AMERICAN CANALS

BULLETIN OF
THE AMERICAN CANAL SOCIETY

BULLETIN NUMBER 73 Editorial Address—809 Rathton Road, York, Pa. 17403 **MAY 1990**

PRESIDENT'S MESSAGE

In Virginia we lost a friend, "Pete" Haxall, who died on March 26th at the age of 97. You saw him in our February 1978 issue, studying the remains of a Kanawha Canal freight boat. He was the expert on Kanawha Canal boats and lived long enough to complete his intended series of carefully researched canal boat models and to see them and his files safely placed in Richmond's Valentine Museum for future research and display. Everyone should be so lucky.

We who study canals are fortunate that so far the locks, lockhouse sites, and other features in canal corridors are rarely attacked by the relic hunters who loot sunken ships and Indian and Civil War sites. Our problems are primarily with mindless Civic Vandalism, called "progress," and the ravages of nature's floods and tree roots. It may not pay now to sell "relics" dug up from locks and canals, but it probably will someday, and in any case we need to do our bit to help discourage looting of archaeological sites of any kind. One way is to join the "Save the Past for the Future" anti-looting campaign begun by the Society for American Archaeology. For a brochure, write the SAA Office of Government Relations, Suite 400, 1333 Connecticut Ave. NW, Washington, DC 20036.

Lastly, just to put us in proper perspective, here's a shocking quote from a history of India by Victor Surridge, published about 1900: "The American Colonies, rebellious and disloyal, had declared their indendence, and fallen from Empire as a rotten branch from a tree."

Bill Trout

REVISED BOOK

William H. Shank, P.E. has recently re-issued portions of his *THREE HUNDRED YEARS WITH THE PENNSYLVANIA TRAVELER* under a new title: *PENNSYLVANIA TRANSPORTATION HISTORY* (A Supplement). The original has been out of print for a number of years. In the new Edition, Bill Shank has covered some of the subjects *not* included in his other books, such as: early river vessels, steamboats, inclined planes, gravity railroads, steam railroads, horse cars, cable cars, trolley cars, elevated lines, subways, and early airlines in the Keystone State. The book is a 8½" x 11" paperback, with 72 pages and four-color cover, selling for $8.00, plus $1 for shipping. Contact: American Canal and Transportation Center, 809 Rathton Road, York, Pa. 17403.

OLD CANAL BASIN NOW REJUVENATED AS SHAD-GROWING FACILITY

General view of the south end of the shad-holding pond (foreground) the pond-level control weir (center) and the restored tidewater lock and Museum in the background.

Havre de Grace, MD, May 1990 - C. Jay O'Dell, Special Projects Director for the Maryland Department of Natural Resources, has just announced completion of a project to convert the old canal basin on the Susquehanna and Tidewater Canal to a shad-growing facility. The project, which was begun in December of 1985, involves the Susquehanna Museum, the City of Havre de Grace, the Maryland Historical Trust and several State and Federal agencies concerned with the re-vitalization of the Susquehanna River.

The new shad-growing pond is entirely within the boundaries of the historic S. & T. Canal Basin and covers approximately 1-1/4 acres, 500 feet long by 100 feet wide. Water in the pond is maintained by two underground pumps supplying Susquehanna River water through six outlets at the north end. Pond depth is held at approximately 1-1/2 feet at the north to 5-feet close to the outlet spillway at the south end. Periodically, the young shad will be released to the Susquehanna River through the old Tidewater Lock located just south of the pond. This lock has been de-silted, missing blocks in the walls replaced, and all four of the old wooden mitre gates have been lifted out of the lock. The two lower gates are to be on display in their operating position on land, while the two upper gates have been buried in the bed of the lock.

Starting in June of 1990, the filled pond will be stocked with approximately 50,000 "larval shad",

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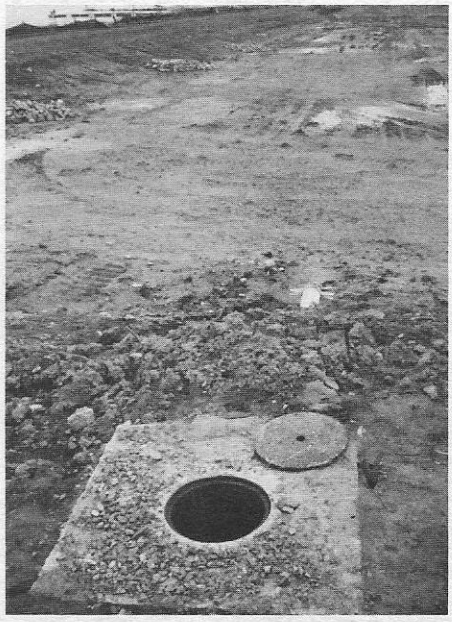

View from the north end of the shad-holding pond (formerly the S. & T. Canal Basin) with the water drawn down. Manhole to the underground pumping station is in the foreground. One of the water inlets to the pond is visible just beyond the manhole.

American Canals

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"DEDICATED TO HISTORIC CANAL RESEARCH, PRESERVATION AND PARKS"

AMERICAN CANALS is issued quarterly by the American Canal Society , Incorporated. Objectives of the Society are to encourage the preservation, restoration, interpretation and use of the historic navigational canals of the Americas; to save threatened canals; and to provide an exchange of canal information.

Annual subscription to "AMERICAN CANALS" is automatic with a minimum ACS dues payment of $12.00. Individual copies may be purchased at $3.00.

CANAL BASIN NOW GROWS SHAD

View from the top of the control weir, looking south into the tidelock of the S. & T. Canal, now cleaned out to almost its historic depth. Missing blocks from the sidewalls have been replaced and the walls reinforced.

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three-weeks old and 1/2" long, from the Van Dyke Hatchery at Thompsontown, Pa., and will be released (through the Lock) in October of 1990 when they have reached a length of two inches.

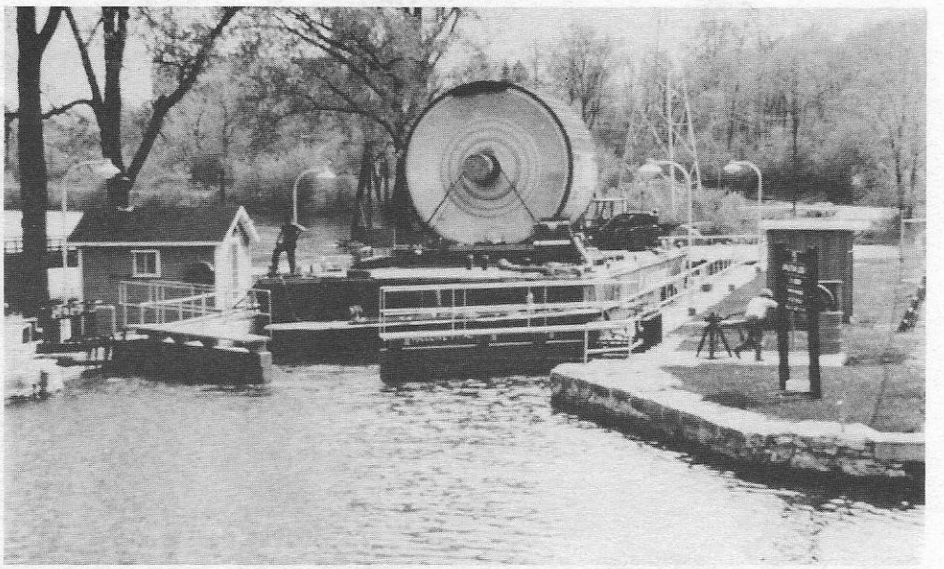
Jay O'Dell has the following comments: "The Project involves both history and biology. The two have been integrated into the project, with the full cooperation of the Susquehanna Museum and the City of Havre de Grace, the Maryland Historical Trust, and expert canal historians including William Shank. Qualified archeologists have been working with us in every construction phase of the project, so that archeological guidelines would be maintained. The City of Havre de Grace will provide general maintenance for the entire property, which will now include the Museum Building, the Tidewater Lock and the area around the canal basin pond, so that it will be an attractive site for visitors. The Susquehanna River Anadromous Fish Restoration Committee will watch the progress of the operation with interest, while the Special Projects Section of the Maryland Department of Natural Resources will be responsible for the stocking and release of the young shad to the River".

"Josiah White" Readied for Festival

The "Josiah White" canal boat, shown here on the Lehigh Canal with its "mule-power" and driver, will be one of featured attractions of the Hugh Moore Historical Park Canal Festival Saturday, July 7th, 1990 at Easton, Pennsylvania. The all-day entertainment includes canal-song "balladeers" on the boat; arts and craft shows, folk music, a polka band, a German band, "blue-grass" singers, food of all kinds and a Canal Boatmen's Reunion. For details phone the Hugh Moore Park Canal Museum at (215) 250-6700. (Photo by David T. Boyer)

FOX RIVER CRISIS

by David F. Ross, Chairman
Navigable Canals Committee



A paper dryer drum on the last stage of its journey from Europe to a Wisconsin paper mill — one of the few remaining commercial uses of Fox River locks.

What happens to a riverine canal when the Corps of Engineers determines that its use no longer justifies the cost of keeping it in operation? This question has had to be faced in Ohio, with the Muskingum River, in Kentucky, with the Kentucky River, in Michigan, with the Inland Route, and is now at crisis stage in Wisconsin, with reference to the Fox River. A waterway is obsolete in terms of the guidelines mandated by Congress for the Corps of Engineers when it "no longer economically serve[s] the purpose for which [it was] constructed or acquired" [Public Law 996]. In almost every case (the Inland Route is an exception) this purpose was *commercial* navigation. The problem arises from the fact that there are usually other criteria by which the waterway continues to have significant value but which are not automatically activated when the commercial-navigation criterion fails. Except in New York State, we in this country have depended for so long upon the Corps of Engineers to be the sole provider of lockage on our waterways that the withdrawal of the corps leaves a responsibility vacuum.

