AMERICAN CANALS

BULLETIN OF
THE AMERICAN CANAL SOCIETY

BULLETIN NUMBER 66 Editorial Address—809 Rathton Road, York, Pa. 17403 **AUGUST 1988**

PRESIDENT'S MESSAGE

In April we lost Lew Richardson, a Director of the society and one of our founding members and most active participants. Elsewhere in this issue is Frank Trevorrow's tribute to him. Lew's canal work was not limited to Ohio, for when he retired in 1966 and moved to Georgia, he and Alden Gould were the ones who "rediscovered" for all of us the canals of the south coastal states. Without Lew's painstaking, detailed research we could never have published part two of the American Canal Guide, our inventory of historic canal resources in that part of the country. We had some good times together. He will be missed.

I'd say Terry Woods' new Engineering Design Committee is quite a success, having stirred up some stimulating discussion of canal technology. Let Terry know of subjects you would like to hear about or work up yourself, including theoretical subjects and nuts-and-bolts techniques for preservation and restoration.

One of the long-term goals of Bill Dzombak's Canal Index Committee is to computerize our canal information sheets. Let him know if you have found a good system for doing this, or if you are itching to do a great deal of computer typing.

Meanwhile, while the rivers and lakes are so low this summer, it's a great time to hunt for sunken boats and to inspect timber foundations of stone aqueducts, culverts and locks before it's too late!

Bill Trout

CORPS SCHEDULES ADDITIONAL LOCKAGES ON TENN-TOM

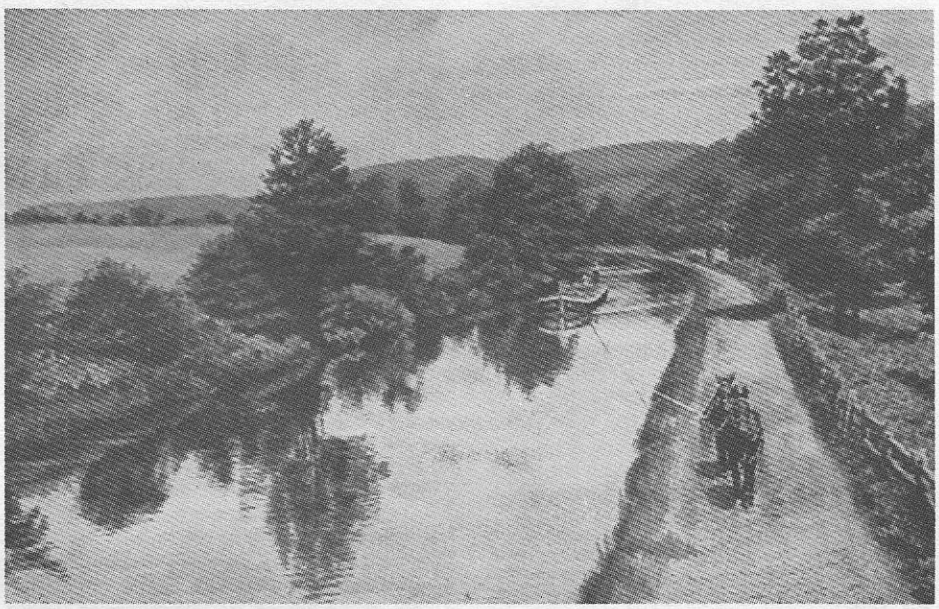
MOBILE, ALA.—The Army Corps of Engineers says now that it has public boat launching ramps in each pool of the Tennessee-Tombigbee Waterway it will increase the number of scheduled lockages times during weekends and Federal holidays for small boats using the waterway for local travel.

Commercial and pleasure craft transiting the waterway as well as weekday lockages will not be affected.

The Corps said it now has a total of 33 free public ramps on the waterway with more under construction as recreation usage increases. There are also a number of private marinas capable of servicing the 100 or more large pleasure craft that use the Tenn-Tom each month in traveling between the inland United States and the Gulf coast.

Lock tenders will have the discretion of locking small boats through with transiting craft including tows but have instructions to consider safety in doing so.

DELAWARE AND LEHIGH CANAL NATIONAL HERITAGE CORRIDOR



(Charlie Derr, ACS Secretary, who has been one of the most active promotors of a Delaware-Lehigh Canal National Heritage Corridor, sends us the following item, as written by Donald Graves for a recent issue of the Bethlehem Globe times. Editor.)

A bill to appropriate $500,000 for restoration work on the Lehigh Canal corridor was introduced in the U.S. House of Representatives Wednesday by U.S. Rep. Don Ritter, R-Lehigh and Northampton counties.

According to the bill, proposed projects that could share in the money include:

- Restoring wooden lock gates at Hugh Moore Park.
- Restoring a building for a tourism center in Bethlehem.
- Cleanup and restoration of the canal in Catasauqua.
- Restoration of locktender houses in Walnutport and Freemansburg.

The bill is a companion piece to legislation submitted Tuesday by Ritter and U.S. Rep. Peter Kostmayer, D-Bucks County, to create the Delaware and Lehigh Navigation Canal National Heritage Corridor.

The first bill would authorize $350,000 yearly for five years to a commission established to oversee the 106-mile-long National Heritage Corridor.

It also authorized a first-year appropriation of $500,000 just for the Delaware Canal portion.

Ritter's bill would authorize an additional one-year appropriation in the same amount for the Lehigh Canal segment.

Isidore "Bill" Mineo, Northampton County parks and recreation superintendent, prepared the list of projects on which the one-year amount could be spent.

Mineo emphasized the list contains projects of the type that could be funded if the money is appropriated. He said the final decision would rest with the National Heritage Corridor Commission, which would work with local groups in deciding how the money would be spent.

Mineo said the $500,000 will be seed money and will not completely finance the projects.

Additional funding could be used for industrial and economic development, as well as new tourism programs, he said.

Ritter said federal money will be provided on a 75-25 percent matching fund system with local government.

The commission set up to oversee the corridor would have eight people from the Lehigh Valley area and eight from Bucks County. Half would be elected officials and half would be chosen from the general public. They would serve three-year terms.

The state would provide three people, including the heads of the Department of Environmental Resources, the Pennsylvania Historical and Museum Commission and the Commerce Department.

(Concluded on Page Ten)

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.

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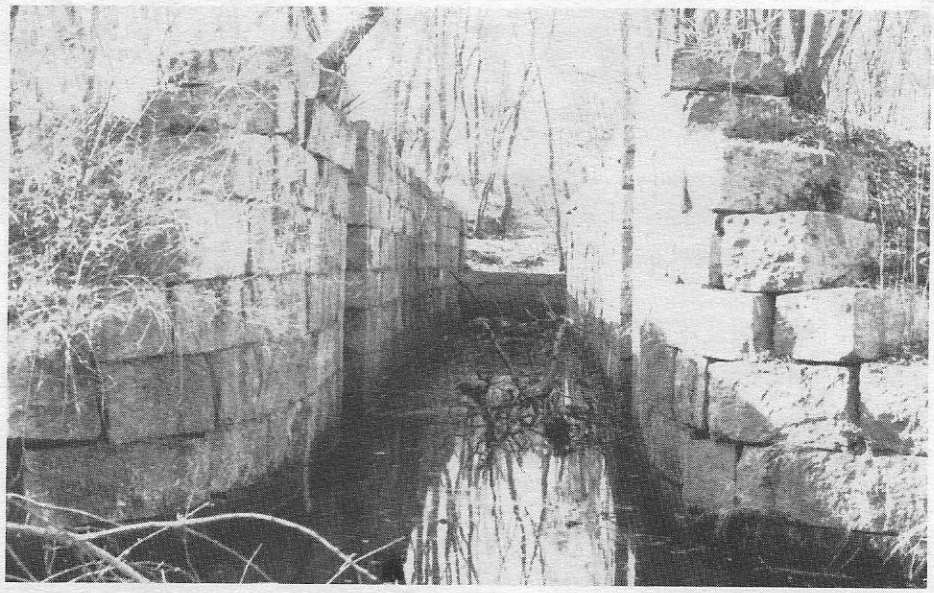
BLACKSTONE CANAL SYMPOSIUM



Blackstone Canal Lock below Millville, Massachusetts, looking into the chamber from the downstream end. (Photo by Dave Barber, 3/12/88.)

Uxbridge, MA—The first Blackstone Valley Canal History and Technology Symposium will be held on Saturday, *October 1, 1988* in conjunction with this year's Heritage Homecoming Celebration.

Announcement of the Symposium was made at a fundraising gathering at the Victorian Restaurant in Whitinsville, held in conjunction with the celebration during May of American Historic Preservation Month. The fundraiser was held to support The Lady Carrington Fund, a project of Blackstone Valley Heritage Homecoming, Inc. to build a full-size replica of the first passenger barge to sail the Blackstone Canal in 1828.

The Blackstone Valley Symposium, which organizers hope will become an annual event, is being co-sponsored by the Blackstone River and Canal Commission and the College of the Holy Cross, according to a joint announcement by Commission Chairman, Rep. Richard T. Moore (D-Uxbridge) and Holy Cross President, Reverend John E. Brooks, S.J.

Rep. Moore stated that David G. Barber of Hopedale, a Director of the American Canal Society and author of two guidebooks to the Lehigh Canal, has agreed to help with the planning and organization of the Symposium.

Moore stated that canal experts and students of the history and technology of America's Industrial Revolution which began in the Blackstone Valley, will be invited to address the Symposium, and their papers will be published to help "to increase the availability of research on this important period in our National history". He added that Lance E. Metz, Director of the Canal History and Technology Symposium at Hugh Moore Historical Park in Pennsylvania, has agreed to assist as a consultant to assist in arranging for speakers and to help publicize the Blackstone Valley Symposium on a national basis.

Moore said that anyone who would like to assist with planning and organizing the new Symposium should contact him as soon as possible so that the first formal planning session can be held. He expects that one of the next steps will be to issue a call for formal papers inviting scholars and students of canal and industrial history and technology to submit papers that would be presented at the October 1st convocation.

Remains of Blackstone Canal Lock at Church Street, Northboro, Massachusetts. Lower gate recesses are under the bridge. (Photo by Dave Barber. 3/12/88.)

CANALS ON STAMPS

The ACS world list of canal stamps was featured in an article by Stanley Holland in the February 1988 WATERWAYS WORLD magazine, with a page of 20 canal stamps in color. Single issues are available at 1.60 pounds from Waterways World, Kottingham House, Dale Street, Burton-on-Trent, Staffs. DE14 3TD, England. Canal stamps is just one of Stan's many interests. His address is 126 Shenley Fields Road, Selly Oak, Birmingham B29 5BU, England. Better start collecting your canal stamps now before everybody does it and the dealers are all out! Many are real gems and would be beautiful when photographed in color and enlarged on a screen.

Mr. Holland has also prepared a supplement to our list, noting more than 100 additional canal and waterways stamps. For a copy, send a self-addressed stamped envelope to W.W. Shuster, ACS Canal Stamps Committee, Box 76, Ave. A, Melrose NY 12121. For a copy of the ACS list as well, enclose a dollar. Be sure to let Bill Shuster or Stan Holland know of any canal stamps we have missed, as well as other stamp news for AMERICAN CANALS.

