

BILLS RELATING TO THE FALLS OF THE OHIO CANAL

32d. CONGRESS
1st SESSION

H.R. 311. [Report No. 166.]

AUGUST 2, 1852

Read twice, and committed to the Committee of the Whole House on the state of the Union

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Mr. BENJAMIN STANTON, from the Committee on Roads and Canals, reported the following bill:

A BILL

To provide for the construction of a steamboat canal around the falls of the Ohio river, for the enlargement of the Louisville and Portland canal, and for the extinguishment of the stock of the private stockholders in the Louisville and Portland canal company.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there be and hereby is appropriated the sum of five hundred thousand dollars, to be paid out of any money in the treasury not otherwise appropriated, for the construction of a steamboat canal on the Indiana side of the Ohio river, around the falls of said river at Louisville, for the enlargement of the Louisville and Portland canal on the Kentucky side of the Ohio river, and for the extinguishment of the stock of the individual stockholders in the Louisville and Portland canal company, to be expended under the direction of the President of the United States in the manner hereinafter provided.

SECT.2. ***and be it further enacted,*** That the sum of three hundred and fifty thousand dollars of the money hereby appropriated, shall be applied to the construction of a canal on the most eligible route on the Indiana side of the falls of the Ohio river, capable of admitting boats and vessels four hundred feet long and ninety feet wide: ***Provided,*** The consent of the legislature of the State of Indiana shall first be obtained for the laying and making of said canal: ***And provided further,*** That the State of Indiana shall procure or cause to be procured from the owners of real estate on the line of said canal, without charge to the United States, a release of the right of constructing and opening said canal without let or hindrance, and also a surrender from the Indiana canal company, of all its corporate rights and franchises granted by the legislature of the State of Indiana on the _____to the United States, before the commencement of said work.

SECT. 3. ***And be it further enacted,*** That the sum of one hundred thousand dollars of the money hereby appropriated, shall be applied to the enlargement of the Louisville and Portland canal, so as to admit vessels of the same dimensions that is provided for on the Indiana side of the river, in the second section of this act: ***Provided,*** That the enlargement of said canal shall not be so prosecuted as at any time to obstruct the passage of boats or vessels of any description through said canal, until the completion of the canal on the Indiana side of the river: ***And provided further,*** That the enlargement of said canal shall not be commenced until the president and directors of the Louisville and Portland canal company, on behalf of the stockholders of said company shall file with the Secretary of the Treasury a release and surrender of their charter, and of all their corporate rights and franchises to the United States, to take effect upon the extinguishment of all the stock of the individual stockholders in the manner provided in this act.

SECT. 4. ***And be it further enacted,*** That the sum of fifty thousand dollars of the money hereby appropriated shall be applied to the purchase of any balance of stock that may be outstanding in the hands of individual stockholders in the Louisville and Portland canal company, at the time of the completion of the canal on the Indiana side of the river, to be paid for at its market value at the time of its purchase; and until the completion of the canal on the Indiana side of the river, the same tolls may be charged by said company that are now authorized by law, which shall be applied to the extinguishment of the stock owned by private stockholders, in the manner provided for by existing laws.

SECT. 5. ***And be it further enacted,*** That after the completion of the canal on the Indiana side of the river, no other or higher tolls shall be charged upon vessels passing through the same, than may be necessary for its continued and efficient operation and the keeping the same in thorough repair; and the same restrictions and regulations shall also govern the amount and rates of tolls which shall be charged on the Louisville and Portland canal after the private stock owned in said canal shall be extinguished.

33d CONGRESS
2d SESSION

S. 689

IN THE SENATE OF THE UNITED STATES,
FEBRUARY 26, 1855.

Mr. SLIDELL, from the Committee on Roads and Canals, submitted a report, (No. 545,) accompanied by the following bill; which was read and passed to a second reading.

A BILL

For the relinquishment of the State of Kentucky of the stock held by the United States in the Louisville and Portland Canal Company, with a view of making the canal free; and for the construction of a public canal for the use of the army and navy, trade, travel, commerce, and passage of the mails on the Indiana side of the Falls of the Ohio, and for other purposes.