The Fox is part of what was once a somewhat equivocal connection between the Great Lakes and Mississippi River waterway systems. Between Prairie du Chien on the Mississippi and the historic community of Portage, north of Madison, the Wisconsin River is the route. At Portage a short divide cut known as the Portage Canal, the subject of numerous articles in this journal and elsewhere, connects the Wisconsin to the Fox. The Fox then carries on down through Lake Winnebago to Green Bay on Lake Michigan. The system is described as "equivocal" because the Wisconsin is only occasionally navigable in its natural state, and has never been canalized. In the words of the Corps of Engineers, "Regulation navigation on this river, even for small craft, is practically out of the question." The United States took title to the route in 1872, and was expected under the provisions of the River-and-Harbor Act of 1873 to establish and maintain navigation over its entire length. However, as the Corps further states, "the impracticality of maintaining navigation on the Wisconsin River was realized rather early," and that portion of the project was formally abandoned in 1887. This left the Portage Canal without a commercial justification, and severely constrained the commercial potential of the Fox, which, however, remained an active federal navigation project for many years. In 1962, the Upper Fox River, which is the 94 miles of the Fox between Portage and the confluence with the Wolf River at Lake Butte des Morts, was turned over to the State of Wisconsin. The state at that time did not follow Ohio's example of keeping open the Muskingum when it was abandoned by the Corps. All Upper Fox River locks were sealed shut except for the one at Eureka, which is operated on summer weekends and holidays by the Berlin Boat Club, a private organization. This history of state neglect is one reason for concern now that the Corps is proceeding to divest itself as well of the Lower Fox.

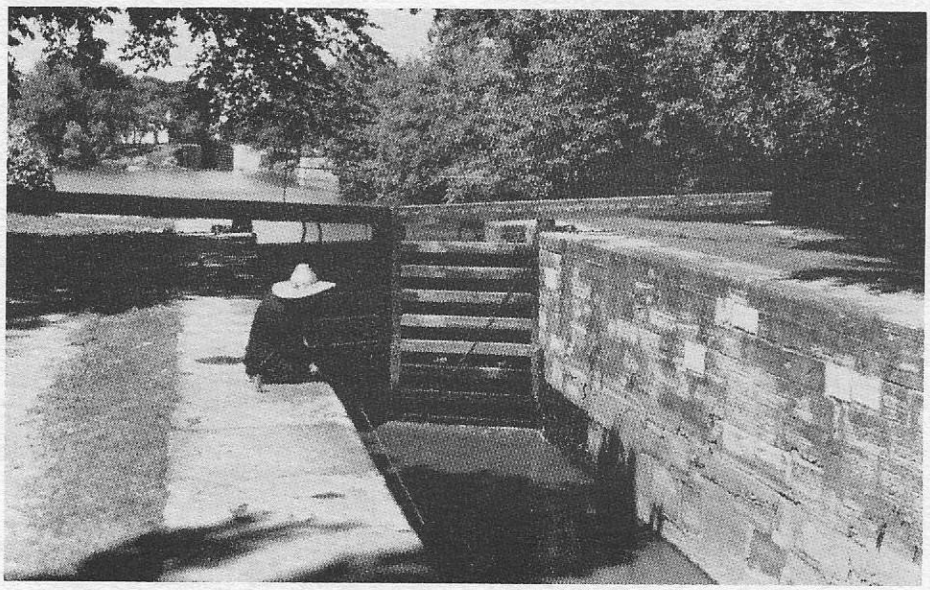
Another more special reason for concern about the future of navigation on the Fox is an unsavory character known as the sea lamprey. This creature made its way into the Great Lakes when the St. Lawrence seaway was opened, and promptly proceeded to wreak havoc with the ecological balance. At one time, the eastern shore of Lake Michigan was piled high with rotting alewives because, in the absence of their natural predator, the lake trout, they had multipled many times beyond the lake's ability to support them. The eels had virtually swallowed up the lake trout and along with them the commercial fishing industry and the resort value of the lakefront property. Eventually, lamprey-control measures and the introduction of the coho salmon restored a tolerable balance, but the experience was not one that anyone would wish to replicate. Originally, the lamprey was discouraged from venturing up the Fox by the repugnant quality of the water, but a successful campaign to clean up the discharge of industrial and urban waste has, ironically, made the river attractive to the eel, and a task force appointed by the governor to study the resulting problem has recommended the permanent closure and sealing of the Rapide Croche Lock, one of the 17 on the Lower Fox. Hence, if the state is to take over from the Corps and maintain navigation on the Lower Fox, it must not only find funds for the operation and maintenance of the system but also make a major investment in a boat lift or some other alternative means of getting vessels past the Rapide Croche Dam.

Local interests can be counted on to lobby energetically for an adequate effort by the state on behalf of the Fox River. The state may need to be made aware, however, that this is not merely a local concern. The Fox is an almost unique living museum of 19th century lock-and-dam technology, with the original hand-operated controls still in use. It is also one of very few canalized rivers immediately accessible to boaters on the Great Lakes. Although even now it has a small amount of continuing commercial use, it is probably not appropriate that an agency of so ponderous and portentous purpose as the United States Army should operate it. *Somebody,* however, should care enough about our history, our resources, and our opportunities for education, for travel, and for recreation, to preserve what little still remains of America as it was before the interstate highway and the jumbo jet. Here is an opportunity for American Canal Society members to make their influence felt. The address of the Governor of Wisconsin is: Room 115 East, State Capitol, P.O. Box 7863, Madison, Wisconsin 53707.

A Fox River lock, showing the turnstile for hand operation of the gates. Photographs courtesy of Kenneth J. Theine, Executive Director, East Central Wisconsin Regional Planning Commission.

HOW THE CHICAGO RIVER FLOW WAS REVERSED

(A History of the I. & M. Canal)



Locks, 6 and 7, on the old Illinois and Michigan Canal near Channahon, Illinois.

By William H. Shank, P.E.

Perhaps no other canal since the Erie Canal had such a profound effect on the commerce and economics of central United States as the Illinois and Michican Canal, completed 1836 to 1848.

The land around the southwest curve of Lake Michigan is only eight feel above the level of Lake Michigan, and a few miles further west the drainage area for the Illinois River slopes west and south to join the Mississippi. French explorer Louis Joliet as early as 1673 spoke of the ease with which a water connection could be made between Lake Michigan and the Illinois River, and the desirability of doing so — to link New Orleans with the Great Lakes. The British were never too concerned with the idea in the 1700's, but as the Americans pushed westward into the Indiana and Illinois territories, in the Nineteenth Century, the prospect of such a water connection became the subject for much talk and speculation.

From the time that Illinois officially joined the Union as a State, in 1818, it was assumed that a Canal between Lake Michigan and the Illinois River would be the prime objective of the new Illinois State Government, and so it was! They immediately petitioned the Federal Government for permission to build the Canal, which was finally granted in the Act of March 30, 1822. At this time no provisions were made for federal financial assistance to the new State on the project. Nevertheless, Illinois formed a Canal Commission the following year which hired Engineers Justus Post and Rene Paul to run preliminary surveys. They came up (in 1824) with five possible routes, and cost estimates ranging from $639,500 to $716,000.

No further action was taken at that time.

In 1827, after repeated appeals from the Governor, the Federal government approved a bill to provide federal lands (300,000 acres) in Illinois which were to be sold to raise funds for the Canal. The Canal Commission was reactivated in 1829 and told to hire an engineer to make more detailed surveys for the Canal route. Engineer James Thompson was retained by the Commission that same year and made a new survey, with some token help from federal engineers sent in by the War Department. However, little action was taken until James Bucklin in 1830-33 made surveys for both a canal and railroad route.

Bucklin's surveys showed three possibilities: (1) A lake-level canal, cut deeply enough to permit Lake Michigan to feed it, costing $4,107,440.30; (2) a canal with its summit level eight feet above the Lake, costing $1,601,695.83; and (3) a railroad along the same line costing $1,052,488.19. The Commissioners recommended (in 1833) that a railroad was the most logical idea, would be open the year round, would be less expensive to construct, and would be a faster means than the waterway. The governor seconded their report.

Railroad Vs. Canal

However, the supporters of the Canal were still numerous in Illinois and were quite vocal in their repudiation of the Commissioners' recommendation. The election of 1834 became a campaign of "those in favor of the Canal and those against it." The "canalers" won the election "hands down" and Joseph Duncan, a strong believer in the Canal, was elected Governor. His dream was a canal channel deep enough to pass steamboats from river to lake. One of Governor Duncan's strong supporters was a young Springfield attorney named Abraham Lincoln. The legislature in 1835 appointed a new Canal Commission, with power to raise funds and begin work at once.

The sale of lands had not yielded sufficient cash to get things going, so an emmisary was sent East to raise a loan of $500,000 — which was finally obtained, with some difficulty.

The new Canal Commission employed William Gooding, a graduate of the Erie Canal school, as their Chief Engineer, January 9, 1836. Gooding, a man of considerable energy and judgment, remembering the mistake of making the Erie too small, now recommended a canal 60 feet wide at the surface, 36 feet at the bottom and 6 feet deep. On this basis he warned that Bucklin's previous estimate of a lake-level canal was much too low, and re-estimated that plan at $8,654,377. "Canal fever" was in the air, and the Commission recommended that the expensive "lake-level" plan be put into effect at once. Ground was broken, with much ceremony, on July 4, 1836.

Chicago Grows!

From the moment the shovel went into the ground, the size of the town of Chicago began to increase by leaps and bounds! In 1833 Chicago numbered 1200 inhabitants; by 1845 her population had jumped to 12,000; and just before the opening of the canal in 1848, she counted 20,000 inhabitants. By 1854 the figure was 74,500!

For years it had been evident that the Chicago Portage was one of the keys to the continent — the connecting link between the Gulf of Mexico and the Great Lakes. As the news of the Illinois and Michigan Canal construction got around, workmen came from everywhere — from Canada, New England and Ireland to go to work on the I. & M. Canal. By the end of 1838 there were 2000 men at work.

But all was not sunshine and flowers, during the construction period. In 1837 there was a financial panic which made money scarce and slowed work on the canal to a snail's pace. In 1842 the State Bank of Illinois failed, and the State itself was close to bankruptcy. Bills of the State bank sold for as little as 38 cents on the dollar in 1842, while Illinois bills sold at auction in Chicago for 18 to 24 cents on the dollar!