Bill Trout

HYDRAULIC LIFTS CENTENARY CELEBRATIONS

By Roger Squires
ACS Director for the U.K.

The weekends of 4 June 1988 and 8 July 1988 saw the centenary celebrations of the La Louviere and Les Fontinettes lifts respectively. I was fortunate to be able to represent the American Canal Society at these events.

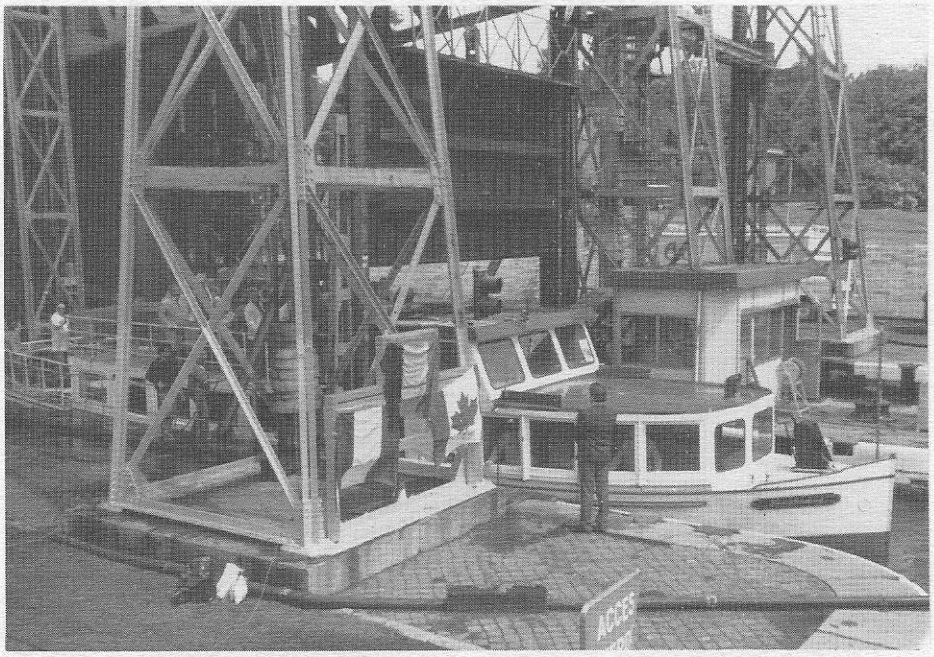
There were eight hydraulic lifts built in the world based on the original Edwin CLARK (1814-1894) designs, developed from the ideas of Edward Leader WILLIAMS. The first was at ANDERTON in England which opened in 1875. One at Les Fontinettes in France opened in 1888. Four were built in Belgium around La Louviere the first of which opened in 1888 and the remainder in 1917. And two were built in Canada between 1895 and 1907 at Kirkfield and Peterborough on the Trent waterway. Six of these eight are still operational and remarkably those in Belgium are still regularly used by a steady flow of commercial craft each carrying 300 tons of coal.

Sadly, as ACS members will have read, the lift at Anderton was taken out of service in 1983 and still awaits major repair. The lift at Les Fontinettes was decommissioned in 1967 when a new European Gauge (1350 tons) shaft lock was built to pass larger craft. The Les Fontinettes Lift is now a static museum piece cut off from the waterway. This makes the future of the remaining six working lifts more important than ever.

The idea behind the hydraulic lifts, devised by Edward Leader Williams and built to Edwin Clarke's designs, was that the two counterbalanced caissons should be able to pass traffic in either direction. Each of the caissons are supported by connected hydraulic rams so that when one caisson is at the higher level and the other at the lower they balance each other. By adding water to the upper caisson or removing some from the lower, the weight difference enables the upper caisson to descend and the lighter lower caisson to ascend. Vessels in the caissons displace their own weight of water so their presence is balanced out. A simple method of raising boats between two levels at little running cost.

The four lifts at La Louviere, the oldest of which was the center of the 4th June centenary celebrations, are due to be replaced in 1993 by a single boat lift with a rise of 73,15 meters at Strepy-Thieu. However, through the efforts of local conservationists the four lifts at La Louviere are to be retained in operational order for use by small craft, principally as a tourist attraction. It was this group, led by Jean Peire Gailliez, who devised the centenary events for the lift adjacent to the village of Houdeng-Goegnies over the weekend of 4 June 1988. Adjacent to this lift they have created a Museum which portrays the links between all of the eight lifts designed by Edwin Clark on the Leader Williams idea. The key element in the 4th June celebrations was the unveiling of plaques to mark the day by the Belgian Minister of Works; representatives from Les Fontinettes; the Chairman and President of the Canadian Canal Society to represent Kirkfield and Peterborough, and the Chairman of the Anderton Lift Preservation Group. Bands played, craft hooted, crowds enjoyed the fun and the whole day was concluded by a Son et Lumiere production to recount the history of the lifts and their links world wide.

The following day a flotilla of craft from Belgium, France, Germany and England passed through the lifts and processed along the waterway to identify with the historic theme of the event. Some of these same craft then proceeded through the canals network to take part in the celebrations at Les Fontinettes a month later on 8th July to commemorate the centenary of the opening of that lift.



Boats from four nations pass through the oldest of the four Hydraulic Lifts at La Louviere, Belgium. This lift was built in 1888 and was the center of the June 4th, 1988 Centenary Celebration, attended by Roger Squires.

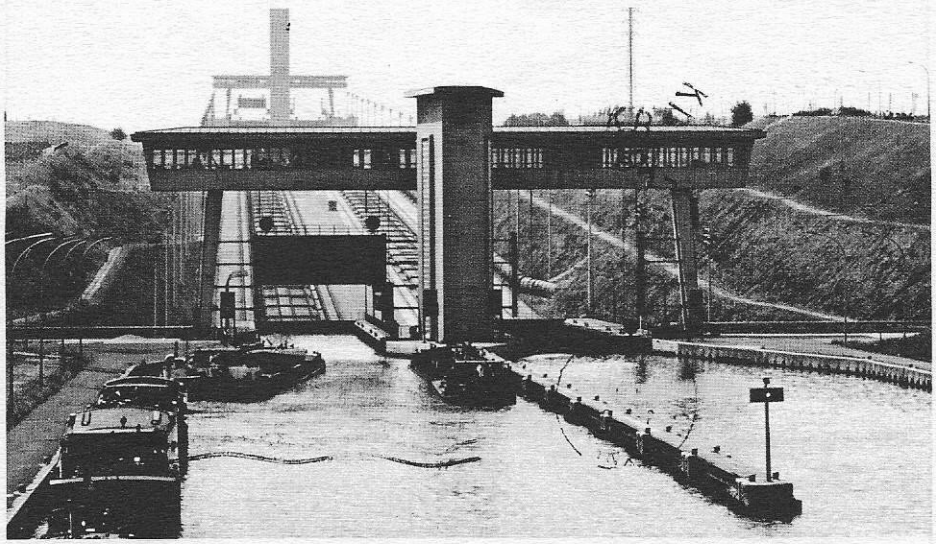
For those ACS members visiting Europe, I strongly recommend that they make a detour to visit these lifts. Les Fontinettes is at St. Omer, just off the autoroute to the Channel Ports. Whilst the four Belgian Lifts are at La Louviere, again on the autoroute in the Hainault Region of Belgium. Quite nearby is the Ronquieres Inclined Plane, one of the waterway wonders of the world, which is also a major tourist attraction in the region.

It was a privilege to attend these celebrations on behalf of the ACS. I hope others will visit them in the years ahead.

SPECIAL EXHIBIT

Syracuse, New York: The Erie Canal Museum has mounted a new special exhibition which features first-person accounts that weave a rich tapestry of images of the Erie Canal, from its construction to its continued operation as part of the New York State Barge Canal System. The exhibition, appropriately titled, "Straight From the Horse's Mouth: Firsthand Accounts of the Erie Canal", is open June 15 - November 30 at the Museum, located in downtown Syracuse.

This portrayal of the Erie Canal through diaries, journals, ships' logs, newspaper accounts, oral histories, travel guides, and visual arts adds a new dimension to Erie Canal history.



Looking upward from the lower level of the Ronquieres Inclined Plane near Chaleroi, Belgium. Two 5000-ton tanks, or caissons, carry the boats up the incline to the next canal level. In this photo, the vessel on the left is about to enter one of the caissons under the guillotine gate, which will be dropped to seal the tank when the boat is in the chamber.

CANAL BOATS OF THE CUMBERLAND AND OXFORD CANAL

by William E. Gerber Jr.
VP, American Canal Society

Recently I had the opportunity to examine the sunken remains of two boats that are thought to have once operated on the Cumberland and Oxford (C&O) Canal. Initial measurements were made of one of these, which was readily recognizeable as being of the "classic" design unique to the C & O. The second boat, examined only from the surface by means of a glass bottomed bucket, appeared to be adapted for use on the canal but was of an entirely different design, perhaps a derivative of a small coastal sailing vessel. Within the near future, I hope to use SCUBA gear to study the two boats more closely.

In the context of the range of craft that have operated on canals throughout the world, the "classic" C & O design was quite unusual. Its unique character derived from being specifically designed to be propelled by three different means: ie., to be drawn by a draft animal; to be sailed; and to be poled. Rarely have boats been designed to have a comparable range of propulsive means. It should be of considerable importance to those interested in documenting American watercraft, therefore, that the opportunity exists to obtain measurements and construction details from one such craft and to photograph its remains. The historical significance of the other boat is not known at this time.

The C & O Canal connected Portland, Maine with Sebago Lake, Brandy Pond and Long Lake; serving the towns of Windham, Gorham, Westbrook, Raymond, Naples and Harrison. The canal opened in about 1830 and continued in operation until about 1870, when competition from newly completed railroads made it uneconomical to operate. Following the canal's demise, some of the canal boats continued to operate on Sebago and Long Lakes and through Brandy Pond and the Songo River. This communication was made possible by the continued operation of the Songo Lock, a surviving part of the C & O.

A number of boats that operated on the canal survived well past the turn of the century; however, none were known to have survived to the present time and all readily accessable derelicts have long since disappeared. There are written accounts of the uses and operation of the boats and a number of photographs of them exist. But there are no known construction plans, or any other forms of documentation, that detail exactly how and where they were built, their size and displacement, or, in the case of the "classic" design, the size and location of the two centerboard boxes.

