

AMERICAN CANALS

BULLETIN OF
THE AMERICAN CANAL SOCIETY

BULLETIN NUMBER 44

Editorial Address — Box 310 Shepherdstown, W. Va. 25443

FEBRUARY 1983

PRESIDENT'S MESSAGE

The concern of a President of any organization is with the financial stability of his operation. There have been times in the early years of the American Canal Society when Tom Hahn, Bill Trout and I dug down into our own pockets to provide printing and mailing costs for our newsletter until the next dues statement went out! Since we depend solely upon membership dues for our operating income, and are committed to a non-profit policy, we are still spending for printing and mailing costs almost 100% of what we take in each year in regular dues.

For special projects, such as Bill Trout's American Canal Guides, we have, on occasion, approached various federal agencies for financial assistance. They have either turned us down cold or offered us 50% funding with so many regulations that we would have lost complete control of the project! Hence, we have had to turn to industry and other sources for aid. Reynolds Metal Company of Richmond, Virginia, for instance, has been most generous in assisting us with such projects as "The Best from American Canals" and "American Canal Guide, Part 3". Another extra source of income for us has been donations made by our thirty Life Members (listed elsewhere in this issue). With our minimum annual membership dues now at \$10, the life membership donation of \$100 becomes a real bargain for our younger members. It has been suggested that future Life Membership donations should be raised to \$150, which would probably be changed at the close of this fiscal year—September 30, 1983. In the meantime we will hold the \$100 option open for any of our members who wish to take advantage of it.

One governmental agency which has been kind to us is the U.S. Postal Service, which several years ago recognized us officially as a Non-Profit Organization, making low domestic bulk-mailing rates available to us. We thank them for this!

Other future income possibilities for us are estate bequests. One such recent bequest was the \$1000 received from the Estate of Ted Sherman. Our members are reminded that such bequests are not subject to Estate Inheritance Taxes.

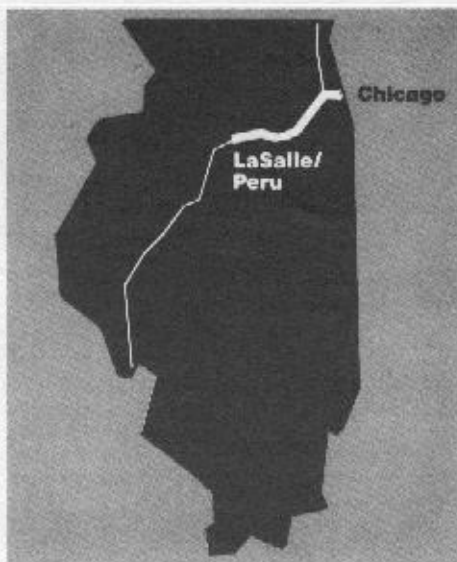
In the meantime, we have been able to provide a multi-page quarterly newsletter to you on an unfailingly regular basis, due to the diligence of Editor Tom Hahn, and our many members who continue to flood him with worthwhile editorial and pictorial contributions. Also, occasional "extras" are sent you, like the enclosed "St. Lawrence River Canal Vessels" reprint, directed to our attention by member Jim Wilson.

Bill Shank

I. & M. NATIONAL HERITAGE CORRIDOR



Stone-cutters continue the restoration process for Lock 14 near the terminus of I & M Canal in LaSalle. This \$226,000 project, funded by the Illinois Department of Conservation and a National Park Service Maritime Grant, will restore the lock to historically accurate working order. Site restoration and interpretive signage are being planned. (Courtesy Upper Illinois Valley Assn., photo by LaSalle Daily News-Tribune).



The Illinois & Michigan Canal National Heritage Corridor will extend 100 miles from Navy Pier in Chicago to LaSalle/Peru, Illinois. (Courtesy Upper Illinois Valley Assn.,)

(Publisher's Note: From ACS Life Members John and Jane Anderson of Champaign, Illinois we had received the following brief history of the I. M. Canal and plans for the new National Corridor, as published in the "Illinois Bell Telebrief" for November, 1982. However, as we were ready to go to press, we received in the mail Volume 1, Number 1 of a well-illustrated newsletter published by the Upper Illinois Valley Association telling all about the plans for the new Illinois and Michigan Canal National Heritage Corridor. It is too lengthy to reproduce here, but we urge all interested canal buffs in the area to write for it: Upper Illinois Valley Association, 53 West Jackson Boulevard, Room 850, Chicago, Illinois 60604).