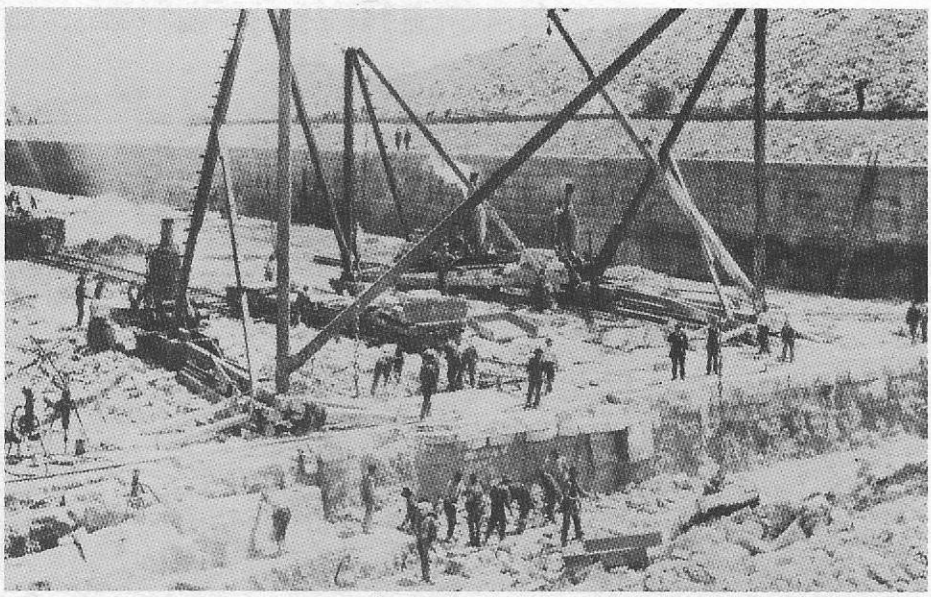
Photo sent us by Gerald Hulslander of Marseilles, Illinois showing the two lock ruins of the old Illinois and Michigan Canal in that city. Gerald reports that the area has been kept tidy by the local citizenry, and the old towpath is maintained in good condition for hiking and biking.

Some State legislators were in favor of repudiation of the State's debts, but others argued that the canal must be finished, regardless of the cost, so that it could become a source of revenue which would at least pay the interest on the State's indebtedness. William Gooding was again consulted on the further cost of completion of the original "deep-cut" plan for the canal, which he said would run more than $3,000,000 — a staggering sum for the nearly bankrupt State. However, Gooding pointed out that by reverting to the "shallow-cut" plan, with the summit level twelve feet above Lake Michigan, the cost of completion could be shaved to $1,600,000. It was decided to put the shallow-cut plan into effect; more money was borrowed, and full-scale work resumed in 1845.

As constructed, the I. & M. Canal began at the mouth of the Chicago River, using the river itself as the first "level." It then climbed twelve feet to the Summit Level, which it followed overland to Lockport (the headquarters for the Canal) dropping down to the Des Plaines River Valley through a flight of four locks, and continuing its descent through Joliet, Channahon, Ottawa, via eleven more locks to LaSalle, where it joined the Illinois River. Total length of the canal, from Chicago to LaSalle — 96 miles. Size of the locks — 110 feet long by 18 feet wide, with varying lifts.

The fact that Lake Michigan was not used as a source of water for the entire canal, as originally planned, made it necessary for Engiener Gooding to provide a number of "feeders." From east to west, there were the Calumet Feeder, the DuPage River Feeder, the Kankakee River Feeder and the Fox River Feeder, providing artificial connections between these rivers and the I. & M. Canal at various levels. Longest of these was the Calumet Feeder, bringing water 17 miles from the Little Calumet River at Blue island to the I. & M. at Lemont.

With hard times having reduced the cost of labor and supplies — for the first time in history a canal was completed at less than the estimated cost — a further expenditure of only $1,429,606. The entire cost of the canal, not counting interest, had been $6,557,681. Sale of canal lands by 1871 had brought in $5,858,547. so the State of Illinois had almost recovered her original investment at that time.



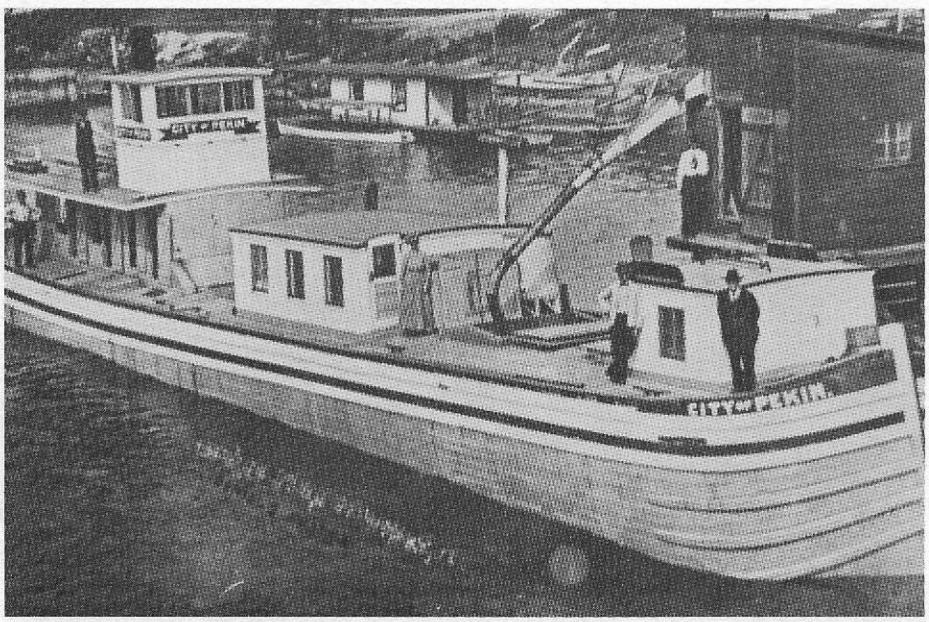
Construction (1895) of the Chicago Sanitary and Ship Canal, the training ground for the Panama Canal. (Chicago Historical Society photo)

The Canal Opens

The Canal was officially opened on April 19, 1848, with a boat starting from each end of the canal, bands playing and champagne corks popping. The celebration in Chicago was particularly hilarious — with good reason. The I. & M. Canal was already making the city prosperous, and would soon make her the "crossroads city" of central USA, with much of American commerce and industry making its headquarters there. A significant event took place a few days after the official opening of the Canal, when the "General Thornton," loaded with sugar from New Orleans, having climbed up the Mississippi and Illinois Rivers, passed through the Canal from LaSalle to Chicago, and on to Buffalo. Nothing like this had ever happened before!

Some of the first materials shipped southward on the Canal were bound for the Mexican War. The Canal Commissioners concentrated on building up Canal traffic to pay off their construction costs, and interest. The old St. Louis overland route eastward, serving Illinois, was replaced by the Chicago water route, giving additional impetus to the growth of Chicago. Previously all traffic had been handled by wagons pulled by horses and oxen. As the price of transportation rates fell, so did the prices of materials shipped. Lumber dropped from $60 to $30 per thousand board feet; wheat prices dropped from eight to four cents per pound.

$88,000. in tolls were collected from 162 licensed canal boats during the Canal's first year of operation. The trip from Chicago to LaSalle took 20 to 25 hours, averaging four miles per hour over the entire route. Seven thousand boats traveled the Canal in 1862 as traffic continued to increase. The two best years for tolls were 1865 and 1866, during each of which a little over $300,000. was collected. Canal traffic increased over two decades until 1874 when 12,424,705 barrels of wheat and corn were shipped to Chicago. Tonnage reached its peak in 1882 at 1,011,287 tons transiting the Canal. That year only $85,947. in tolls were collected, as rates had been reduced to meet the competition of the railroads.



"City of Pekin" Packet Boat on the Illinois and Michigan Canal, C. 1890 (Courtesy Bruce Anderson)

Sewage Problems

However, the rapid growth of Chicago as one of the nation's leading grain and meat-packing centers had its problems, the greatest of these being sanitation. For years Chicagoans had been dumping their sewage into the Chicago River, which ran sluggishly into Lake Michigan — the source of their water supply. In 1854, five percent of Chicago's population died of cholera, which brought the City face to face with its water pollution problems.

A set of pumps had been installed where the I. & M. Canal met the Chicago River, to augment the supply of water in the summit level of the canal. It was found that these pumps could be used to pump some of the suspended sewage out of the Chicago River and into the Canal. This led to the idea of using the I. & M. Canal as a means of diverting Chicago's sewerage westward, away from Lake Michigan.

Sanitation problems became so bad in the 1860's that the City of Chicago petitioned the State for permission to revive the old "deep'cut" canal

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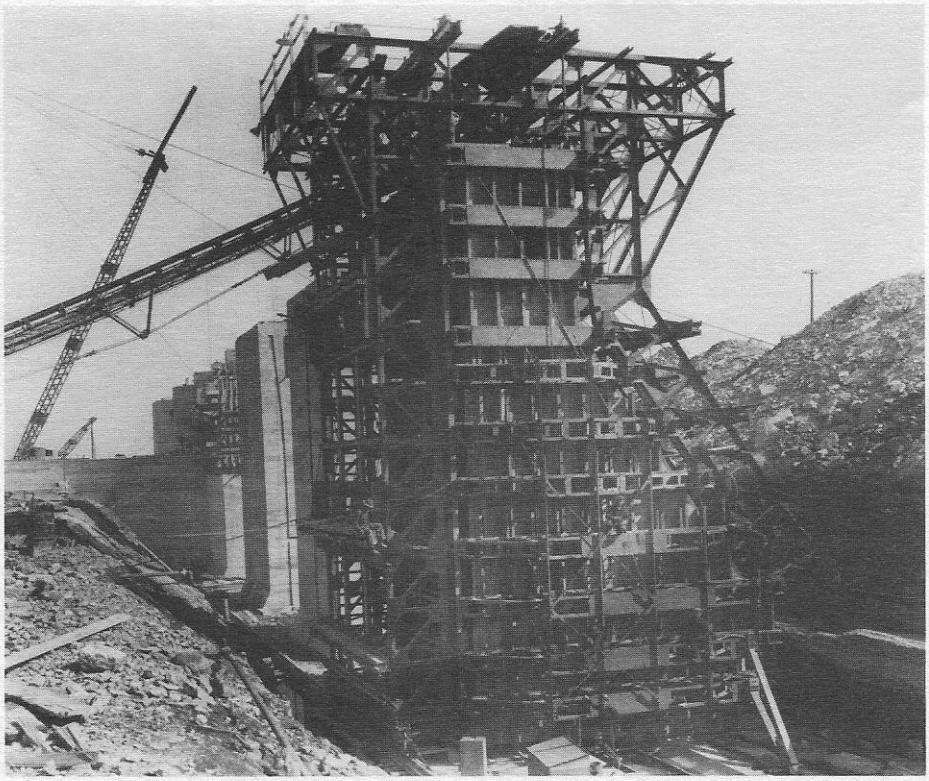
CHICAGO RIVER FLOW REVERSED



The gigantic forms used in pouring concrete for the 58-foot high lock walls of the Illinois Waterway. This photo was made at Brandon Road Locks, Joliet, Illinois, during construction in 1928. Robert S. Mayo, one of the Engineers for Blaw Knox, the contractor, stands on the concrete at the base of the form. (Courtesy Bob Mayo)

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plan of 1836 and use Lake Michigan water to purge the Chicago River of its accumulation of sewage and send it over the divide and down the Canal. The State passed an enabling act in 1865 and worked commenced the same year to deepen the summit level of the Canal, with Chicago paying the bill. Construction of the "deep cut" meant the removal of the lock at summit level, south of Romeo. A guard lock was installed at Bridgeport to replace the old lift lock located there. The need for the Bridgeport pumping works was eliminated, as well as the Calumet Feeder, and much later, the DuPage and Kankakee Feeders.