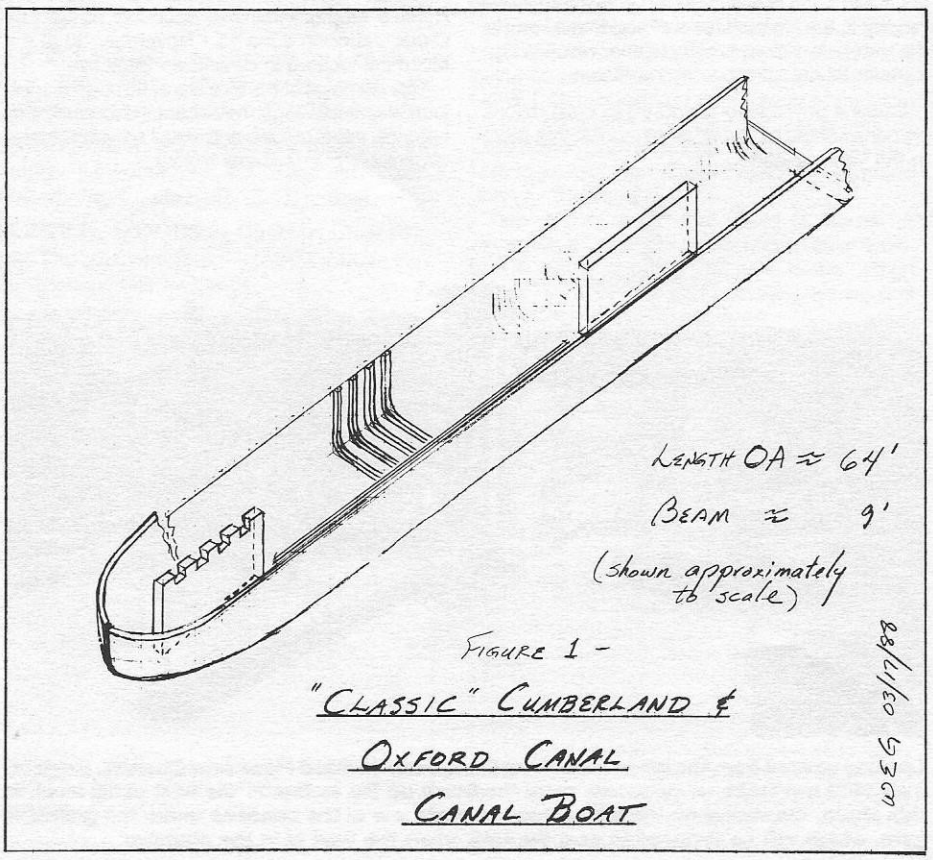
The two boats that have been found are physically located at two widely separated sites which, in an effort to curtail the damage that might result from their becoming objects of curiosity, will only be identified as site 1 and site 2. At the outset of the search for the two boats, expectations were that they would both be of the known "classic" design. This was a boat with an internal keel, about 65 feet in length and 9 feet in beam; with longitudinally planked straight sides that rounded to a flat bottom; having a straight vertical bow stem, with a bow rounded in both planes, and a square stern; and using a schooner sail plan, but without bow sprits or jib sails, with two erectable masts on which gaff type sails were rigged. The boat found at site 1 was of this form. A sketch and measurements of it are provided in Figure 1 and Table 1, following. (The measurements are approximate, having been obtained by a friend, Art Bearce, and I surface diving at either end of a tape measure!)

Table 1
Dimensions of a Cumberland and Oxford Canal Boat, Site 1

Bow to Front of Bow CB (*) Trunk	= 5 feet, 6 inches.
Length of Bow CB Trunk	= 9 feet, 3 inches.
Rear of Bow CB Trunk to Front of Aft CB Trunk	= 29 feet, 8 inches.
Length of Rear CB Trunk	= 10 feet, 2 inches.
Rear of Aft CB Trunk to Transom	= 9 feet.
Beam at the Transom	= 9 feet.
Beam at rear of Bow CB Trunk	= 9 feet, 4 inches.
Beam, one rib forward of front of Bow CB Trunk	= 5 feet, 5 inches.
Spacing of ribs (LE to LE)	= 1 foot, 9 inches.
Width of CB Trunk	= 6 inches.

*CB = Centerboard

Bottom and Ribs of the "Ethel", formerly the "Cereg" at Long Lake in the early 1900's.



As shown in the figure, the sides and bottom, the bow stem and a piece of the transom, and the centerboard boxes remain all reasonably intact. The ribs are all there (although I've only attempted to suggest that level of detail in the sketch). The starboard side planking is pulling away from the bow stem (not shown) and there is a vertical break in that planking about six feet back from the bow. A single plank from what was probably the "poling deck" remains attached to the port side, amidships. Both centerboard boxes are notched on top (one is thus shown) where the deck beams passed across them. The decking and the cabin structure of this boat are missing. (It is remotely possible that some of these parts may be found in deeper water.) There are no obvious signs of the mast steps, although I expect to find some trace of them at the front of the two centerboard boxes when I can brush the silt away.

Table 2
Estimated Dimensions of a C & O Canal Boat, Site 2

Length = 25 to 30 feet Beam = 9 feet

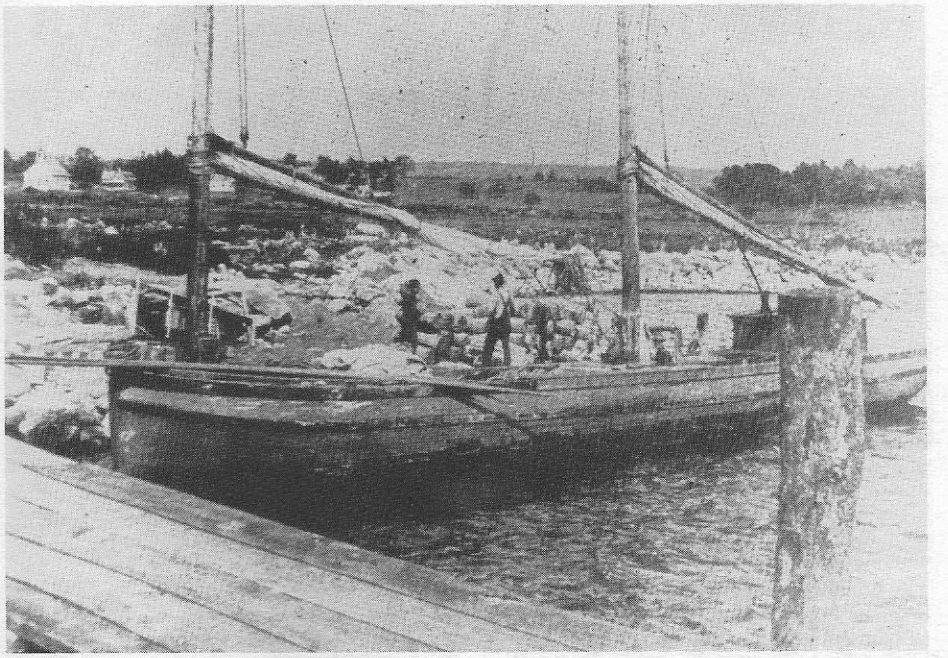
The boat at site 2 is completely different, and of a form not described in any of the readily available literature about the canal. A sketch and estimated dimensions are provided in Figure 2 and Table 2. This hull-remain was also in much poorer condition; only the bow stem and stern post, and the gunnels fore and aft of the center section remain. There is little or no sign of the planking and the center sections of the gunnels have sagged out of sight into the silt and mud of the lake bottom. There are a heavy plank and a fork-like structure near the middle, described below, that may be important. To a considerable degree, the description that follows derives from my "imaginative interpretation" of what I think I have seen.

The site #2 boat is considerably shorter than the one at site #1 and its design probably derived from that of small coastal vessels, such as might have been common in the Portland area at the time of the canal's operation. (Perusal of Howard Chapelle's "American Small Sailing Craft", suggests to me that it may have evolved from a whale boat or Pinky design, or possibly a colonial batteau.)

The site #2 boat is double ended (ie., pointed at both the bow and stern), with a curved bow stem and a straight stern post "raked back" at a fair angle, and it appears to have been more rounded on both its sides and bottom. There was no obvious sign of a centerboard box (although it is possible that some sign of one will be found when the silt can be brushed away); and a local resident stated that neighbors had raised the rudder several years before. (Mr. E. Knight, C&O historian and Canal Society president, stated that the rudder was placed in a museum, in Naples, many years ago.)

The heavy plank and fork structure, resting loose just forward of the mid section, may have been a mast thwart and a permanently stepped fork. If so, these would have been the main support members for a mast that could be pivoted from a horizontal position, where it would have been stowed to clear the bridges on the way up from Portland, to a vertical erected position (and a sail raised) when the boat was prepared to sail across Sebago Lake. The fork might also have served as the tie point for the tow line when the boat was pulled by an animal. Positioned just forward of center, as it appears to have been, the fork/tie-point would not have interfered significantly with steering of the boat while it was under tow.

(Editor's Note: For a complete history of the Cumberland and Oxford Canal, and its special boats, see Joel Eastman's three-part article, Pages 12, 13 and 14 of "Best From American Canals" Number One.)



Loading a C. & O. Canal Boat at Chadbourne Landing, Lake Sebago at Standish, prior to 1879. (Courtesy Ernest Knight.)

Lewis W. Richardson

Word received from his son informed that Lew Richardson, one of our ACS Directors, in Gainesville, Georgia died peacefully on April 16, 1988 whle enjoying an afternoon drive with a friend.

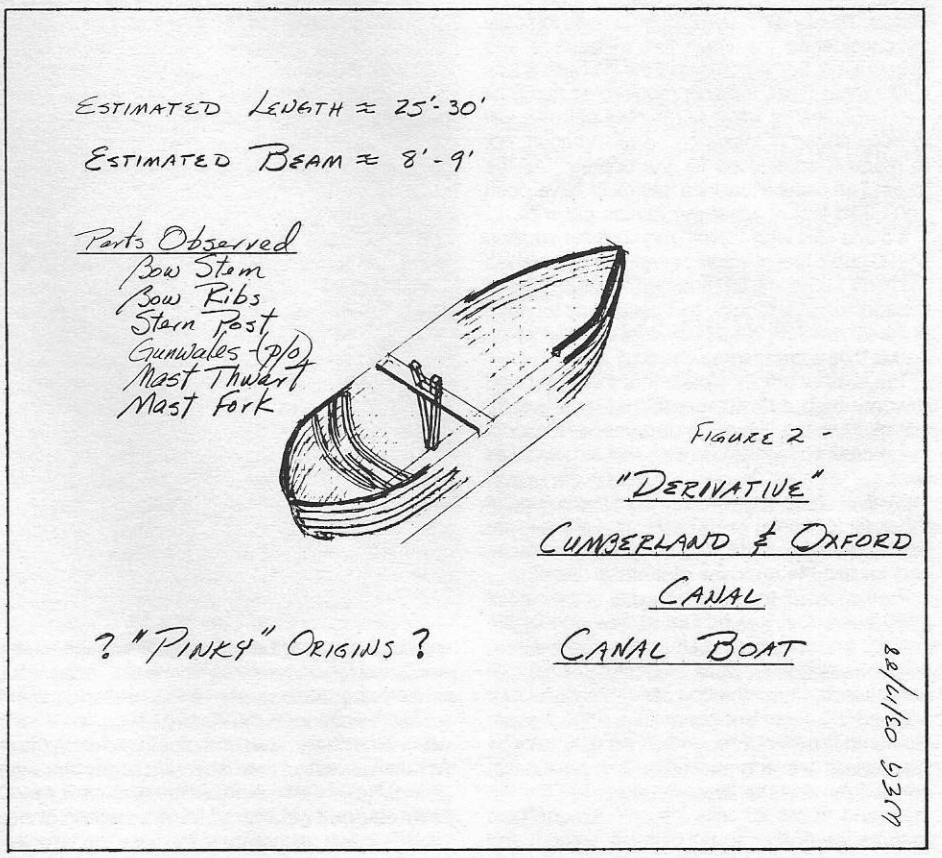
Lew was one of a group, who met in the fall of 1960 at Akron, Ohio to plan the formation of the Canal Society of Ohio.