One of the most historic waterways in America stretches between Chicago and LaSalle/Peru—the Illinois-Michigan Canal. Completed in 1848, the I&M Canal linked the Mississippi River system with the Great Lakes and made it possible to ship goods cheaply between New York and New Orleans. The canal was largely responsible for the rise of

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American Canals

BULLETIN OF THE AMERICAN CANAL SOCIETY

"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 \$10.00. Individual copies may be purchased at \$2.00.

WILLIAM H. SHANK, P.E. — President; Publisher of "American Canals" — 809 Rathton Road, York, PA 17403

Capt. THOMAS F. HAHN, Ed. D. — Editor of "American Canals"; President Emeritus — Box 310, Shepherdstown, WV 25443

Dr. WILLIAM E. TROUT III — Vice President; Editor and Publisher of "American Canal Guides"; Chairman, Canal Parks Committees — 35 Towana Road, Richmond, VA 23226

CHARLES W. DERR — Secretary and Treasurer — 117 Main Street, Freemansburg, PA 18017

LOUIS J. CAHILL — Director for Canada — P.O. Box 745, 215 Ontario Street, St. Catharines, Ontario L2R 6Y3, Canada

Dr. ROGER W. SQUIRES — Director for the United Kingdom — Bailiff's Cottage, 4 Manor Way, Beckenham, Kent BR3 3LJ, England

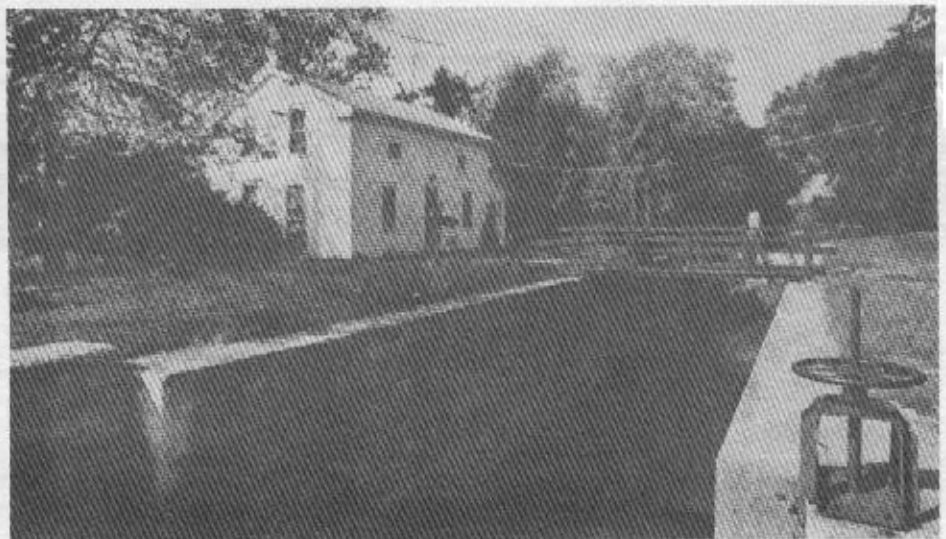
TERRY K. WOODS — Director; Chairman, Canal Index Committee — 6939 Eastham Circle, Canton, OH 44708

WILLIAM J. McKELVEY, Jr. — Director; Chairman, Canal Boat Committee — 103 Dogwood Lane, Berkeley Heights, NJ 07922

THE MARINERS' MUSEUM

The Mariners' Museum has many activities of interest to canal enthusiasts. Membership in The Friends of the Mariners' Museum includes *The Journal*, the quarterly newsletter of the museum. Individual membership is \$15, Family \$25. Send payment to The Mariners' Museum, Museum Drive, Newport News, VA 23606.

I. & M. NATIONAL HERITAGE CORRIDOR



The lock-tender's house overlooks a well-maintained lock on the I. & M. Canal at Channahon, Illinois. (Courtesy Illinois Bell "Telebriefs").

(Continued from Page One)

Chicago and for the growth of industry in towns like Joliet, Lockport, Ottawa and Seneca.

Even though the canal's commercial importance to the region is long gone, it remains a treasure trove of Illinois history, with limestone quarries, archeological sites, and 19th century examples of breweries, bridges, steel mills and grain elevators lining its banks. In addition, there are areas rich in natural beauty which are home to rare plants, varied wildlife and the state's largest tree—a 120 ft. cottonwood near Morris.