River Flow Reversed

With this "deep cut" across the divide completed by the City of Chicago in 1871, at a cost of $3,000,000. the upper reaches of the Canal were now deepened to below lake level, permitting Lake Michigan water to flow westward into the Chicago River, sweeping some of the sewage down the canal towards the Illinois River. Because of the City's tremendous losses in the great fire of 1871, the State refunded the money spent by the City in reversing the flow of the Chicago River.

This operation improved Chicago's sanitation picture for the next few years, but a heavy storm in1885 dumped 5.5 inches of rain into the Chicago area in a 24-hour period, washing much of the accumulated filth of the Chicago River into Lake Michigan, far beyond the city-water intake point. The resulting outbreak of cholera, typhoid and other water-borne diseases killed 12% of Chicago's population.

This disaster hastened action on recommendations by the Citizen's Association of Chicago" (formed in 1880) who had asked for an entirely new and larger canal, parallel to the I. & M., to carry Chicago's sewage across the divide. In the meantime, the pumping station at Bridgeport had been started up again to help in chasing the polluted water down the Canal. The State finally passed an act in January of 1890 which created the Sanitary District of Chicago, and initiated the construction of the much larger Chicago Sanitary and Ship Canal from Chicago to Joliet, whose prime purpose was to divert Chicago's sewage west and south to the Illinois River. Joliet, already suffering from the unbelievable stench of the sewage arriving there, violently objected to the new canal and other communities as far downstream as St. Louis took up arms against it also. Nevertheless, the Chicago Sanitary and Ship Canal began construction in 1892 and was completed to Joliet in 1901, making connection there with the I. & M. in the "Upper Basin" at Joliet, above Dam Number One. The old I. & M. above Joliet was abandoned as a traffic artery, but continued to handle some local drainage between Lockport and Joliet. Since then the Chicago Sanitary District has developed some of the world's largest inland sewage disposal systems to reduce the pollution of the Chicago and Illinois Rivers.

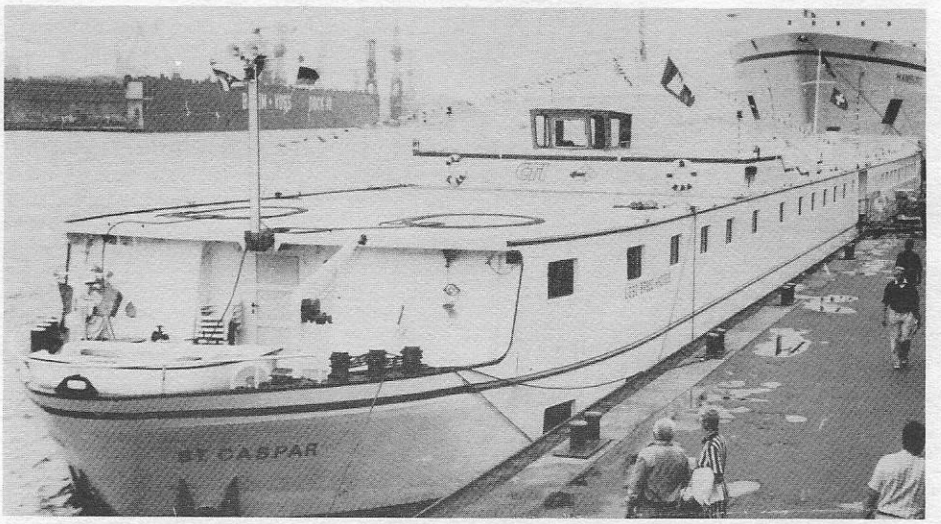
Many engineers tell us that the Chicago Sanitary and Ship Canal, an extremely wide artificial waterway, became the training ground for the building of the Panama Canal. After World War I, federal funds were applied to the building of the Illinois Waterway, opened in 1933, which supplemented the use of the older canals.

In 1982, the Upper Illinois Valley Association announced plans for an "Illinois and Michigan Canal National Heritage Corridor." Shortly thereafter Congress enacted a bill, creating a 90-mile National Heritage Corridor along the historic route of the I. & M. Canal, the first such Corridor in the Nation, extending from Chicago to LaSalle/Peru, Illinois. Federal funds were made available in 1984 and in 1985 a Corridor Commission of 18 persons was created to carry out plans for canal rehabilitation and trail development.

KENTUCKY LOCK

This excellent photo of passengers on the front deck of the DELTA QUEEN shows the ship emerging from Kentucky Lock into Kentucky Lake above the TVA Dam on the Tennessee River. The Lock has a lift of 58 feet. (See complete article by Bruce Russel in the February, 1990 Issue of *AMERICAN CANALS*.)

CANAL CRUISING IN NORTHERN GERMANY



M.S. St. Casper, a German ship, carrying 85 passengers and crew of 18, on which the Squires toured the waterways of North Germany.

By Roger Squires

Unless you know someone who owns a boat, it is very difficult to actually cruise the canals of Northern Germany. I was therefore pleased to find that C.T.I. based at Dusseldorf have started to offer a byweekly cabin boat service offering a top class cruising holiday between Hamburg and Bremen, via the Elbe Lateral Canal and the Mitteland Canal, together with the Rivers Elbe and Weser. They have a purpose built canal cruising ship, the St. Casper which during the summer offers first class facilities for the 'canal buff' and tourist.

I joined the St. Casper at Hamburg where it berths adjacent to the North Sea Ferry terminal last June. The first night was spent moored at Hamburg which gave me the chance to tour the canals and docks of this historic seaport. Late the next morning we set sail up the River Elbe heading for Lauenburg. The journey gave an ideal opportunity to study the array of river craft that service the port of Hamburg. We passed through one set of huge locks at Geesthacht before arriving at the boatbuilding town of Lauenburg to spend the night.

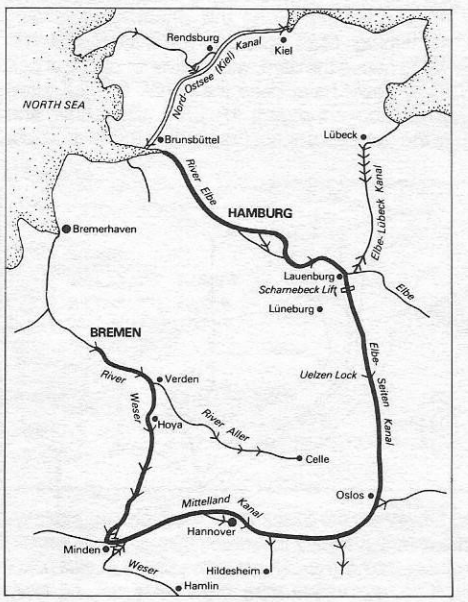
Elbe Museum

The next morning we made a quick visit to the local Elbe Shipping Museum before taking a coach excursion to see the Elbe Lubeck Canal and the old Salt Town and Port of Lubeck. This tour included a visit to the 1724 Palmeschleuse lock that is all that remains of the much earlier Stecknitz Canal which first opened in 1390. We arrived back at the St. Casper at 1600 hours and once on board, cast off to cruise up the first section of the Elbe Seiten Canal. The highlight of this section of the trip was actually being raised 38 m. in the Scharnebeck Ship Lift. This must be one of the modern waterway wonders, with its twin independently counterbalanced caisons each weighing 6000 tons and capable of raising a 1350 ton fully loaded craft. We moored above the lift and had time to investigate this modern waterways wonder.

The next day provided an opportunity to see the extent of the works of this modern German Canal. Also to see the huge amount of commercial traffic that uses this waterway. The highlight of the day was the chance to see the huge 'water saver' lock at Uelzen where the boat was lifted 23 m. In the late afternoon we arrived at the junction with the Mittelland Canal, which is the main East West waterway across Germany. We turned West along it and marvelled at the quantities of coal that were being transported, much of it from Poland and East Germany. That night we had a late finish and it was after dark when we reached the mooring above the Hannover-Anderton Lock.

Although only opened in 1939, the next section of the Mittelland Canal is being widened and deepened and the bridges raised. For this section of the route for which St. Casper is purpose built, the crew had to strip off its Bridge, and sundeck fittings. Some chose to stay on board, but the majority took up the offer of a free trip to the 'Pied Pipers' town of Hamlin where there is both an old and a modern navigation lock. After a most interesting excursion along the Upper Weser Valley, we rejoined the boat at Minden where it had moored adjacent to another older water saver lock which was in the process of being enlarged under the current modernization programme.

The next day we took the alternative canal route down through two smaller locks to join the River



Weser after first crossing over it on a gigantic aqueduct.* It was interesting to sail under another boat crossing the aqueduct, where we had been an hour before. The locks on the River Weser, the first section of the river navigation, were modern. Built between 1953 and 1960. Each had its own hydro station for power generation. Late that afternoon we reached the riverside town of Hoya, where the unloading at the local wharf and the view of passing craft from the town bridge proved it to be a most photogenic spot. The next morning we had an early start. It was interesting to see the way in which the sun burnt off the river mist. Our route took us down through the final two locks on the river navigation, built in 1911, before reaching our final mooring in the centre of the town of Bremen.