When the formal organization of the Canal Society of Ohio took place at the meeting at Valley View on March 21, 1961, Lew was elected Second Vice President. He continued to serve as Vice President and Editor of *Towpaths*, the CSO Journal, until his retirement and removal to Gainesville, Ga. in 1966. After his retirement he was elected an Honorary Trustee.

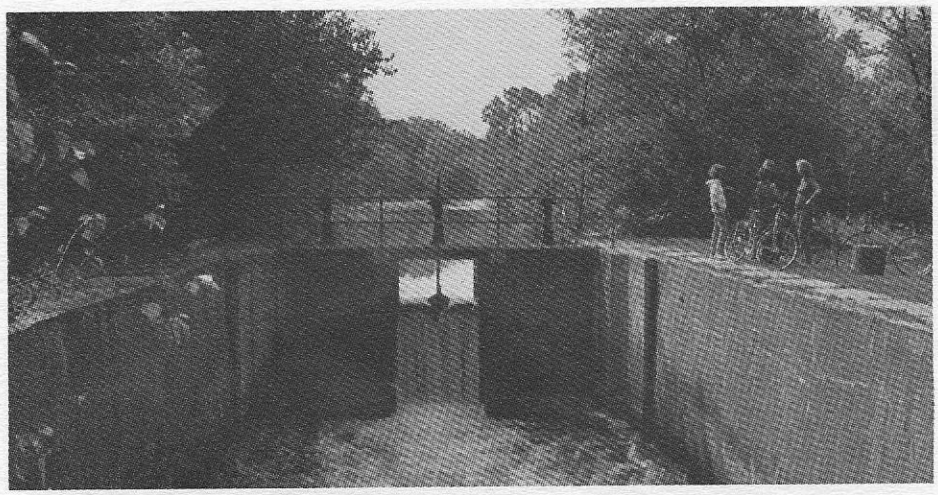
Through his work in the merchandising department of Standard Oil Company of Ohio, which took him to all parts of the state, he could share his interest with like-minded individuals. When Sohio issued its "Let's Explore Ohio" series to newspapers, those related to Ohio canals were based on information supplied by Lew.

The long list of articles in *Towpaths* authored by Lew attest to his contribution to the documentation of Ohio canal history. He was a sound historian and an excellent writer, meticulous in regard to authenticity, accuracy and attribution. As a contributing editor for *American Canals,* he has written a number of excellent articles on the historic canals of South Carolina, Tennessee and Georgia, featured in "Best From American Canals — Volume I."

Frank Trevorrow



SLOPED LEVELS



The Delaware and Raritan Canal, which still runs full of water 154 years after its opening, is fed by a 22-mile long feeder canal running from Raven Rock on the Delaware River, down to Trenton and from there all the way across lower New Jersey to New Brunswick. Needless to say, a calculated incline is required in the feeder to keep the entire sixty miles of the canal bank-full across the entire state!

In reply to your invitation for readers' comments on the article "SLOPED LEVELS" by William Dzombak which appeared on page 9 of the May 1988 issue of AMERICAN CANALS, I offer the following:

Although his arguments against the existence of a gentle longitudinal slope in the bottoms of the canal "levels" are explained in great detail and in a logical and sensible manner, William Dzombak's conclusion that the canal "levels" were indeed level from one end to the other is based on a fundamental error and is not supported by the facts when we examine them.

This error is in assuming that the water in the canal "levels" did not move. That the water in the canals actually did move can be proven logically by considering the water lost to leakage and evaporation. Some portions of the Wabash & Erie Canal (near Peru, Indiana) required as much as 140 cubic feet of water per minute per mile just to keep ahead of leakage and evaporation, not to mention water used for the operation of the locks. The usual allowance seems to have been 100 cubic feet of water per minute per mile.

If a one mile long "level" required the addition of 100 cubic feet of water per minute just to keep the canal full, then a 22 mile "level" would require the addition of 100 cubic feet per minute for each of the 22 miles, or 2200 cubic feet of water which had to come from somewhere.

The laws of gravity dictate that this water had to come from a location which lay at a greater altitude than the "level" in question, and except in the case of "summit levels", that location was at one end of the "level". In order for the mile of the "level" lying most distant from the source of the water to receive its 100 cubic feet of water per minute, the water had to flow away from the source and toward the opposite end of the "level".

If we continue to introduce water at the rate of 2200 cubic feet per minute at one end of the "level", and if each mile of that "level" consumes 100 cubic feet per minute, then after the first mile has taken its share, the flow into the second mile will be 2100 cubic feet per minute, 2000 feet per minute to the third mile, and so on until the flow into the last, or twenty second mile will be 100 feet per minute, and the flow will be zero at the farthest end of the 22 mile "level". Although we assume the bottom to be perfectly smooth and level, this continuous introduction of water at one point and its continuous removal at other points (or an other point) has produced an actual slope in the surface of the water. It is this slope in the surface of the water, independent of the bottom, which causes the water to flow.

Because of the inadequacy of the several small feeders on the 51 mile stretch between the town of Lafayette in Tippecanoe County, Indiana and Coal Creek in Parke County, operation of the Wabash & Erie Canal required 4500 cubic feet of water per minute to be available at Lafayette. The only available source of water at Lafayette was the canal itself, which stretched 22 miles in a long "level" called the "Lafayette level" to Lock Number 33 near the town of Delphi in Carroll County, the location also of a large dam on the Wabash, the source of ample water. In addition to the 2200 cubic feet per minute required by the Lafayette level itself, this "level" had to deliver a surplus of 4500 cubic feet of water per minute at its lower end, requiring the introduction of 6700 cubic feet of water per minute at the upper end.

In his REPORT OF THE CHIEF ENGINEER DESCRIPTIVE OF THE CANAL AT THE COMMENCEMENT OF THE TRUST, delivered to the Canal Commissioners of the State of Indiana in 1847, Chief Engineer Jesse L. Williams wrote:

". . . The greater part of the large deficiency on the lower part of the line, must be passed through the Lafayette level, from the Wabash Feeder at Delphi. Fortunately there is in this stream (the Wabash) an abundant supply."

"The Lafayette level is near 22 miles long, extending from the lock at Delphi (No. 33) to the one at the crossing of the Wea (Lock No. 34). This level was constructed no larger than the established size of 40 feet surface, and, not anticipating so great a demand below, no unusual descent was given it. An inclination in the (water) surface adequate to the passage of the greater quantity of water now required, can only be given by raising the canal surface, at the upper end, to five and one half feet, or, perhaps, six feet, above the bottom."

That the bottom of the 22 mile Lafayette "level" was not actually level may be construed from Williams' statement that "No unusual descent was given it." In order to increase the amount of water per minute being delivered at the lower end of the "level", it was necessary to increase the velocity of the water flowing through the "level". Williams understood that the velocity of flow in an open conduit is regulated by the inclination of its surface and that in order to increase the carrying capacity of the canal the inclination of the water surface must be increased.

If the surface of the water at the upper end of the 22 mile long "level" were raised as Williams proposed, from the original four feet above the bottom to six feet above the bottom, the increase would be 24 inches, giving an additional inclination to the surface of slightly more than one inch per mile. This in addition to whatever the original inclination may have been.

Many years later, in a letter to the Editor of the Fort Wayne Gazette, concerning a proposed plan to use the St. Joseph Feeder canal as a source of water for the City of Fort Wayne, Jesse Williams wrote, in part:

". . . It might be pertinent here to refer to the amazement which fills the minds of many, that there should be a proposition entertained by any one to bring the city her water supply through an open canal, five miles long, built for the passage of canal boats, when it must be obvious to all that a navigable canal can only have a fall of one or two inches to the mile, and is therefore devoid of any cleansing current to keep the sides and bottom free from accumulated filth." (That some current did flow in the feeder is adequately attested by the fact that the minimum amount of water it delivered to the Summit Level at Fort Wayne was estimated to be 4250 cubic feet per minute.)

In Hubert Addison's A TREATISE ON APPLIED HYDRAULICS, on page 197 we find the statement: "The maximum permissible longitudinal slope of the bed of earthen canals is fixed by the water velocity that will just not cause erosion of the banks; this slope is of the order of 1/10000 to 1/5000."

A slope of 1/10000 gives us an inclination of 6.3 inches per mile, while a slope of 1/5000 gives 12.6 inches per mile as the maximum slope of a canal before it starts washing itself out. That the actual slopes were much more gentle is borne out by Engineer Williams' statements.

While a sloping bottom will not induce the flow of water in a canal "level" where the water is lying in a state of perfectly level equilibrium, the addition of water to one end of that "level" will produce an inclination of the surface which will, in turn, produce a flow of water for as long as enough water continues to be introduced at the upper end and to escape at the lower end. If the depth of the water (that is the distance between the surface of the water and the bottom of the canal) is to remain constant throughout the "level", while the water's surface is sloped enough to maintain the desired flow of water, it will be seen that the inclination of the bottom of the canal must equal the inclination of the water's surface.

By applying the formulas available in encyclopedias and engineering textbooks, it is possible to calculate the inclination of the bottom of a channel which is required to pass a given quantity of water. Although I have toyed with the equations for my own entertainment and instruction, I think it best to leave their detailed explanation to others who have more technical engineering training and experience.

For several years, I have "just known" that the canal levels were built with a slope, but never actually sat down to prove it before now. Thanks to Bill Dzombak for his thought-provoking article.

Thomas Meek
Fort Wayne, Indiana

National Canal Meeting in September

September 12 to 15 will be the dates for the National Conference on Historic Canals to be held in Morris, Ill. The conference is sponsored by the Illinois & Michigan Canal National Heritage Corridor Commission, the Illinois Department of Conservation and with the assistance of the Friends of the Illinois & Michigan.

Corridor Interpretive Specialist Robert Holmes has sent information saying the purpose of the conference is to assist managers, administrators and canal friends in the appreciation of the management, maintenance and resource potential of canals through the sharing of ideas, techniques and philosophies.

The three-day program includes lectures on maintenance programming; restoration, rehabilitation and construction; grants, funds and budgeting; a tour of the I and M Canal and canal communities; an evening boat trip on the Illinois River with dinner and entertainment aboard; the canal as a recreational resource; and a panel discussion on interpretation, signage and recreational activities.

Several options for full or partial attendance are available. For complete information write: Dave Carr, Site Superintendent, Illinois & Michigan Canal State Trail Complex, P.O. Box 272, Morris, Ill. 60450.

PORTAGE CANAL SUSQUICENTENNIAL

On June 25th, 1988 the City of Portage, Wisconsin, Downtown Businessmen and the Portage Canal Society celebrated the sesquicentennial of the digging of the first Portage Canal. It was only fitting, that, the workers, who dug the canal with only shovels and wheelbarrows as their tools, be remembered. It was through their efforts, that linked the Fox and Wisconsin Rivers into a waterway that extended to the Great lakes and to the Gulf of Mexico.