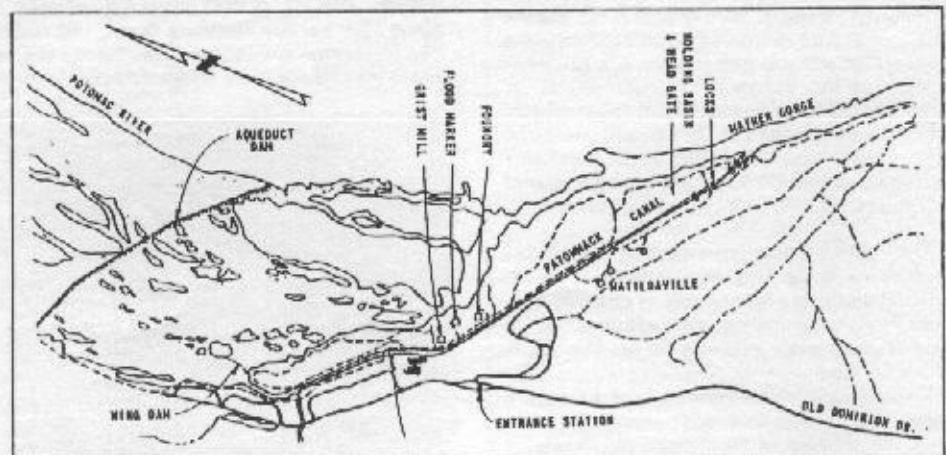
Rich as the canal's past is, its future might be even more promising. Congress is con-

sidering bills that would designate the canal and its environs a 90-mile National Heritage Corridor, the first in the nation. Such a designation could increase tourism in the area and create new jobs.

But you don't have to wait until then to enjoy the I&M Canal. A trail along the section west of Joliet is under development, with completed portions running from Channahon to Morris and from Utica to LaSalle/Peru. Camping, skiing and fishing are also available. And several state parks either border the canal or are within easy driving distance.

(For further information on the Illinois Canals, see page nine, AMERICAN CANALS No. 42).

POTOMAC CANAL NAMED HISTORICAL LANDMARK



Congressman Frank R. Wolf (R-VA) announced recently that Secretary of Interior James Watt has approved the designation of the Potomac Canal, located in the 10th District of Virginia which Wolf represents, as a National Historic Landmark.

"The Potomac Canal in Great Falls National Park is an extraordinary pioneer engineering achievement and stands as a reminder of our early 18th century experiences in trade and commerce," the Congressman said. "I am pleased that the Secretary and the National Park System Advisory Board have recognized

the historical significance of this canal which was planned and designed by America's first president, George Washington.

Congressman Wolf had joined in the efforts of the Great Falls Historical Society and the Virginia Canals and Navigations Society, Inc. to have the canal included in the National Historic Landmark program. Wolf had recommended earlier in a letter to the Deputy Director of the National Park Service that the canal be designated as a National Historic Landmark.

(Submitted by Earl Minderman)

UNITED KINGDOM- UNITED STATES FILM EXCHANGE

Dr. Roger W. Squires, ACS Director in the United Kingdom and William H. Shank, P.E., ACS President, have discovered that they have much in common. In addition to their ardent interest in the history and preservation of canals and inland waterways in both countries, they are also both prolific writers and authors of books and other tracts on the subject. They have both lectured extensively on canals of the two countries. Both are semi-professional photographers, and between them have made thousands of color-slides of derelict and operating canals. Both are fully knowledgeable on the effective use of audio-visual equipment.

Bill has recently provided Roger with an extensive series of color-slides from his own collection, showing canal relics and inland waterways travel in the United States, which the latter will be using for a series of lectures on American Canals in the U.K. The first of these lectures is to be held at Sutton College of Liberal Arts, March 2, 1983. There will be others. Interested persons in the U.K. are advised to contact Dr. Roger Squires, Bailiff's Cottage, 4 Manor Way, Beckenham, Kent BR3 3LJ or phone him at 01-848-3389.

Over the past several years, Roger has provided Bill Shank with two excellent tape-slide-lectures which have already been used by various canal historical groups in the U.S.A. The first (made in 1979) is entitled "The Old Barge-Canal Revival in Great Britain" and consists of fifty slides (with accompanying tape-narrative) showing the extensive volunteer work done to restore the derelict canals of England. The second (made in 1982) is titled "Maritime England-1982" and is a 50-slide-tape talk directed toward American canal buffs visiting England, from the time they get off the plane at Heathrow Airport until they arrive at their first canal (or take a canal-boat ride) out of London, or into the English Midlands. It is fully detailed, with maps and other information of great assistance to English visitors.

In both presentations, Roger's broad English accent enriches the entire program. Highly recommended for canal society program directors here in the U.S.A. All that is needed is a small cassette-tape recorder and a slide projector. For further information write American Canal Society, 809 Rathton Road, York, PA, or phone (717) 843-4035.

Canal society program directors are also reminded of two professional 16-mm sound-color movie films made available to us by the British Waterways Board. They are: "Waterways—Our Heritage"—a 35-minute film showing typical vacation travel on the English Canals in 1980. The other was sent to us several years earlier and is about the same length, entitled simply "Inland Waterways." Either of these movies would be an excellent base around which to build your next canal society meeting. They are available at ACS headquarters (above).