We Tour Bremen

Here we were provided with a guided tour of this ancient town, that was unfortunately badly damaged in the last War. That evening we were provided with a Buffet Dinner and a party which lasted to the early hours. The following morning the group left the boat after a really enjoyable trip. Some returned by coach to Hamburg but I caught a train to the Hook of Holland to return to England after a splendid trip along the German canals. Any members interested in taking the trip should contact: COMPASS TOURS INCOMING gmbh, Barbarossawall 11-23. 4000 DUSSELDORF 31. West Germany. Phone. 0211/40 70 21.

*(*For a complete description of the Minden Aqueduct see Bruce Russell's article in* American Canals *#56 (February 1986); or* Best from American Canals *No. 3.)*

CANAL CALENDAR

June 8-10, 1990 — Spring Field Trip of the Canal Society of New York State, along the summit level of the Erie Canal, DeWitt to New London.

June 15-17, 1990 - Old Canal Days, Historic Lockport, Illinois on the I. & M. Canal. "The Old Canal Town."

July 7, 1990 - Canal Festival, Lehigh Canal, Hugh Moore Park, Easton, PA. Rides on the "Josiah White" canal boat.

July 13-15, 1990 - Old Canal Days Festival, Canal Fulton, Ohio. Launching of the new "St. Helena III."

July 21, 1990 - Canal Days at Schoharie Crossing, Fort Hunter, NY.

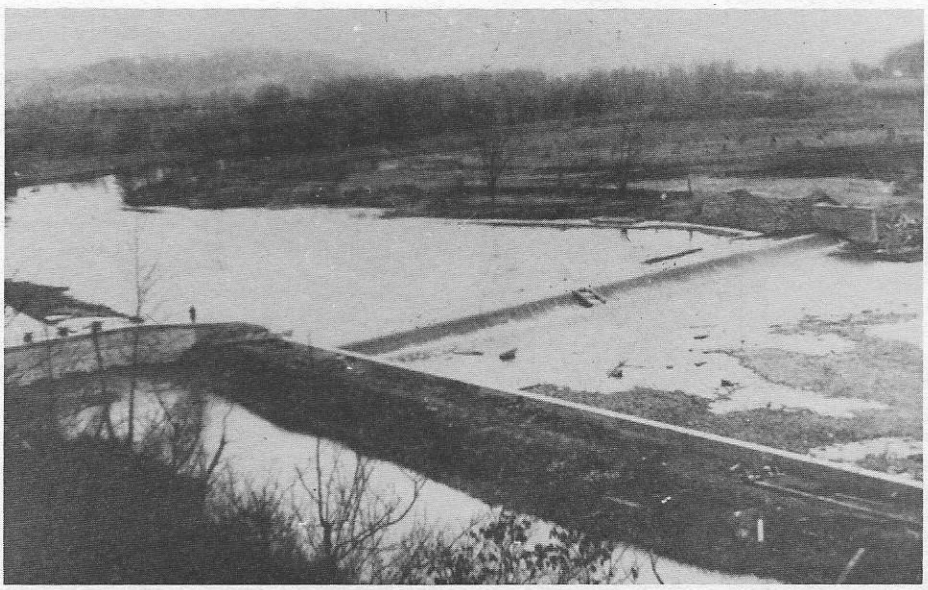
August 4-5, 1990 - Canal Days on the Welland Canal, Port Colborne, Ontario.

August 17-19, 1990 - Coshocton Canal Festival, Roscoe Village, Ohio, with rides on the new "Monticello III."

September 15-16, 1990 - Canadian Canal Society Fall Field Trip, Port Severn and "Big Chute", Ontario.

Gary E. Heiland recently became a LIFE MEMBER of the American Canal Society. Mr. Heiland is located in Dallastown, PA. This brings to seventy-four our total membership in this important category.

THE SEARCH FOR LOCK #5



A 1909 photograph of the Walhonding Canal showing the old concrete Six-Mile Dam across the Walhonding River. Lock Five would have been across the river at the upper left. (Courtesy of Charles Lundenberger)

by Terry K. Woods

I spent many hours back in the early spring and late fall of 1976 and 77 hiking along the 25 mile route of the Walhonding Canal in northeastern Ohio. There were 13 locks on that canal and I was able to locate actual remains of 12 of them. The 13th, Lock #5 west of Coshocton, had been a victim of an early 20th century hydraulic project, or of Mother Nature, as the site of that lock was now under water — or so I thought.

Lock #5 was an outlet dock into the Walhonding river about 80 yards above the Six Mile Dam. In 1907-09, that dam was rebuilt as part of a project to supply water power to an electric plant in Coshocton. I located a great deal of documentation indicating that the dam had been relocated to insure its stability during high water. I even located a map with a penciled in location of the structure with a notation, "new dam". This new location was some 60 yards above the old dam. Therefore, Lock #5 should be just above the present dam, if construction work hadn't destroyed it.

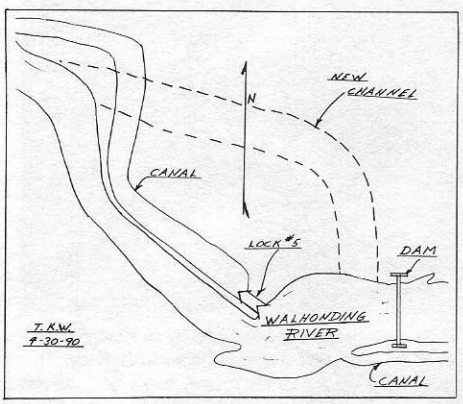
Field work indicated that, over the years, the unruly Walhonding River had cut a new channel and now approached the Six Mile Dam in two separate channels. One channel was the original one and approached the dam at a right angle to it. The new channel cut across low ground and met the old channel scant feet above the dam and flowed parallel to it. According to my data, the new channel was flowing in the bed of the canal. The site of Lock #5 was under water. My research on the Walhonding Canal resulted in a 1978 book titled "TWENTY FIVE MILES TO NOWHERE". In that book I described how the dam had been rebuilt in a new location and that Lock #5 was gone.

The ink had barely dried on the book, when an older gentleman contacted me with the information that, "that isn't the way it was. That new dam was built smack, dab on top of the old one". I rechecked my research and even had a man at the Ohio Historical Society delve back into those records. He found a wealth of data to support the theory that the dam had been relocated. But it remained a theory in that we didn't find a document actually stating that the dam had been relocated. On the other hand, we found no information to indicate that the dam had been rebuilt in its original location. Thus we maintained the status quo. Still, in the back of my mind, . . .

Then one day in May of 1987, I was invited to talk on the Walhonding Canal at the Loudenville Historical Society. That canal was to have been extended up the Killbuck to Loudenville. It hadn't been, hence the "Twenty Five Miles to Nowhere" appellation. I hadn't been asked to speak on that canal in years and I had done a lot of work on it. I accepted.

New Clue in Old Postcard

I'm not sure how much interest that talk generated. The gentleman who'd invited me seemed to like it. He even brought along his scrapbook of postcards of the area. One caught my eye instantly. It was a colored version of a black and white photo of the Six Mile Dam after being rebuilt. I had studied similar black & white photos, under magnification, for hours trying somehow to see the missing lock. Now, in this photo, I could see, something. High up along the river, about 100 yards above the dam, was a sliver of blue that certainly could have been the canal. One hundred yards above the dam AFTER it was rebuilt, and at the upper corner of the bend of the river where the 'canal' would have touched it, was something. There was definitely something there on that piece of land that was now an island in the middle of the Walhonding River. I had hiked every inch of the Walhonding Canal three times while researching the book, every inch except those on that island. I had to get to the island.



Six-Mile Dam Area.

That was easier said than accomplished. May was too late in the year for canal looking in the wild. I did set about trying to develop a possible method of getting there. I contacted various people in the area who might know what was out there and, more importantly, had a boat on the upper river.

Several times I was in the area at the right time of year, but the water was too high (the island was scant yards above the dam) or the person who promised to lend me a boat was on vacation or, oh, a lot of things.

April 1990 rolled around. Joel Hampton, the Director of the Roscoe Village Foundation was interested. We set up a date to borrow a canoe and go to the island. April 7 was our day. But it rained that entire week. Cooler heads strongly suggested that, "Nobody in their right mind would go out on the Walhonding with the river so high."

We waited. By April 6, 1990, the height of the river and of the island foliage were at a stand-off. It was now, or next year. We chose now.

We Rent a Canoe

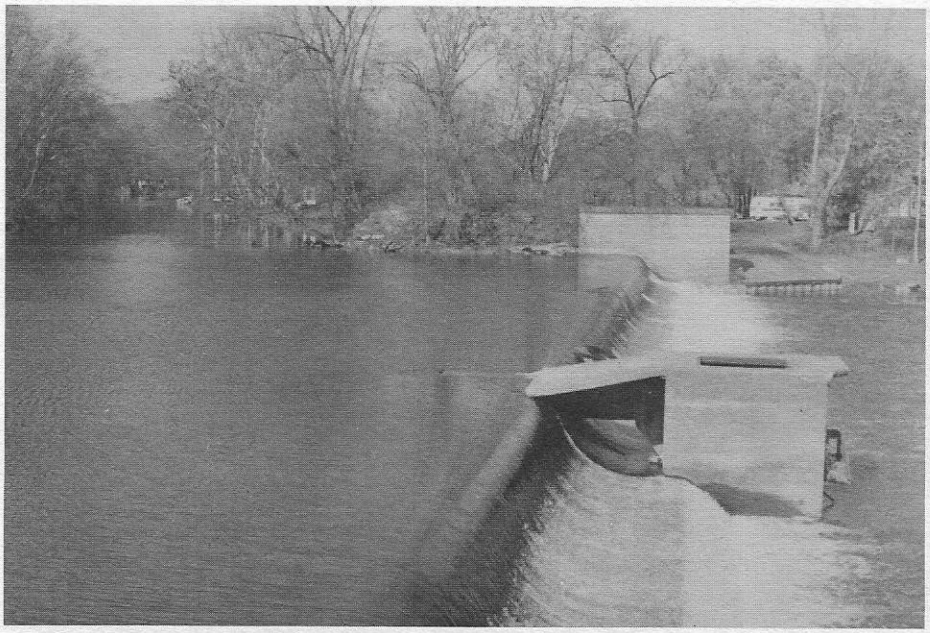
Joel rented a canoe, we tied it onto his van and headed out to the Six Mile Dam and the Whispering Falls Camp Site that now surrounds the dam. Mentioning one of the permanent resident's name got us onto the private grounds and we looked him up. He thought we were crazy for going out on to the river so close to the dam. The canoe-livery man did too. He insisted we wear our life jackets. Several of the old timers fishing at the foot of the dam cheerfully offered to wave as we went over.