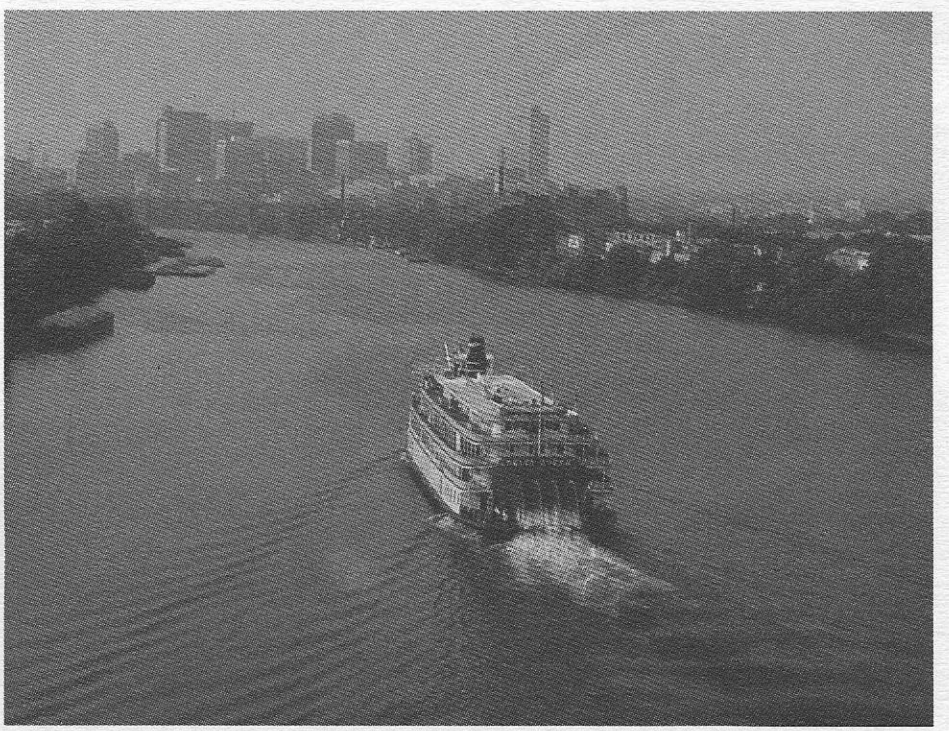
It took 40 years to complete the present canal for the traffic of large boats and to be considered for possible use by gunboats.

A large parade kicked off the celebration, led by a descendant of the man who turned the first shovel of dirt to start the canal.

Market Square was turned into a mall with: arts, crafts, talent show, band concerts, food and much more. Portage Canal Society sponsored the 5th annual race on the canal and Fox River. In spite of the drought and the low water table, there was plenty of water for canoeing. The Canal Society had a display in a Mini-Museum of canal artifacts and among them, a shovel used to dig the canal. One of the on-going projects will be the contacting of the descendents of the canal diggers. Already, many of the families are planning reunions to coincide with the future Portage Canal Day. It was truly a fun day and a first for Portage.

Frederica Kleist

"RIVER HERITAGE CRUISES"



Your Editor recently received a most attractive brochure entitled "River Heritage Cruises" issued by Great American River Cruises, Naples, Florida. The above photo of the Delta Queen traveling one of the "Deep South" canalized rivers out of Nashville graces the cover. There are seven trips listed in the USA, plus a trip up the Rhine. Included are cruises on the Columbia River, St. Lawrence Seaway, Yukon and Alaskan Rivers, Hudson River, and the California Delta, most of them at least a week in length, and including land tours. Fares run from $945 to $2,739 per person. Check it out, with: Great American River Cruises % Uniglobe All-Ways Travel, 1250 Tamiami Trail North, Suite 112, Naples, Florida 33940. Phones: (813) 262-6599 or (800) 523-3716.

SLOPED LEVELS

I have more information about sloped levels (see the February 1988 issue of American Canals and a reply by William Dzombak in the May issue).

Early canal engineers definitely designed canals with a slope to provide a current. In the report of the survey of the Michigan and Wabash Canal (never constructed) Lt. Col. J.J. Abert, the engineer, stated in regard to the slope of one long level

> "From the great length of this level, it is proper that a fall of from one to two inches per mile should be given to the bottom of the canal to prevent stagnation, and to facilitate the passage of the water that is introduced into it from one end only."*

Mr. Dzombak found it impossible to accept the assertion that a slope of one inch per mile could provide a significant flow in a canal. From the illustration in American Canals, we see that Mr. Dzombak is referring to a canal with a level surface and a sloped bottom. As long as the surface is level, I think Mr. Dzombak is correct; the early canal engineers must have been describing a different situation.

An explanation to the problem, I believe, is that the surface of the level was also sloped. An inflow of water at one end of the level would raise the level of the surface at the point of inflow. This would provide a source of potential energy that would be converted into the kinetic energy of the flowing water. The outlet end of the level would probably require a waste weir to prevent the water level at the two ends from reaching equilibrium.

I believe that early canal engineers referred to the slope at the bottom of the canal because canal profiles were frequently measured relative to the bottom. This appears to be true for several Michigan canal surveys that I have examined, although the evidence is not conclusive. As long as the engineer assumed that the depth of the canal was uniform, he would probably see little need to provide an explanation that the surface would also be sloped and that the flow was caused by the sloped surface.

**U.S. Congress, Senate, Doc. No. 143, 22d Cong., 1st Sess., p7; Report from the Secretary of War in compliance with a resolution of the Senate, relative to an examination with a view of connecting Lake Michigan with the Wabash River, in Indiana.*

Eric Zellin
Ann Arbor, Michigan

GOVERNMENT GRANT TO RIDEAU CANAL MUSEUM

The proposed Rideau Canal Museum at Smiths Falls, Ontario, has been given a grant of $2 million jointly by the Government of Canada and the provincial Government of Ontario. The Canal Museum Corporation is pledged to raise $1.5 million from private sources. With these funds it is hoped to have the Museum ready for opening in May 1990.

Wood's Mill and an adjacent three-story masonry building will be the nucleus of the Museum, preliminary planning for which is complete. The buildings are actually owned by The Crown, through Parks Canada, and will eventually house not only the Museum but also the headquarters of the Rideau Canal, its Superintendent and his staff. The Town of Smiths Falls has already given the project its full support and has pledged the sum of $100,000 as its share in the development fund.

Robert F. Legget

CANAL FEEDERS

By Terry K. Woods, Chairman
ACS Engineering Design Committee

The usual method of collecting and conveying available water to the summit of a canal is by reservoirs and feeders. A feeder is a canal, usually with a small cross section, constructed with a suitable slope to convey water either directly into a reservoir, or more commonly from a reservoir into the summit level of the main canal. The dimensions of the feeder's cross section and it's longitudinal slope bear certain relationships to each other in order that it deliver a specific quantity of water in a given period of time.(1)

Water can be made to flow in a level channel, but it can have neither a uniform depth nor velocity. This, as the older engineering texts state, is "because the action of gravity due to the inclined plane of a sloping bottom is wanting, and the water can flow only by forming its surface into an inclined plane, which evidently involves a diminuation of depth at every successive distance from the reservoir."(2) And a change in water depth in a channel with the same bulk flow, requires a change in flow velocity.

Therefore feeders were sized and sloped to carry a specific quantity of water based upon calculated requirements for a particular canal system. The figures in table '1' give the quantity of water that can be conveyed in 10′ wide channels with smooth (masonry or timber) bottoms and with slopes of varying degrees. Table '2' provides multiplying factors for channels with other than 10′ widths. In trapezoidal channels (canal prisms) the mean flow velocity would be from 4% to 6% LESS than the values for similar sized rectangular ones.(3)

The slope of any such feeder, however, has a practical flow limit which in one text is given as 13 inches per second. This would mean a maximum slope of 7″ per mile in a 2 1/2 foot wide channel. Other sources place the flow and slope limit much lower, depending upon the type of channel bottom. An engineer had to calculate his feeder slopes carefully, or scouring, or other damage to the channel's bed could occur.(4)

Differences in velocities at the various depths of a trapezoidal channel were apparently ignored by the majority of the early canal engineers in their calculations and estimates for water requirements and supply. Instead, average, or mean velocities were usually employed for these calculations, though there was some attempt toward the end of the canal era (1860's) to differentiate between surface, mean, and bottom velocities.(5)

Canal engineers took these smooth channel design figures and made allowances (designed the channel to convey a greater quantity of water) for factors peculiar to their situation. Factors to be considered were anything that could impede the easy flow of water. They included, the type and texture of the channel's bottom, growth of aquatic plants in the channel, deposits of mud from rain, washes, etc. or even strong winds blowing against the current.(6)

In order that velocity and flow losses could be kept to a minimum in feeders with channels of small cross sections exiting large reservoirs, a secondary pool or 'funnel' was employed to ease the flow from the reservoir into the feeder. Otherwise, the drastic change in channel width would create an artificial 'fall' that produced a higher velocity at that point than the channel was designed for and would also reduce the calculated depth in the feeder for its entire length.(7)

TABLE '1' OF MEAN VELOCITIES IN FEET PER SECOND; AND OF FLOW DISCHARGES IN CUBIC FEET PER SECOND, IN RETANGULAR CHANNELS 10 FT. WIDE; BUT WITH DIFFERENT DEPTHS AND SLOPES.

Slope inches per Mile	Depth in Feet .50 Vel. Dis.	.75 Vel. Dis.	1 Vel. Dis.	1.5 Vel. Dis.	2 Vel' Dis.	2.5 Vel. Dis.	3 Vel. Dis.	4 Vel. Dis.	5 Vel. Dis.
1	.140	.186	.222	.277	.319	.352	.379	.421	.452
1	.700	1.39	2.22	4.16	6.38	8.75	11.38	16.8	22.6
2	.236	.301	.351	.430	.489	.536	.573	.633	.677
2	1.18	2.26	3.52	6.45	9.75	13.4	17.2	25.3	33.8
3	.309	.389	.452	.547	.619	.677	.723	.792	.842
3	1.54	2.92	4.52	8.22	12.4	16.9	21.7	31.8	42.1
4	.371	.463	.536	.647	.729	.792	.850	.933	.992
4	1.86	3.47	5.36	9.67	14.6	19.7	25.5	37.3	57.9
5	..426	..529	..609	.733	.827	.900	.958	1.05	1.12
5	2.12	3.97	6.09	11.0	16.5	22.5	28.7	42.0	56.2
6	.476	.587	.677	.812	.917	.992	1.06	1.17	1.24
6	2.73	4.41	6.77	12.2	18.3	24.7	31.7	46.6	62.1
7	.522	.642	.738	.883	.992	1.08	1.15	1.27	1.34
7	2.61	4.82	7.38	11.2	19.8	27.1	34.5	50.7	67.1
8	.562	.693	.795	0.95	1.06	1.16	1.23	1.36	1.44
8	2.82	5.20	7.94	14.2	21.3	28.9	37.0	54.3	72.1

(Reworked from Trautwine)

In this aspect of canal engineering, as in all others, the engineer was guided, first, by his theoretical knowledge (a careful study of the information available) and secondly, by that practical experience which could only be gained by careful examination of canals in actual operation.(8)

1) *ELEMENTARY COURSE OF CIVIL ENGINEERING FOR THE USE OF CADETS OF THE UNITED STATES MILITARY ACADEMY, D.H. Mahan M.A.; 1866; John Wiley; New York; Pg. 322.*
2) *THE CIVIL ENGINEER'S POCKET BOOK, John Trautwine Jr. C.E.; 1885; John Wiley's & Sons; New York; Hydraulics, Art 24. Pg. 275*
3) *Ibid.*
4) *Mahan; Pg. 322. Trautwine; Art. 18; Pg. 270.*
5) *Trautwine; Art. 21; Pg. 271.*
6) *Trautwine; Pg. 275.*
7) *Trautwine; Art. 22. Pg. 273.*
8) *CANAL & RIVER ENGINEERING: 1884; Stephenson; London; Pg. Pg. 22*

TABLE '2' OF MULTIPLIERS FOR VELOCITIES IN CANALS OF WIDTHS OTHER THAN TEN FEET.