Whereas, the legislature of the State of Kentucky did, by their act of the twenty-first February, eighteen hundred and forty-two, authorize the directors of the Louisville and Portland Canal Company, with the approbation of the stockholders, to appropriate the net income of the company in purchasing up the shares other than those owned by the United States, on certain terms and conditions until the whole were purchased, when they were to be transferred to the United States, on condition that the latter in future should levy tolls for the use of said canal only sufficient to keep the same in repair, to pay all necessary superintendence, custody, and expenses, and make all necessary improvements; and whereas it will be more consistent with the powers reserved to the individual States, that the State of Kentucky should exercise over the Louisville and Portland canal, located within its territorial jurisdiction, the powers which is legislature were willing should be exercised by the United States; and whereas Congress desires to aid that State in extinguishing all the stock, and in making the canal as free to commerce as practicable, and are willing to cancel and relinquish all the stock in that company held by the United States, but decline levying tolls or other charges or assuming any permanent local jurisdiction within a State of the nature proposed, or for purposed not expressly warranted by the Constitution, therefore—

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That upon the production of satisfactory evidence to the Secretary of the Treasury, that the stock in the Louisville and Portland Canal Company, and in the dry dock connected therewith, held by individuals, and all stock therein other than that held by the United States, has been extinguished under the operation of the act of the legislature of Kentucky on the twenty-first February, eighteen hundred and forty-two, so that no other interest or impediment shall exist to the annulment or surrender of the charter of that company by the president and directors thereof than the stock and interest held by the United States, then the said Secretary of the Treasury be, and he hereby is, authorized to cancel and surrender to the authorities of the State of Kentucky all the certificates or evidences of interest or stock held in the said company by the United States, for the encouragement and advantages of commerce among the several States, and to provide for the common defence and general welfare: ***Provided,*** That the legislature of the State of Kentucky shall assume the management, care, custody, and control of the said canal and dry dock and other property now belonging to the said canal company, upon the conditions that the said canal and appendages shall be kept in a good state of preservation and repair; that impartial, just, and general regulations shall be made for the use of the said canal, dry dock and their appendages, for the greatest accommodation and convenience of vessels for trade, travel, and commerce passing through the same; and that no higher or other tolls, taxes, or charges shall be made upon boats and vessels passing through or using the same than may be sufficient to keep the said canal, dry dock and appendages and other property in a good state of preservation and repair, and to defray all the expenses incident to the proper management, care, custody, and control of the said canal, dry dock, and the entire establishment; ***And provided, also,*** That all vessels and troops in the service on the United States, ordnance, arms and munitions of war, the public mails, and all other property belonging to the United States, shall at all times pass though the said canal, and use the docks, harbors, and other appendages of the same, free from all taxes, tolls, or any other charge whatsoever.

SEC. 2. ***And be it further enacted,*** That whenever the State of Indiana, by the duly constitutes authorities thereof, shall assent to the examination, survey, and location for an armory and foundry, in connexion with a public canal and site for water power, by a Board of three officers to be selected by the President of the United States, one from the corps of topographical engineers, and one from the ordnance department, and one civil engineer; the said board shall proceed fully to examine the banks, shores, and country in the vicinity of the falls of the Ohio river, and locate, in the first place, the best site, under all circumstances, for a canal and dry dock of ample dimensions to admit of the passage of the largest vessels capable of navigating the Ohio river above the Falls, the lower terminus of said canal to be fixed at the most eligible site for the

application of the water-power to be furnished by said canal to the machinery of a manufacturing armory and foundry; and, secondly, to locate the best site for such manufacturing armory and foundry, and arsenal or depot for ordnance and arms, in the most convenient position for the application of water-power of the canal to machinery, and for receiving materials from, and for placing the ordnance and arms on board of vessels for transportation, and in a position beyond the reach of the floods of the river; and when the said locations shall have been made, and approved by the President of the United States, four complete plats and descriptive returns thereof shall be made and attested by the said board of officers; one of each of which shall be delivered to the governor of the State of Indiana; one of each to be deposited and recorded in the office of land records for the county of _____, in that State, and one of each to be deposited in the Topographical Bureau and ordnance departments, respectively.

SEC. 3. ***And be it further enacted, That*** when the duties required by the second section of this act shall have been performed, and the State of Indiana shall have ceded to the United States, in perpetuity, the right of soil and exclusive jurisdiction in and over the entire sites and parcels of land so located and described, the President of the United States shall assign two of the best qualified engineer officers to direct and superintend the construction of the said canal and entire establishment, as described in the first section of this act, who shall proceed to the construction of the said canal and dry dock in the most substantial manner, and of dimensions capable of admitting the convenient passage of the largest vessels that can conveniently navigate the Ohio river above the falls, with ample locks, harbors, booms, and passing places, all well secured against the violence of the high water of the river, with the construction and improvement of a sluice channel in the lower part of the Falls, would the same be necessary, as a part of the improvement; and, for the purpose of carrying this act into effect, the sum of five hundred thousand dollars be, and the same hereby is, appropriated out of any money in the treasury not otherwise appropriated.