Joel and I drove as close to the dam as we could get then climbed up onto the dike and looked at the river and our objective. The channel here was 45′ to 60′ wide and the stream was flowing swiftly toward the dam. It certainly could not be called 'slackwater'. We decided to carry the canoe some 75 yards along the river away from the dam and let the current carry us down while we paddled like Hell to reach the island before we were swept over the dam.

Joel paddled bow and I paddled stern. We both knelt to keep our C.G. low (I fell out of a canoe once in a strong current, sitting with my body high). The current swung us around and we touched the bank backwards, but we managed to grab hold of some tree roots and drag ourselves, and the canoe, up on the island. We had made it!

Once my heart rate was back to normal, we headed toward the east end of the island. Sure enough, a 5′ to 6′ high dike extended the entire side of this part of the island. I knew then that we were going to find something. If the dam had been relocated up river during the rebuild, there would have been no earthworks above it. Joel walked over to the dike, while I followed its base to my right, toward that spot that had shown on the photograph. I walked directly to Lock #5. It's there. It's not intact, but a lot of the stonework is still visible.

Lock #5 let boats into what was the river's edge about 100 yards or so above the dam. When the canal was operational, a towpath on the opposite river bank ran to a point just opposite this lock.



North abutment of new dam. New river channel straight ahead. (1977)

The towpath over there now ends at the hydraulic inlet gates set into the east end of the dam. I don't know exactly how boats got across the river. I've seen one account where the animals were put on board and the crew poled themselves and their boat across. There may also have been an endless rope and pulley arrangement strung from one shore to the other. Boatmen could then have pulled themselves, and their craft, across.

We took a few slides then walked the towpath to the west, up the canal. There was no berme bank. There was just the canal towpath, then the dike we'd walked the canoe along. This would have made a widewater of over 100 yards. This widewater did not exist when the canal was operational. Levies were built here after the 1913 flood did some damage to the dam. Land containing Lock #5 was repurchased in 1916 from the people the State had originally sold it to in 1898. I'm assuming (pending further research) that the berme bank was removed then and used to form the dike that runs parallel to the dam. This dike keeps the river from bypassing the dam to the west.

Walking the towpath was interesting. Even though we had risked life and limb to reach the island, the ever-present worn footpath existed along the towpath, indicating that quite a few 'someones' had gotten there first. The island is 200 to 250 yards long and about 50 yards wide. The towpath runs right up to the island's edge. When the canal was running, it made a sharp bend here to the north, then another to the west and ran on a line to Warsaw. The main channel of the river still follows that 'S', but a branch channel has cut across the last loop of the 'S' to meet the original river just above the dam.

Both channels around the island are 45′ to 60′ wide and neither shows any sign of giving in to the other. Local residents say that, in periods of low water, pilings are visible at the northwest edge of the island. There were probably pilings and rip-rap placed at the curve in the river to keep it in its original channel. That didn't work.

When we decided to leave, we again carried the canoe further away from the dam. This time we decided to paddle upstream, against the current. That worked fairly well, except we once more reached the bank backwards. I had an anxious moment or two when we seemed suspended in the current about 6″ from shore. Joel paddled furiously to keep us from sliding backwards while I side paddled to gain that six inches. At last we did. I grabbed a root, pushed us forward a bit so Joel could grab one, he did, . . . and we got out of the river.

Mission Accomplished!

The whole expedition was a bit tiring, but we accomplished what we had set out to do, confirm the relative location of the new dam and locate the remains of Lock #5. Joel plans to run a Canal Society of Ohio tour along this canal in the near future. He is already trying to figure out how to get people to Lock #5. I have suggested tying a rope to a tree on the south shore of the river, the other end to a tree on the island, and issuing everybody bathing suits. I don't know if that is the method he is going to use or not.

NEW PERIODICAL

Steve Cochran has called our attention to a brand-new publication called *WATER-WAYS,* which bears the sub-title "New York's Waterfront News". It is published by North River Communications, P.O. Box 11, Croton-on-Hudson, NY 10520. The first issue contains two long articles on New York State's Canals, their historical and archeological value, and what is being done to preserve them.

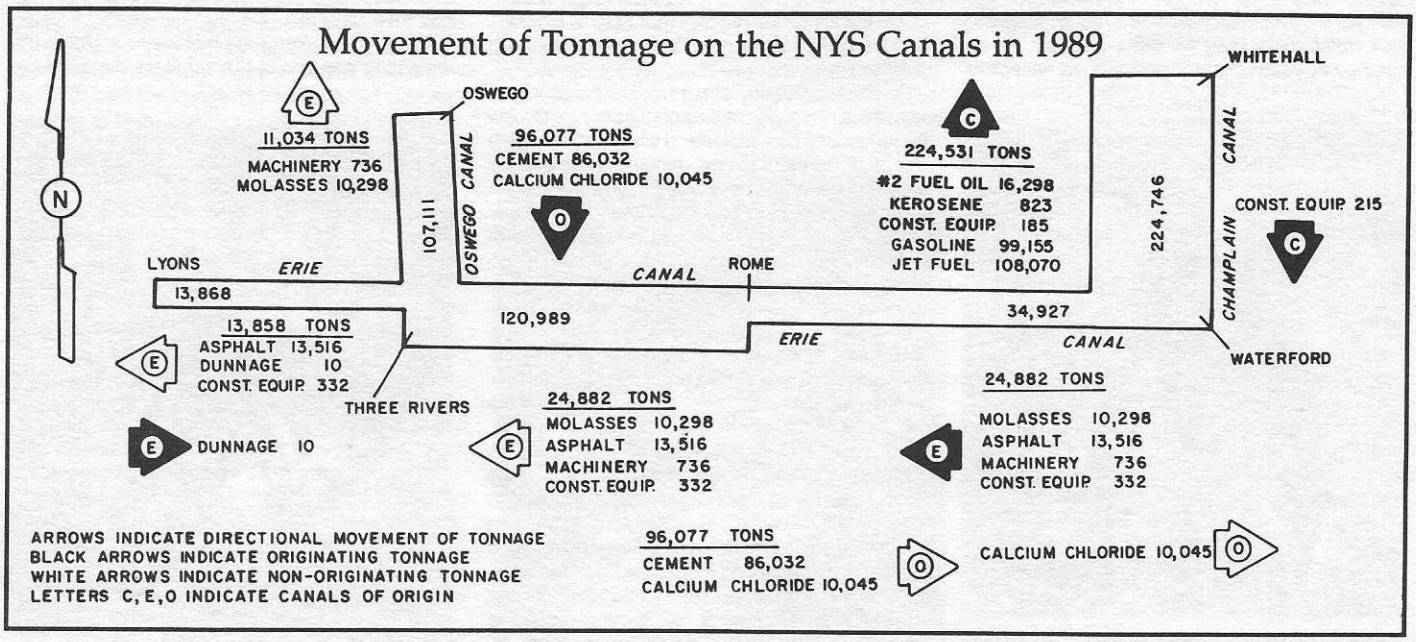
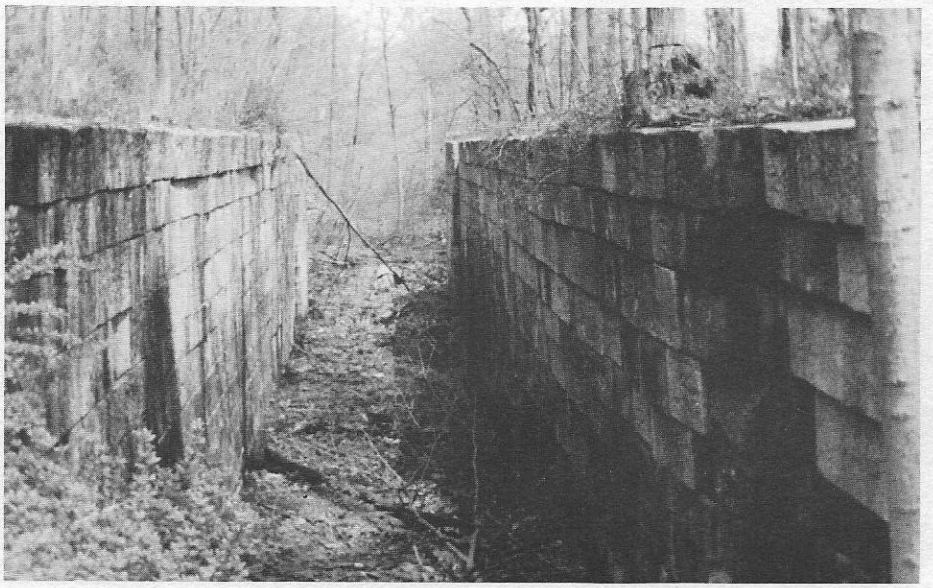


Table from *CANAL TIMES,* Volume 1, No. 4, published by the New York State Canal Board in Albany. It indicates that while the NYS Canal System has grown in popularity for pleasure-boating there is still plenty of commercial traffic moving east and west and north and south. If you will add up some of the above figures you will see that they add up to over a half-million tons of asphalt, cement, construction equipment, fuel oil, molasses, etc. which were shipped on the canals in 1989. (Courtesy of Walter Meseck)

CANAL SOCIETY OF NEW JERSEY VISITS THE D&H



This shows the excellent condition of many of the surviving locks of the D. & H. Canal, nearly a century after its abandonment, One of the locks at High Fall, NY. (Bruce Russell photo)

By Bruce Russell
Contributing Editor

THE CANAL SOCIETY of NEW JERSEY has done it again! For the 11th year in a row they have planned, organized, and executed an exploratory trip over an existing or abandoned canal PAR EXCELLENCE. Advance preparation and preliminary scouting of the territory by BOB BARTH, LINDA HOUSE, and BILL MOSS combined to insure that everything went according to plan. New Jersey's "canalers" were certainly ready for a trip after five months of winter "hibernation", and two bus loads of men and women attested to their enthusiasm.