Depths Feet	5 Ft. wide	15 ft. wide	20 ft. wide	25 ft. wide	40 ft. wide	60 ft. wide	80 ft. wide
8	0.77	1.13	1.22	1.28	1.40	1.47	1.51
6	0.79	1.11	1.19	1.25	1.33	1.39	1.42
5	0.80	1.10	1.17	1.22	1.29	1.34	1.37
4	0.81	1.09	1.15	1.18	1.25	1.28	1.30
3	0.83	1.07	1.12	1.15	1.21	1.23	1.25
2	0.86	1.05	1.09	1.11	1.15	1.16	1.17
1	0.91	1.03	1.06	1.07	1.08	1.09	1.10

(From Trautwine)

THE RIDEAU CANAL

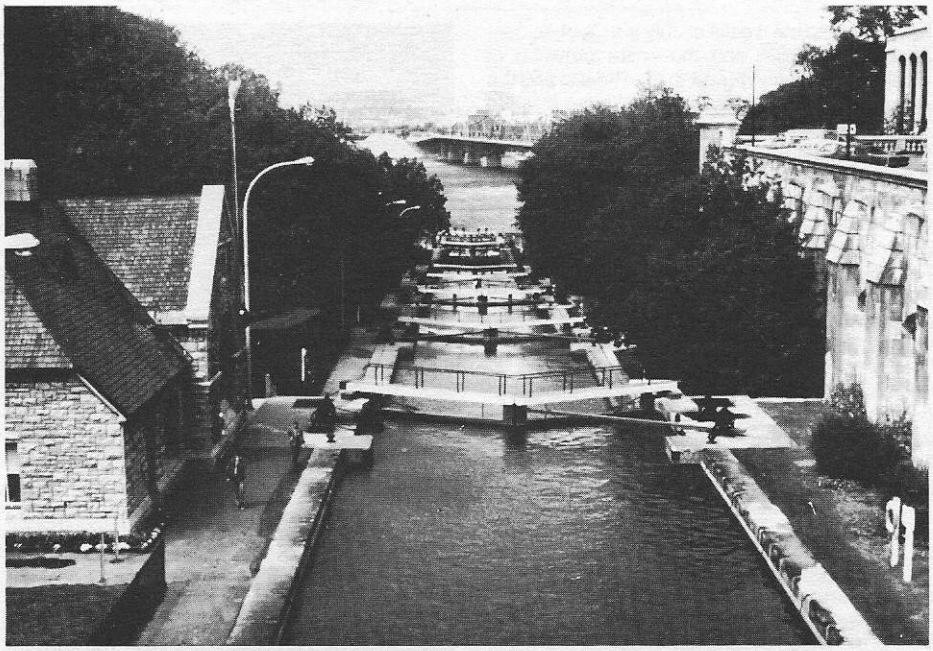
Editor's Note: Richard Porto, a boat enthusiast of San Francisco, sent us the following item on the Rideau Canal in Ontario, Canada. It was written by Joan Eyolfson Cadham, for a recent issue of the SMALL BOAT JOURNAL.)

Ironically, Canada's historic Rideau Canal was originally built to keep out Americans. At the conclusion of the War of 1812, the British realized that defending and provisioning Upper Canada (now Ontario) by way of the St. Lawrence River was simply too precarious. A post-war survey verified the possibility of engineering a gunboat canal linking the Ottawa River to the Royal Navy base in Kingston. Lieutenant-Colonel John By, sent from England in 1826 to build the canal, persuaded officials to enlarge the original concept to allow steamboat travel. The 123-mile waterway — 47 locks and 12 miles of canal cuts, linking a chain of lakes and rivers — was completed in 1832, at an enormous cost to life and to the government, which had to bear serious cost overruns. Colonel By was censured and died in quiet disgrace. However, the anticipated war never happened, and the Rideau served as a commercial waterway until after World War I. During the Great Depression, it narrowly missed being dismantled, but since Parks Canada took over its stewardship in 1972, the Rideau has become one of the finest canal systems anywhere.

Today, the Rideau Canal attracts scores of Canadians and Americans alike. For many boaters, it has become an annual retreat, as they return again and again to savor its beauty and charm. Indeed, the Rideau would be a paradise for any boater, but strictly enforced speed restrictions and the absence of commercial traffic make it especially suitable for small boats.

The Rideau Canal can be approached from any town or park along its length by trailerable boat, but boaters usually launch at the municipal marina in Hull, Quebec, just across the river from Ottawa, and climb the staircase of eight locks that lift boats 79 feet from the Ottawa River up to the canal proper in the heart of downtown Ottawa, Canada's capital city.

Because of the low clearance under Ottawa's fixed bridges, sailboat masts need to come down.



The flight of Eight Locks on the Rideau lifts boaters 79 feet from the Ottawa River (seen in the background) up to the Parliament Houses area in downtown Ottawa.

A mast that is easily stepped and unstepped will facilitate sailing in the system's lake section.

The Rideau is one of the oldest canals in North America still functioning with original equipment, and the lock gates and valves are all hand-operated by permanent park staff who are uniformly helpful, friendly, and cheerful. At 15-foot intervals along the lock walls are rubber-covered cables. The boater catches one or two of these cables with a boat hook, then slips a line round the cable to control the boat while the water rises or falls. On a busy day, the lockmasters call the boats in by size and order of arrival, the larger craft taking the walls, and the smaller boats rafting alongside. The lockmasters pride themselves on knowing exactly how many boats they can squeeze into the lock.

There's ample tie-up space in Ottawa, as there is all through the system. In the capital city, politicians jog or bike to work alongside the canal, football teams work out along its banks, troops march across the bridge for the ceremonial changing of the guard at the parliament buildings, and in winter, office workers skate to work on it.

There is a fee for boaters, but the one pass, purchased daily, weekly, or annually, covers all facilities. The locks are grouped into 23 stations offering protected overnight tie-up, spotless bathrooms (without showers), picnic and camping facilities, nature programs, hiking paths, and living museums.

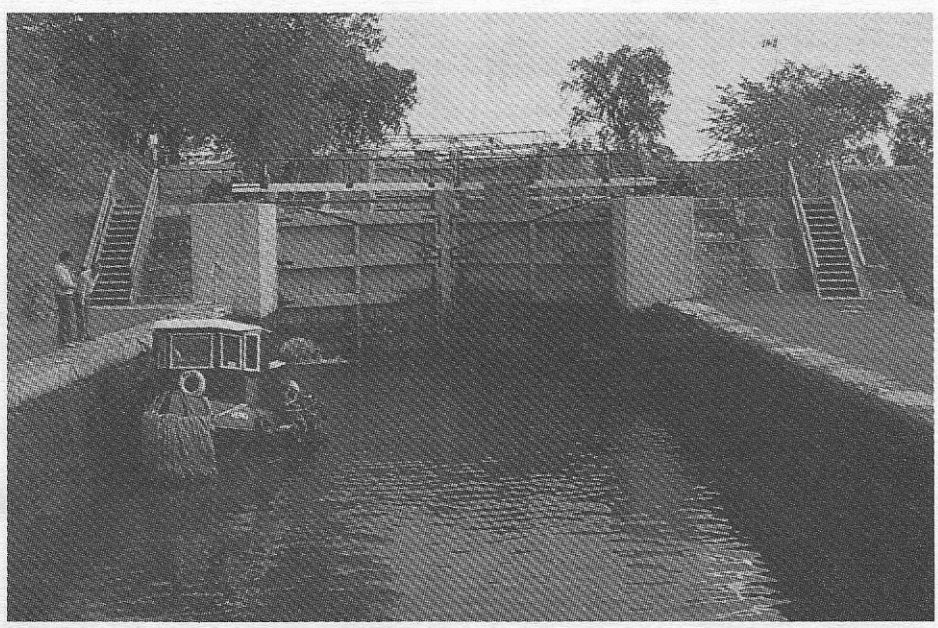
But most of the history can best be picked up by rambling through the little towns along the route. For example, Newboro offers a jewel of a little stone Anglican church. A short walk from Newboro is an Anglican cemetery, and across the road a stark sign in the Old Presbyterian cemetery honors the sappers and miners who died of malaria while building the canal.

The Rideau was torn out of uninhabited wilderness, through bogs and swamps, through solid bush and equally solid granite. Many of the original blockhouses remain as mute testimony to the endurance of the men who built, worked, and defended this waterway.

There is no more malaria, but the mosquitos remain, and they are legendary (though there is little truth to the rumor that they will carry away all craft less than 11 feet long). Rideau deer flies are dainty creatures with spotted triangular wings and a predilection for gnawing on human flesh. Fly swatters and mosquito netting or mosquito coils are very useful.

A good camera with a long-range lens and lots of film is equally important, as is a boat hook or two and a pair of lines for locking through, and a mud-bottom anchor for over-nighting or swimming in the Rideau lakes.

The Rideau is open from mid-May to mid-October (or from Canada's Victoria Day to Canada's Thanksgiving weekend). However, the



Typical Lock on the Rideau Canal, maintained and operated by Parks Canada personnel.

(Concluded on Page Ten)

RIDEAU CANAL

(Concluded from Page Nine)

last two complete weeks of July are Quebec construction holidays, and the entire province of Quebec seemingly moves to the Rideau and the Thousand Islands. Lineups at locks are the rule during this period.

VHF reception is patchy through the Ottawa River, possibly caused by iron ore deposits, and there is a magnetic anomaly in the Kingston area that affects compasses. According to an experienced Rideau lakes cruising couple, there are two solutions: use a CB radio, and carry a 'Signal Mate' emergency replacement antenna, which will at least guarantee reception of Coast Guard weather forecasts.

The Rideau is meant to be savored. Colonel By and his family made the first complete Rideau trip by steamship in 5 days. We took 2 weeks for our last Rideau trip aboard our 38-year-old 23-foot Duet class wooden sloop, the *Hirondelle,* and still we didn't have time enough.