SEC. 4. ***And be it further enacted, T***hat the said Board of Officers shall prepare a detailed and full estimate of the cost of constructing the said armory, foundry, and depot, with the machinery, together with every other cost for carrying this act into effect to be communicated to Congress during the next ensuing session thereof.

SEC. 5. ***And be it further enacted, T***hat when the said public canal and appendages hereinbefore described shall have been completed, or placed in a condition to admit of the use and passage of vessels through the same, the said public canal, dry docks, locks, harbors, booms, sluice channel, and passing places, shall be and remain free to the use and passage through the same of boats and vessels of all descriptions, whether public or private, navigating the Ohio river, without any charge or toll whatsoever, under such impartial, just, and general regulations for the safety of such boats and vessels, passengers and freight, for the benefit of trade, travel, and commerce, and for the preservation of regularity, order, and the public convenience, as may, from time to time, be made by the Secretary of the Interior, and approved by the President of the United States.

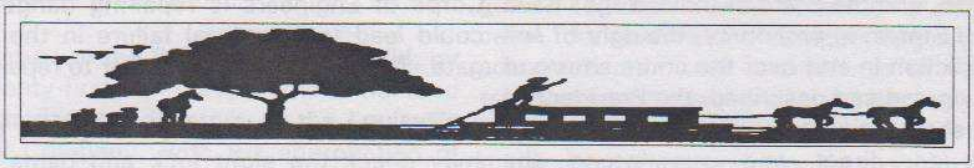
FALLS OF THE OHIO TODAY

The CSI-CSO "Falls Of The Ohio" tour this coming October 1-3, 2004 will see the McAlpine Lock and Dam that are located at Louisville, Kentucky. They pass boats around the rapids in the Ohio River. Locks were never built on the Indiana side. This August 9-22 all business on the Ohio River at Louisville will be halted while repairs are made on the lock and dam. The Army Corps of Engineers is repairing dangerous cracks that could lead to structural failure in the 40-year-old lock gate. It would take even longer to repair if it were to fail.

Although the corps only has enough funds to fully check the eight lock and dams in the Louisville district every five years, they periodically use divers to conduct checks. Often the divers' vision is impaired by the murky water and damage is hard to assess. The age of the structure, the stress on it and the low budget all contributed to its need for immediate repair. After consulting with industries involved and determining the best time to halt traffic, the proposed date of August 3-16 was moved back.

The Ohio River is a major transportation artery for barges loaded with coal, grain and petroleum. In 2001 over 55 million tons of freight passed through the McAlpine Locks. It was worth nearly $11.7 billion dollars.

The Louisville & Portand canal opened on December 22, 1830. By 1852 it was only large enough for 57 percent of the water craft. In 1874 the War Department help supervise navigation. In 1880 all tolls were released. In 1914 a lock numbering system was established on the river. This structure was Locks and Dam 41 on the river. In 1930 a combined navigation and hydroelectric development was completed as part of the canalization of the Ohio River by the United States. The name was officially changed on May 24, 1960, to McAlpine Locks and Dam to honor W. H. McAlpine, who was the Louisville District Engineer in 1917-1918. He was the only civilian employee in the Louisville District to hold this position since it was established in 1886.



LOUISVILLE AND PORTLAND CANAL CONSTRUCTION BEGAN IN 1826

Famous Canal Allowed Boats To Bypass Falls Of The Ohio River; Many Ancient Artifacts Were Found During Its Construction

Louisville Directory - About 1835

In 1804 the legislature of Kentucky incorporated a company to cut a canal around the falls. Nothing effectual, however, beyond surveys, was done until 1825. On January 12th of that year, the Louisville and Portland Canal Company was incorporated by an act of the legislature, with a capital of $600,000 in shares of $100 each, with perpetual succession. 3,665 of the shares of the company are in the hands of individuals; about 70 in number, residing in the following states: New Hampshire, Massachusetts, New York, Pennsylvania, Maryland, Ohio, Kentucky and Missouri; and 2,335 shares belonging to the government of the United States.

In December 1825 contracts were entered into to complete the work of this canal within two years, for about $387,000, and under these contracts the work was commenced in March 1826. Many unforeseen difficulties retarded the work until the close of the year 1828. When completed it cost about $750,000. Owing to the advanced season at which it was opened, the deposits of alluvial earth at the lower extremity of the canal, or debouchure, could not be removed. Also from the action of the floods during the succeeding severe winter on the stones that had been temporarily deposit on the sides of the canal, causing them to be precipitated into the canal, it was not used to the extent that it otherwise would have been. During the year 1831, 406 steamboats, 46 keelboats, and 357 flatboats, measuring 76,323 tons, passed through the locks; which are about one-fourth the number that would have passed if all the obstructions had been removed.