It would be impossible to fully enjoy a trip such as this without knowing something of the history of the DELAWARE and HUDSON CANAL. Thoughtfully BILL MOSS had included with everyone's information packet a fact sheet giving key dates pertaining to the waterway, which opened in 1828 and was abandoned except for a short stretch near Kingston in 1898, after the railroads had supplanted it as a mover of anthracite coal from the Carbondale, Pa. area to the major market of New York City. The D&H CANAL was actually the middle link in a transportation system that began near Carbondale (close to Scranton) with a unique gravity railroad which carried coal up and over Moosic Mountain to Honesdale, Pa. where the waterway actually began. After traversing the approximately 108 miles of canal in boats of 140 ton capacity pulled by mule teams, the fuel was unloaded at the mouth of the Rondout Creek, a tributary of the Hudson. The place where it was removed from the wooden vessels was known in canal days as Terminal Island, a man-made facility where it was stored in gigantic piles. At the end of summer or during early autumn it was reloaded into much larger barges which were then lashed together to form a "tow". This was taken down the Hudson by steam tug to New York City.

On the second day of our trip there was a boat ride which gave tour participants a chance to view the remains of Terminal Island which still sits in the middle of Rondout Creek, minus its piles of D&H coal and the machinery used to transfer it from canal barge to river barge.

MAURICE and WILLIAM WURTZ of Philadelphia initially proposed the idea of an artificial waterway or canal connecting the Pennsylvania anthracite fields with the Hudson River in the years immediately following the War of 1812. Wood as a fuel was no longer available in sufficient quantities to supply a growing nation and anthracite coal, first discovered in the 1790s, was the answer. It burned both hot and relatively clean. They hired JOHN JERVIS and BENJAMIN WRIGHT who had perfected their canal building skills on the ERIE, a public project as opposed to the D&H which was a private venture. These two engineers realized that a canal traveling in a straight line connecting Honesdale with Kingston on the Hudson was impossible due to the Shawangunk Mountains, so they designed a waterway which would initially head south by following the valley of the Lackawaxen and then the Delaware River. At Port Jervis, N.Y. it would proceed north towards the Hudson by paralleling the Neversink and Rondout Creeks from which it would also draw water. Hence a map of the D&H CANAL resembles a giant V with Port Jervis at the bottom. Our field trip began at Port Jervis and concentrated on the remains of the waterway as far north as Rondout near Kingston. On previous trips we had explored the Honesdale to Port Jervis section as well as the previously mentioned gravity lines.

Ground breaking for the D&H CANAL occurred on July 13, 1825 at Beatysburg, N.Y. which is now appropriately called Wurtsboro. On our April 28 and 29th trip we stopped briefly at the point where the Wurtz Brothers turned the first shovelful of earth to initiate work on the waterway, which was finished three years later in 1828 at a cost of $1,200,000. A plaque is affixed to an old stone snubbing post marking the spot where it all began. Also at this location was a storage basin and boat building facility.

Locally quarried sandstone was utilized to fabricate the lock chambers and aqueducts, and by sheer accident a product known as natural cement was discovered in the area of Rosendale during the construction period. With its ability to harden and become super strong under water it was an ideal material for building canal structures. Consequently the D&H CANAL, in addition to coal, transported large quantities of this commodity which was produced by the A.J. SNYDER family at their kilns in and around Rosendale.

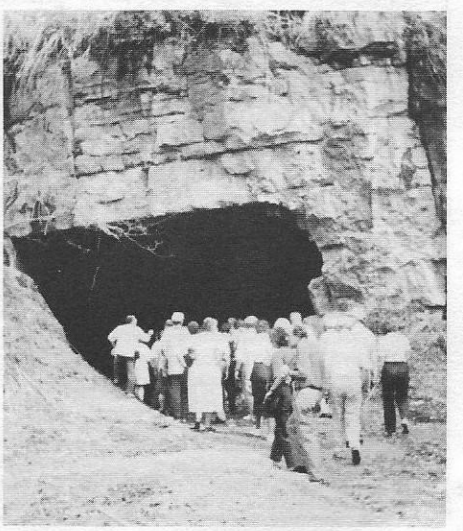
Snyder Cement Works

As part of the tour we visited the SNYDER ESTATE and cement works.

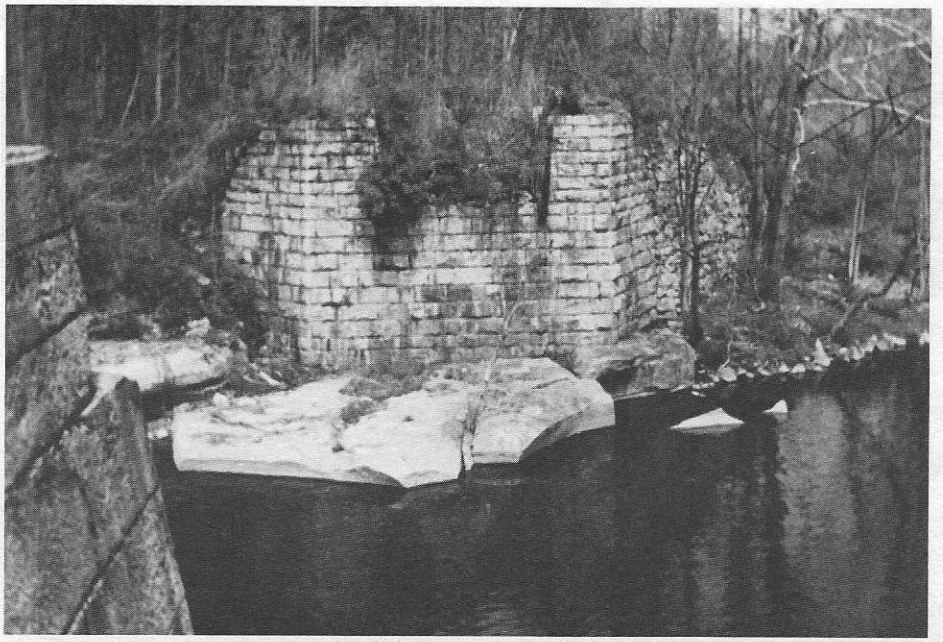
It took about five days for a boat to travel from Honesdale to Rondout, just below Kingston. Passenger packets took less time but by 1860 had vanished due to railroad competition. BOB BARTH described the MERCHANT'S and TANNER'S LINE which operated a fleet of 6 passenger vessels along the D&H between Ellenville and Rondout. These boats were pulled by horses rather than mules. Our stop at the D&H CANAL MUSEUM located in a former church in High Falls, N.Y. was valuable since it contained a number of exhibits which depicted the lives of D&H boatmen and their families.

As we drove along the highway parallel to the remaining portions of the canal we were able to

At Rosendale this "Canal siding" ran off the main channel directly into the Snyder cement works to allow canal boats to unload coal for the kilns and pick up bags of newly-made cement. (Russell photo)



Members of the Canal Society of New Jersey are shown at the entrance to the natural cement mine located on the Snyder Cement property at Rosendale, NY. (Russell photo)



The remaining abutments of John Roebling's Aqueduct over Rondout Creek at High Falls, NY. This was a cable-supported structure similar to those built by Roebling at Pittsburgh and Lackawaxen, but with a single span only. The wooden trough burned in 1918. (Bruce Russell photo)

spot various buildings which had once been canal supply houses and stores. Near Lock 50 BOB BARTH pointed out an old red barn which once sheltered D&H CANAL mules. At its peak in the 1870s there were about 1500 boats operating on the D&H, and this meant a lot of hungry and tired men needing to be fed and resupplied. After the waterway closed in 1898 most of these establishments continued in use serving a non-canal clientele, primarily local farmers. We didn't stop at any of them but since several sat on "Canal Street" or "Canal Avenue" it was obvious what their original purpose was.

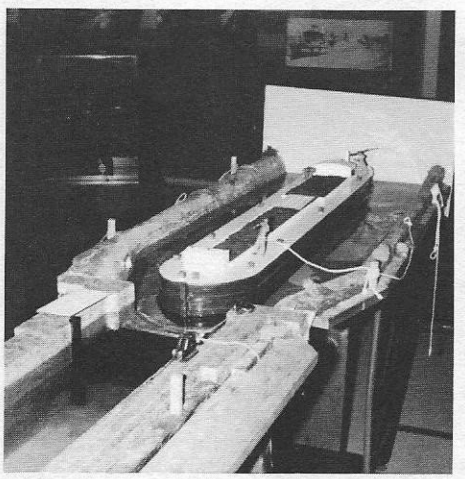
In Ellenville we passed one of two surviving D&H CANAL toll houses which had been moved from its original site at the time the canal prism was filled in during the early part of this century. Furthermore near Ellenville was situated the DAVIS HOUSE where, according to local legend, the peanut butter and jelly sandwich was invented. It was sold to D&H boatmen passing through town and was valued as a source of quick energy.

Undeveloped Area

One of the reasons why so much of the D&H CANAL survives is that the area through which it ran has not yet fallen victim to rampant real estate development. Thus at High Falls a 5 lock flight remains intact along a half mile stretch beginning at the previously discussed museum. Unfortunately some of the other locks as well as sections of the dewatered prism are now situated on private property and no longer accessible to the casual tourist. Nevertheless the "Advance Party" for our trip managed to contact some of the people to get permission to enter their premises. There were a few isolated canal segments which still contained water, giving a more authentic, historically accurate picture. Generally these remnants are fed by underground streams and the clay which lined the old canal bottom to prevent seepage continues to retain water, incredible, after 160 years!

At High Falls across the road from the museum were the ruins of two parallel aqueducts which once crossed Rondout Creek. The first of which almost nothing survives was the original 1828 structure consisting of twin masonry arches. It was designed for boats of 10 ton capacity. After 1845 when the waterway was enlarged for the third time to provide a 6 foot depth it became useless since the larger capacity boats couldn't fit through it. Consequently next to it a larger replacement was built. This was not a twin arch affair but instead was a suspension aqueduct designed by JOHN ROEBLING, of Brooklyn Bridge fame. An enormous wooden trough made water tight with bitumin carried the D&H CANAL approximately 40 feet over the river. This trough was supported by iron rods and steel cables, portions of which remain embedded in the surviving stonework.