VISITOR INFORMATION

Ontario Ministry of Tourism and Recreation
Ontario Travel
Queen's Park
Toronto, Ontario M7A 2E5
(800) 268-3735

Rideau Canal
12 Maple Ave. North
Smith Falls, Ontario
Canada K7A 1Z5
(613) 283-5107

CHARTS

Hydrographic Chart Distribution Office
PO Box 8080
1675 Russell Rd.
Ottawa, Ontario
Canada K1G 3H5
(613) 998-4931

BOOKS

Building the Rideau Canal: A Pictorial History. Parks Canada and Fitzhenry and Whiteside.

Rideau Boating and Road Guide ($6.95 Can). Ontario Travel Guides, 100 Helena Ave., Toronto, Ontario, Canada M6G 2H2.

Small Craft Guide, Rideau Waterway and Ottawa River. Fisheries and Oceans, Ottawa, Canada K1A 0E6.

DISMAL SWAMP CANAL NOW ON NAT'L REGISTER

CHESAPEAKE, Va. (AP) — The Great Dismal Swamp Canal, hand hewn by slaves from the wilderness nearly two centuries ago, has been placed on the National Register of Historic Places.

The designation Monday culminated a two-year effort by Virginia and North Carolina officials.

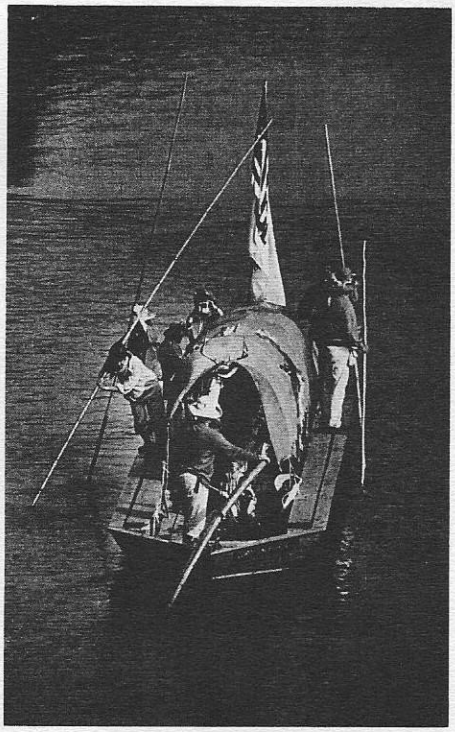
"I hope people who may have been indifferent to the canal will now view it in a different light," said Rep. Walter B. Jones, D-N.C., who has struggled for years to prevent closure of the 55-mile cut linking Deep Creek in Chesapeake with North Carolina's Pasquotank River.

As early as 1728 William Byrd proposed a canal to link Virginia and the Albemarle region of North Carolina. George Washington also mentioned the possibility in the 1760s.

An act for "cutting a navigable canal through the swamp" was passed by the Virginia General Assembly in 1787, with North Carolina following suit three years later. The canal was constructed from 1793 to 1805 and led directly to the rise of Elizabeth City, N.C., as a transportation center.

The waterway has been used by pleasure boats for decades, but drought and expensive repairs to the locks forced closure of the canal in the peak traveling periods in recent years.

"Lord Chesterfield"



The Bateau LORD CHESTERFIELD has become a state-wide recognized symbol of the Virginia Canals and Navigations Society. It is shown here, with its crew, on the Rapahannock River at Fredericksburg, Virginia during the Society Annual Meeting May 13-15, 1988 in that city. Photo by the Fredericksburg "Free Lance-Star", courtesy of Cliff Satterthwaite.

Delaware - Lehigh Corridor

(Concluded from Page One)

Ritter emphasized the corridor's success depends on a partnership between the public and private sectors, as has been successfully implemented for the Illinois & Michigan Heritage Canal Corridor in Illinois.

Such a system, he said, provides an effective way to extend limited federal resources into a broad regional effort that will include the Lehigh River and adjacent historical sites.

"The Corridor can serve as a unifying force, bringing our communities together" Ritter explained, and not just with historic preservation, but recreation, conservation, sportsman's activities, economic and residential development, the environment and tourism.

The National Heritage Corridor "encompasses all these things," Ritter said. "This is the path to a regional approach that is so essential for the future of the Lehigh Valley."

He described the project as a golden opportunity: "We were looking for a handle to get everybody together to develop a regional focus."

Organizations which have been working for years on various segments of the project include the Walnutport Canal Association, the Old Freemansburg Association, the Hugh Moore Park, the Delaware Valley Protective Association and the recently formed Friends of the Delaware Canal.

IRISH CANAL WAR

(ACS Vice President Bill McKelvey is a great researcher. He scans old records and magazines, looking for canal-related items. The following is one he turned up in NILES REGISTER for June 21, 1834. Editor.)

About two weeks since, the Irish laborers on the Chesapeake and Ohio canal, near the Point of Rocks, had a series of battles among themselves, in which three persons were murdered, and many others injured. And during the whole of the present week, two or three companies of the Baltimore volunteers have been engaged in a harrassing and unpleasant duty, to reduce and keep in order large bodies of Irishmen, employed on the Baltimore and Washington rail road, about 18 miles hence, in the neighborhood of the Patuxent—who, divided and marshalled into two furious parties, the *Fardowns* or *Longfords* and the *Corkonians,* commenced general hostilities on Sunday last, which have been partially continued, notwithstanding the presence of the troops, up to this time, though some sixty or seventy of the apparent leaders had been arrested and sent to prison. It is believed that four or five persons have been murdered in these affrays, and broken heads, black eyes and bloody noses are "without count" — several being also seriously injured in some of their limbs. It is said that they had collected about forty muskets, and appeared resolved to use them against the troops—but they gave way whenever an advance was made upon them, and scattered in the woods, through which they were hotly pursued. Several of the shantees, or huts, had been fired by them and consumed, and much distress prevails, among the women and children. The whole affray was among themselves, except that they essayed an attack upon a body of German laborers, who resisted and beat them back, being well disciplined and steady, and partially armed for defence. A good many of the Irish were supplied with short pikes. The number of rioters is thought to have been four or five hundred, on each side; and neither party seems yet disposed to end the quarrel. From 100 to 150 of the troops remain in the neighborhood.

ALEXANDRIA MUSEUM OPENS

The new Alexandria (Va.) Waterfront Museum was opened on June 30, 1988. The Museum interprets the development of the city's waterfront and maritime activities from Alexandria's founding in 1749 to the present. The Museum is located along the route of the Alexandria Canal, which operated from 1843 until 1886.

It will be open Tuesdays through Fridays from 11 a.m. to 4 p.m. and from 1 p.m. to 4 p.m. on Saturdays and Sundays. Admission is free. The museum is located in the TransPotomac Canal Center, 44 Canal Center Plaza, and is adjacent to the reconstructed Alexandria Canal tide lock.

An integral part of the Alexandria Waterfront Museum's interest is the remains of the Alexandria Canal, a seven-mile extension of the C & O Canal, which used four locks to lower canal boats into the Potomac River. The tide lock, the lock that released the boats directly into the river, has been excavated by Alexandria Archaeology, a division of the Office of Historic Alexandria. The four locks lowered canal boats 38 feet to the Potomac River, where their cargoes were then transferred to ships heading for foreign or domestic ports, or collected by merchants in Alexandria for sale within the community.

THE SHUBENACADIE CANAL

To: Bill Shank, Editor, AMERICAN CANALS

My wife and I attended an Elderhostel course at Dalhousie University in Halifax, Nova Scotia the last week in July. In our visits around the city I picked up a copy of the enclosed leaflet "The Shubenacadie Canal - Restoring the Past". This led to a visit to the Interpretive Centre in Dartmouth across the harbour from Halifax.

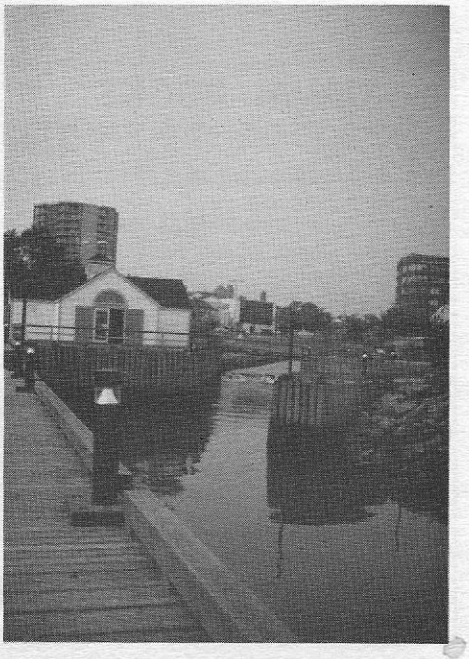
The two young ladies there were most helpful and generous with their time in showing me around the Centre and the various interesting exhibits they have on display. They suggested I contact Mrs. Mildred Richardson, the Executive Director of the Shubenacadie Canal Commission for additional information.

In a telephone conversation Mrs. Richardson was most cordial. I took it from her conversation that she was not acquainted with our Society and would like to exchange information. She promised to send me additional information about their project. The enclosed packet arrived this week.

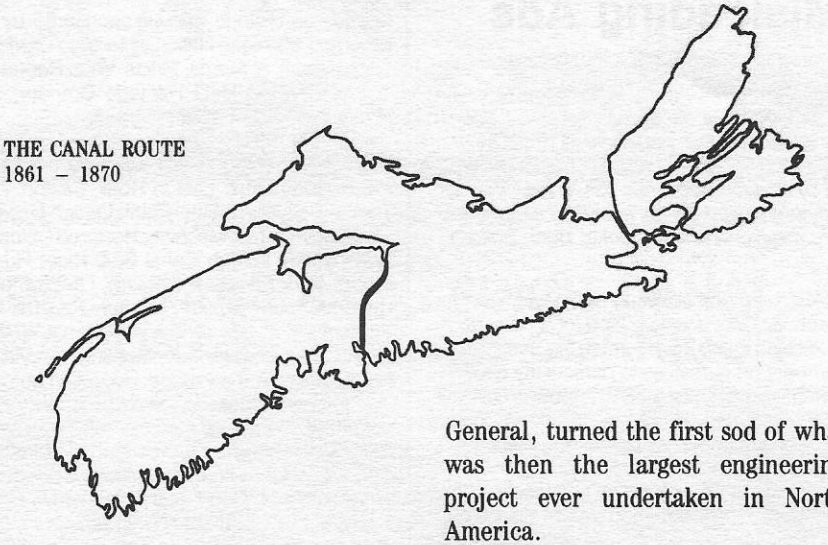
I was surprised at the amount and quality of work their group has done in the short time they have been working on the restoration. I take it from the writeup that they have had help from the provincial and national governments and they seem to have spared no ends to present a complete and beautiful restoration to the visitors. I'm also sending photos I took of the canal as it passes the Interpretive Centre and empties into Dartmouth Harbour. I did not visit the Fairbanks Centre. They are working toward the day when pleasure boats can cross the Nova Scotian peninsula on the restored canal.