The Louisville and Portland Canal is about two miles in length and is intended for steamboats of the largest class and to overcome a fall of 24 feet, occasioned by an irregular ledge of limerock; through which the entire bed of the canal is excavated. A part of it to the depth of 12 feet is overlaid with earth. There is one guard and three lift locks combined, all of which have their foundation on the rock. One bridge is of stone 240 feet long, with an elevation of 68 feet to the top of the parapet wall, and three arches, the center one of which is semi-elliptical, with a transverse diameter of 66 feet, and a semi-conjugate diameter of 22 feet. The two side arches are segments of a 40-foot span. The solid contents of this lock are equal to 15 common locks, such as are built on the Ohio and New York canals. The lift locks are of the same width with the guard lock, 20 feet long in the clear, and contain 12,300 perches of masonwork. The entire length of the walls, from the head of the guard-lock to the

end of the outlet-lock is 912 feet. In addition to the amount of mason-work above, there are three culverts to drain off the water from the adjacent lands, the mason-work of which, when added to the locks and bridge, give the whole amount of mason-work 41,989 perches; equal to about 30 common canal locks. The cross section of the canal is 200 feet at top of banks, 50 feet at bottom, and 42 feet high, having a capacity equal to that of 25 common canals. If we keep in view the unequal quantity of mason-work compared to the length of the canal, the great difficulties of excavating earth and rock from so great a depth and width, together with the contingencies attending its construction from the fluctuation of the Ohio River, it may not be considered as extravagant in drawing the comparison between the work in this and in that of 70 or 75 miles of common canaling.

In the upper sections of the canal, the alluvial earth to the average depth of 20 feet being removed, trunks of trees were found more or less decayed, and so imbedded as indicate a powerful current toward the present shore, some of which were cedar, which are not now found in this region. Several fireplaces of a rude construction, with partially burnt wood were discovered near the rock, as well as the bones of a variety of small animals and several human skeletons. Rude implements formed of bone and stone were frequently seen, as also several well-wrought specimens of hematite or iron, in the shape of plummets or sinkers, displaying a knowledge in the arts far in advance of the present race of Indians.

The first stratum or rock was a light, friable slate, in close contact with the limestone and difficult to disengage from it. This slate did not, however, extend over the whole surface of the rock, and was of various thicknesses, from three inches to four feet.

The stratum next to the slate was a close, compact limestone, in which petrified shells and an infinite varied of coralline formations were imbedded and frequent cavities of crystalline incrustation were seen. Many still contained petroleum of highly fetid smell, which gives the name to this description of limestone. This description of rock is on an average of five feet, covering a substratum of a species of cias limestone of a bluish color, imbedding modules of hornstone and organic remains. The fracture of this stone has in all instances been found to be irregularly conchoidal, and on exposure to the atmosphere and subjection to fire, it crumbles to pieces. When burnt, ground, and mixed with a due proportion of silicious sand, it has been found to make a most superior kind of hydraulic cement or water-lime.

The discovery of this valuable limestone has enabled the canal company to construct their masonry more solidly than any other known in the United States.

A manufactory of this hydraulic cement or water-lime is now established on the bank of the canal, on a scale capable of supplying the United States with this much-valued material for all works in contract with water or exposed to moisture. The nature of this cement begins to harden in the water. The grout used on the locks of the canal is already harder than the stone used in their construction.

After passing through the stratum, which was commonly called the water-lime, about ten feet in thickness, the workmen came to a more compact mass of primitive gray limestone; which, however, was not penetrated to any great depth. In many parts of the excavation masses of a bluish-white flint and hornstone were found enclosed in, or incrusting the fetid limestone. From the large quantities of arrowheads, and other rude formations of this flintstone, it is evident that it was made much use of by the Indians in forming their weapons for war and hunting. In one place a magazine of arrowheads was discovered, containing many hundreds of these rude implements, carefully packed together, and buried below the surface of the ground.

The existence of iron ore in considerable quantities was exhibited in the progress of the excavation of the canal, by numerous highly-charged chalybeate springs that gushed out, and continued to flow during the time that the rock was exposed, chiefly in the upper strata of limestone.

Article sent to CSI headquarters by Jim Ellis