As part of the 1845 aqueduct a mile long new alignment or approach to High Falls was built. Our N.Y. STATE tour guides explained that for this section there were actually two PARALLEL D&H CANALS. One was the orignal 1828 prism which was not enlarged or deepened, and the new one which replaced it. Each had its own locks and as mentioned above its own aqueduct at Rondout. During our 2 hour stop at High Falls we were able to explore the remains of both aqueducts and prisms. Walking back into the hills behind the museum we located the two parallel flights of locks - one for each alignment. However this situation was not common. In most instances when the canal was made bigger to handle larger boats the existing channel was widened and deepened and its locks reconstructed to new dimensions. High Falls was one of two exceptions. The museum offered a brochure describing all of this plus directions for a self guided walking tour. It was a most worthwhile stop.



The D. & H. Canal Museum at High Falls contains several interesting models and dioramas showing how the canal locks worked. This is one of them. (Bruce Russell photo)

(To be concluded)

SAVING WATER AT THE LOCKS

By Keith W. Kroon
2240 Ridgeway Avenue
Rochester, NY 14626

I have to comment on the amount of water used in locking a boat through a lock. Basically I agree with Terry Woods and again Bill Dzomback is wrong. For my study I assumed that the empty lock held 10,000 gallons of water and the full lock held 30,000 gallons. The boats going through have a 2000 gallon displacement empty and 5000 gallon when loaded. Going through a complete cycle and calculating the amount of water that passes from the upper level to the lower level is the measure of water used.

The basic formula for the amount of water lost from the upper level is the difference between a FULL lock and an EMPTY lock (20,000 gallons in my example) MINUS the displacement of the boat going down PLUS the displacement of the boat going up.

If the lock is cycled empty it will take 20,000 gallons of water each cycle. As Terry Woods says, "In a high traffic . . . displacement of each boat IDENTICAL, the same amount . . . (in this case 20,000 gallons) lost from . . . EACH ascend/descend cycle.

In the case of nothing up and a line of boats coming down, a LOCK FULL of water (20,000 gallons) MINUS the displacement of the boat is needed for the cycle. i.e.: lock empty, 10,000 gallons, fill it with 20,000 gallons from upper level, now it contains 30,000 gallons, put in loaded boat displacing 5000 gallons, net 15,000 used from upper level and 25,000 gallons in chamber, lower boat by releasing 20,000 gallons and pull boat out allowing 5000 gallons from the lower level to fill the lock back to 10,000 gallons. NET USED: 15,000 gallons. An empty boat going down uses 18,000 gallons, 20,000 - 2000 gallons.

The case of nothing down and a line of boats up uses a LOCK FULL of water PLUS the displacement of the boat. Thus 25,000 gallons for loaded boats and 22,000 gallons for empty boats.

Alternating boats going up and down uses a LOCK FULL of water MINUS the displacement of the boat going down PLUS the displacement of the boat going up. Loaded down/empty up uses less water than loaded up/empty down.

By William L. Huber
RD 2, Box 48A, Whitney Rd.
Sag Harbor, NY 11963

Regarding the article "Saving Water at the Locks, AC No. 71, November 1989, I have given considerable thought to the subject and feel that

(Concluded on Page Twelve)

Saving Water at the Locks

(Concluded from Page 11)

I must agree with Mr. Williamson and William Dzombak that the same amount of water is used in a lockage whether or not a boat is involved.

When a boat is launched it displaces a certain amount of water which is pushed into the adjacent waters thereby raising the water level, in theory at least. As this vessel moves through the water it displaces water from in front, around the hull, to fill what would be a void behind. While the water level is the same in front, adjacent to the boat, and behind, (discounting the turmoil caused by this displacement which has no bearing on this case) the volume of water adjacent to the boat is less than that before and behind by one displacement - D - of the boat. It takes power, regardless of the source, to move this water which causes the boat to move forward which is the subject of another limitless discussion!

Displacement may vary from 0% (no boat) to 100% in the case of a vessel filling the lock from sill to water level, in theory at least if not in actual practice (although one could come pretty close). Displacement can be anything from 0% to 100% then.

In summary a boat moves through water only because a source of power forces it to displace water from in front to the rear (pressure to a void). The lock does nothing to change this. What it does is to change direction by lowering or raising the boat by letting out or adding water in an amount equal to the volume of the lock from sill to sill or water level to water level.

Editor's Comments

If you have read carefully the above remarks, you are now as thoroughly confused as I am! Space does not permit me to include the large table of data which accompanied Keith Kroon's comments or the complex geometric diagrams and their explanations which Bill Huber sent along. If you wish to examine all of their material in depth I suggest you write them!

It appears we have opened up another "can of worms" more complex than that stirred up by our various articles on "Sloped Levels in Canals" of about a year ago. Many of the opinions already expressed are in complete disagreement. It is doubtful whether we will ever get the matter settled. I suggest that we publish nothing further about it, and get on with our regular business of reporting canal and waterway history and news — past and present.

ERRATA

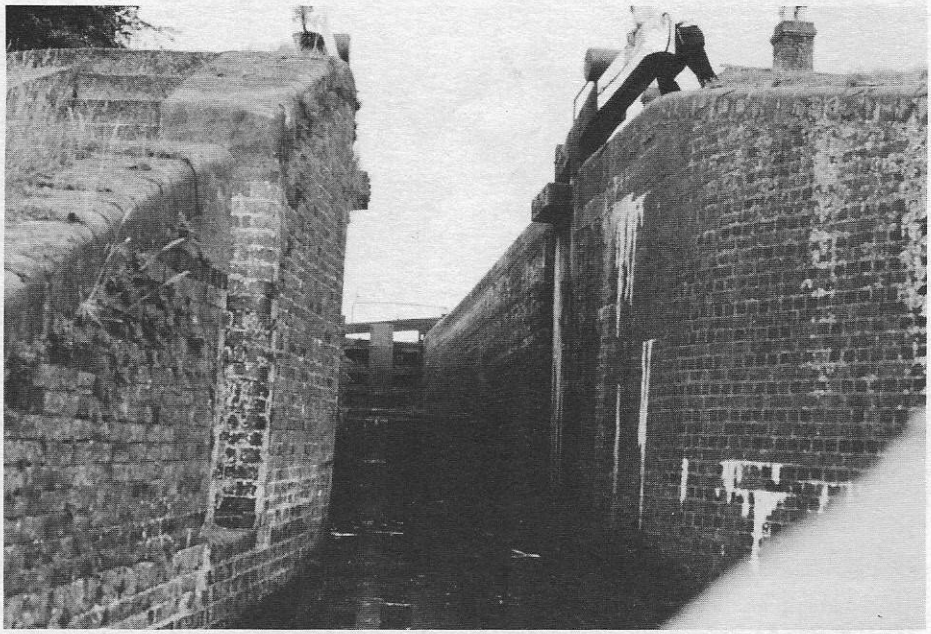
The Peterborough Lift Lock is not the highest hydraulic lift lock in the world. A much higher one is the German hydraulic lift of 38 meters at Scharnebec, south of Hamburg. There is also another lift lock in Belgium higher than the Peterborough lock.

Bev. Wm. Morant

In my article on the TSW in the February issue of *"American Canals"* I gave the depth of the waterway as 8′. According to a letter received from John P. Good of Canadian Parks Service the depth from Ashburnham Lock 20 to Georgian Bay is 6′. Vessels drawing 5′ or more must contact the TSW office in Peterborough before attempting passage.

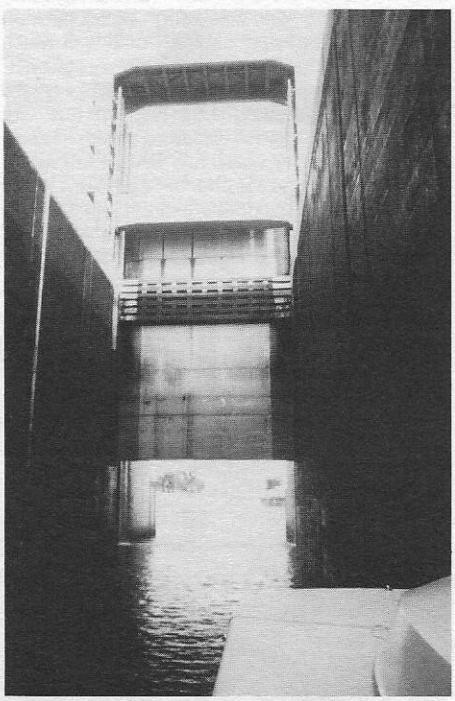
William L. Huber

"ELEVATOR-SHAFT" LOCKS



Summerton Lock, 7 feet wide with a lift of 12 feet, on the Oxford Canal in England. (Photo by Jeremy Scanlon)

In the February 1990 issue of *American Canals*, a picture of the Walter F. George Lock (width 82 feet, lift 88 feet) on the Chattahoochee River was accompanied by an invitation to readers to identify other "elevator-shaft" locks if they could. As the May 1990 issue is going to press, there have been several responses. The first refers to English locks, so the appropriate term is probably "lift-well" rather than "elevator-shaft," but it's a jolly good contribution anyway.



This Carillon Lock on the Ottawa River in Canada with its lift of 67 feet appears to qualify as one of David Ross's "Elevator Shaft" Locks. Note the guillotine-type gate at the lower end. This lock (and dam) replaced eight former locks on the Carillon, Chute-A-Blondeau and Grenville Canals. (Photo by Sidney Beyland)

Linn Loomis sends us this photo of Lock 28 on the Ohio and Erie Canal, just south of Peninsula, Ohio. His comment: "This structure was also called 'Deep Lock'. It is near Deep Quarry, and a part of Akron Metropolitan Park, as well as the Cuyahoga Valley National Recreational Area. It had a lift of 16 feet; hence its lift exceeded the lock width, which was 15 feet."

Jeremy Scanlon, who conducts canal and river cruises under the name of "England Afloat," reminds us that many English locks are only 7 feet wide, and several of them have lifts of more than 7 feet, the highest being Tardibigge, with a 14-foot lift. The accompanying picture, supplied by Dr. Scanlon, is of Summerton Lock, on the Oxford Canal, with a 12-foot lift.

Anyone wishing to investigate this subject at first hand can reach England Afloat at Box 2083, Springfield, Massachusetts 01101.

— David F. Ross

(Note: Your editor has received several other contributions, which are published here also.)