I'm sure Mrs. Richardson would like to continue friendship with our Society. Mrs. McCray can attest to the beauty of Halifax and Dartmouth and to the friendliness and kindness of their citizens.

Richard N. McCray
Hendersonville, North Carolina



Dartmouth Harbour and end of the partially restored Shubenacadie Canal. Interpretive Centre building, at the left. (Photo by Richard McCray.)



The largest part of the Shubenacadie Canal was laid over 20,000 years ago. During the last ice age, moving ice left in its wake a remarkable lake and river chain — one that practically connected the Bay of Fundy with Halifax Harbour over a distance of 86 kilometers. It became a significant means of transportation for native peoples over 2000 years ago.

The merchants of early Halifax soon realized the trade potential of the waterway. Legislators of the day also recognized its value in transporting troops to the other side of the province quickly and safely. As a result, in 1797, the Legislature voted funds to survey the route from Halifax to the Shubenacadie River System. However, it is not until 1824 that Francis Hall, an English engineer, submitted plans and estimates for construction of a canal.

Construction began at Port Wallace on July 25, 1826, financed by the merchants of Halifax. They expected the new canal would ensure good trade with settlements on the Bay of Fundy and at the same time, open up undeveloped areas in the centre of the province. Lord Dalhousie, the Governor General, turned the first sod of what was then the largest engineering project ever undertaken in North America.

Unfortunately, the completed canal did not bring the expected benefits and revenues. The 35 years of construction had been a bad omen. During that time, the project had suffered many setbacks — construction problems and bankruptcy among them. During its best year, it showed a profit of only $3,000, less than 1% of the total investment. Competition with a newly constructed railway sealed its fate. In 1870 it was abandoned. Navigation on the canal became impossible when a railway bridge was built at Enfield, and a drawbridge was replaced with a fixed one at Waverley.

The Province of Nova Scotia began restoring the canal in 1984. The Minister of Development, the Honourable Roland J. Thornhill, signed an agreement with the Federal Government, which began the rehabilitation of two key sections of the canal. These areas include the entrance to the canal system at Halifax Harbour, where you will find an Interpretive Centre, walkways and a small boat basin. In the Port Wallace section, there are two restored locks, a beautiful walking area, several historic sites, and a major Interpretive Centre.

To: Richard N. McCray

How pleasant it was to chat with you. I certainly appreciate you taking time out of your vacation schedule to support the Shubenacadie Canal project. I have enclosed material containing information that may be passed on to the American Canal Society. I would appreciate any information you may have in your canal library pertaining to the Shubenacadie Canal. Thank you for your interest. I look forward to your return visit to Nova Scotia, and a visit to the Fairbanks Centre.

Mildred G. Richardson
Shubenacadie Canal Commission

Complaints About Misleading Ads

(Another item turned up by ACS Vice President Bill McKelvey in his canal research. This one is a Card Advertisement published in EMPORIUM AND TRUE AMERICAN for June 8, 1838. It is signed by several dozen irate passengers from all over eastern United States, after their experience on a Pennsylvania Canal Packet Boat. Editor.)

A. CARD—We the undersigned, passengers in D. Leech & Co's Packet Line of boats from Philadelphia to Pittsburg, deem it an imperious duty incumbent on ourselves to particularly caution the travelling community against impositions of the grossest character, practised by the agents, representing the boats "as possessing every convenience for board, lodging, & c., and fully equal to the best hotels." Our surprise and feelings can be much better imagined than described, on our arrival at Columbia, to find the story of these Shylocks diametrically opposite, in every particular, to what we had been led to expect, as we found ourselves, numbering more than one hundred!! crammed so close that it was found utterly impossible to make room in the cabin to spread what few beds were furnished, and a vast number of ladies were obliged to remain on deck all night. We related our grievances to the agent in Harrisburg, and all the satisfaction we received was, "that you shall neither have another boat, nor your money refunded." But one alternative remained, which was, to stop the boat and demand another; they saw we were resolute, and quickly complied. After dividing our passengers in the boats there were still quite a number unprovided with berths. Persons along the line assured us that it is a matter of diurnal occurrence. Therefore, we hope this may prove a salutary caution to those emigrating west. In conclusion, allow us to observe that this is their "Superior $10 Line," which only ought to hear the appellation of common freight boats; and much more might be said in reference to this swindling concern, but we hope that this will operate as a caution to those who have fortunately not yet suffered by their impositions.

EXPLOSION ON THE OSWEGO CANAL

(A letter just received from our ACS Canal Traveler, Walter Meseck, indicates that there are uncorrected dangers in traveling some of the remaining American canals. Editor)

Over the past week-end a few of us from the SSHSA got together and made a two day trip on the "EMITA II" from Liverpool to Oswego and return on the Oswego River branch of the canal. We didn't pass a single commercial tow but the small boat traffic does seem to be picking up and you see boats tied up all over the place.

Unfortunately we were held up for two hours at Lock 2, Fulton, N.Y. A power boat exploded, burned and sank in the lock. There were no fatalities but both of those on board were injured. The boat was a total loss.

It is becoming more and more obvious to me that the canal is not equipped to handle such occasions. There are no fire extinguishers in evidence and no fire hoses present. Fortunately the boat had just come up in the lock so was at top level. Had it been going down the only way out is via the four narrow ladders that are in the corners of the lock. I am sure you have noticed that the Canadian canals are well equipped with escape ladders along the lock walls that are 5 and 6 feet wide plus the fact that fire extinguishers are on the lock walls when the locks are operating.

Next week I am off on a 5 day trip on the Rideau Canal with a group from the Canal Society of New Jersey. It will be my 5th trip through but it is a pretty trip so not hard to take.

CANAL CALENDAR

September 12-15, 1988 — National Conference on Historic Canals, sponsored by Illinois and Michigan National Heritage Corridor Commission, at Morris, Illinois. Write Robert F. Holmes, I & M Nat'l Heritage Corridor, 30 North Bluff, Joliet, Illinois 60435.

September 15-18, 1988 — Society for Industrial Archeology Fall Tour, Lehigh Valley, Pa. Headquarters: Easton Hotel, Easton, Pa. Tour of Bethlehem Steel Plant, Lehigh University Structural Test Machine, Restored Colonial Waterworks, Lehigh Canal Boat Ride, Hugh Moore Park Facilities. Contact: Lance Metz, Canal Museum, Box 877, Easton, Pa., 18044.

September 21-23, 1988 — National Waterways Conference Annual Meeting, Opryland Hotel, Nashville, Tennessee. Reception abroad the "General Jackson" showboat, and dinner cruise. Combined meeting with Tennessee River Valley Assn., Cumberland Waterways Council and American Waterways Operators. Write Harry N. Cook, Nat'l Waterways Conference, 1130 17th St., NW, Washington, DC 20036.

September 24, 1988 — Canadian Canal Society Fall Field Trip, a tour of the Toronto Waterfront Facilities. Contact: Canadian Canal Society, P.O. Box 1652, St. Catharines, Ont. L2R 7K1.

October 1, 1988 — Canal Society of New York State Field Trip. From Lock 18 Cohoes to Pattersonville Aqueduct including locks, aqueduct and a dry dock. Contact: John Hulchanski, P.O. Box 1186, Latham, NY 12110.

October 6-8, 1988 — Welland Canal Rally, Brock University, joined by the Steamship Historical Society of America. Tour of the Canal and Canal Control Center. Lectures. Contact: Welland Canals Foundation, P.O. Box 745, St. Catharines, Ont. L2R 6Y3.

October 8-9, 1988 — Canal Society of Ohio, combined with Canal Society of Indiana, Fall Field Tour, Defiance, Ohio. Tour of the Wabash, Miami and Erie Canal from Independence Dam to the State Line. Write: Edith McNally, 1341 West 112th St., Cleveland, Ohio 44102.

October 14-15, 1988 — Fall Field Trip, Penna. Canal Society, Union Canal, Lebanon, PA. Bob Keintz, (717) 259-9831.

October 15, 1988 — Batteau Day, above Petersburg, Virginia on the Upper Appomattox Canal opposite Matoaca. Bateau rides, displays, crafts, Free. For details phone (804) 748-1623.

October 30, 1988 — Delaware and Hudson Canal Historical Society Annual Dinner, Williams Lake Hotel. Write D & H Canal Hist. Soc. High Falls, New York 12440.

CANAL AT LOUISVILLE, AT THE OHIO FALLS, 1835

By William Dzombak

Frederick Gustorf first emigrated to America in 1819; in 1820, he was a private teacher in German at Harvard University. In 1824, he declared his intention to become an American citizen, but family affairs forced his return to Germany. In 1834, he once again emigrated to America, this time bound for the German immigrant colonies in Illinois and Missouri, where he settled down. His travels took him down the Ohio River by steamboat, and thus to the canal built to skirt the falls on the Ohio River near Louisville, Kentucky. Gustorf's journal contains the following description of that canal: July 10 (1835) "Until this morning we anchored at the entrance to the canal for loading and unloading of cargo. Here, where the Ohio is quite broad, are the so-called rapids: a group of rocks through which the river drops 60 feet. Boats can pass the rapids only at high water; otherwise, they must unload their cargoes, which is a great hindrance to trade. Someone got the idea of bypassing the rapids with a three-mile canal, which runs on the Kentucky side of the river through rocky terrain. The banks of the canal are reinforced by levies made of the surplus rock. Before the canal returns to the river, we must pass through several locks, some of which are 30 feet high. Over each lock is a stone bridge and while we were passing through one lock, the bridge was crossed by a carriage on its way to Shippingport, a small place with a big cafe. This canal cost more than two million dollars. On the other hand, the canal makes money by collecting a toll of $20 to $200, depending upon the tonnage of the boat. Too bad this canal is not wide enough for boats to pass each other. At the mouth of the canal the river has a current of between 5 and 6 miles per hour, caused by the rapids. Opposite Louisville is Jeffersonville, Indiana, and not far from the mouth of the canal is New Albany, also in Indiana, a nice town where many steamboats are built and repaired."

CANAL BOOKS

Reprinted and available again: *A GUIDE TO THE WORKS OF THE JAMES RIVER & KANAWHA COMPANY, FROM THE CITY OF RICHMOND TO THE OHIO RIVER,* by W.E. Trout, III, Second Edition, 35 pp., $3 ppd. from Richard A. Davis, VC&NS Sales, Rt. 2, Box 254, Lexington, VA 24450. 600-mile automobile guide to the JR&K Canal, Turnpike and Kanawha River Navigation.

BATTEAUX: THAT OLD TIME BOATING ON THE JAMES, by David Brown, $14.95 (paper), $24.95 (hardbound) plus $2 postage payable to Arrowsmith and Lewis, Publishers, P.O. Box 2428, Charlottesville, VA 22902. Beautiful photographs by David Brown, evoking the James River Batteau period two centuries ago.

TOWPATHS TO TUGBOATS, A HISTORY OF AMERICAN CANAL ENGINEERING, by Shank, Hahn, Hobbs and Mayo, now printed again, for the third time. Complete history of American Canals of the past two hundred years, and biogs of their principal engineers. Cost: $6.00, plus $1.00 for shipping. Write American Canal and Transportation Center, 809 Rathton Road, York, Pa. 17403.