In all cases, whether you order slide-tape-films, or movies, there is no rental charge. We ask only that you send along a check for \$5 to cover shipping costs, and also that you return the films promptly after your "showing," so that other groups may enjoy them also.

LIFE MEMBERS OF ACS

John and Jane Anderson	Illinois
David G. Barber	Vermont
John Barrat	England
David W. Beach	Maine
Anthony Carriero	New York
L. M. Clark	Canada
Richard A. Davis	Virginia
Charles W. Derr	Pennsylvania
John A. English	New York
Thomas F. Hahn	West Virginia
Michael A. Handford	England
Leonard H. Harman	Massachusetts
John Paul Hartman	Florida
Irving M. Johnson	Massachusetts
Karl Kettelhut	Saudi Arabia
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Alan F. Laufman	New Hampshire
Dennis K. McDaniel	Maryland
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Ralph S. Misener	Canada
Arden Phair	Canada
Robert L. Schuyler	Pennsylvania
William H. Shank	Pennsylvania
William E. Trout III	Virginia
William G. Tumbridge	New York
Herbert F. Verity	Ohio
David J. Williams	Maryland
Avery Wolfrum, Jr.	Illinois
Nathaniel H. Wooding	Virginia

(Note: The above are credited with a single \$100 payment to ACS, putting them on our permanent mailing list. At the close of our fiscal year, we may have to boost the LIFE MEMBERSHIP fee for future members in this category to \$150.00).

"ANCIENT HISTORY!"

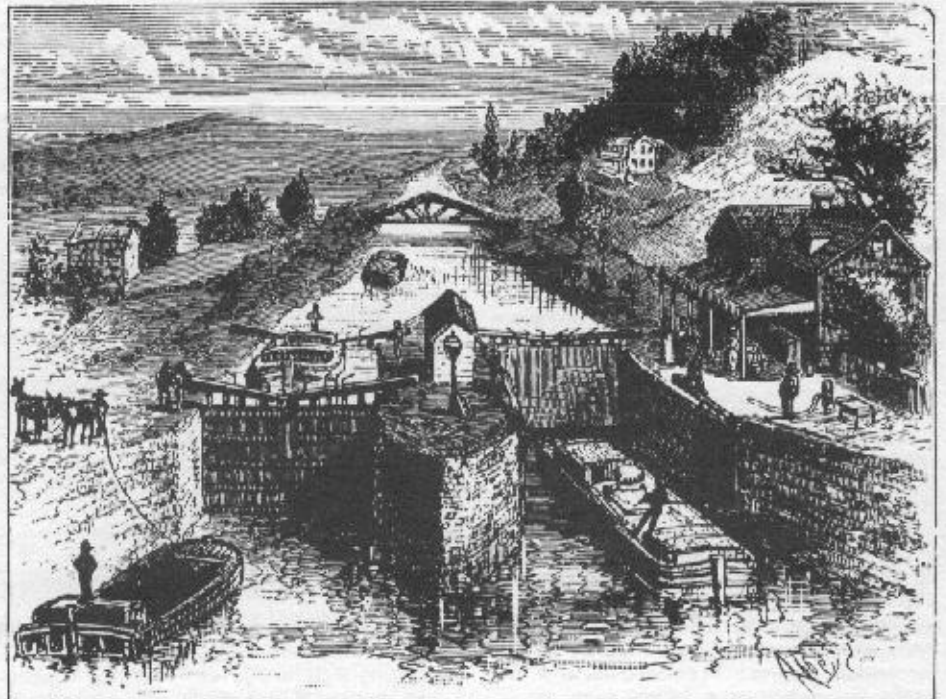


While looking for pictures to illustrate this issue of AMERICAN CANALS, we ran across the above photo, made in July of 1965 by Philip C. Myers of the Canal Society of New York State at Altoona, PA. It shows Bill and Ruth Shank having dinner with a group of 100 canal buffs from CSNYS who had just finished a tour of the Allegheny Portage Railroad and were waiting for Bill to deliver his "Amazing Pennsylvania Canals" slide-lecture to them.

At this time the Canal Society of New York State was the largest and most active canal society in northeastern United States. Bill Shank was so impressed with their activities that he joined their ranks as a full member immediately after this meeting. The following year the CSNYS returned to Pennsylvania for a tour of the Lehigh Canal at Bethlehem and sponsored the formation of the Pennsylvania Canal Society. Bill Shank assumed the duties of Secretary and Treasurer of PSC and later became Editor of CANAL CURRENTS, PCS newsletter.

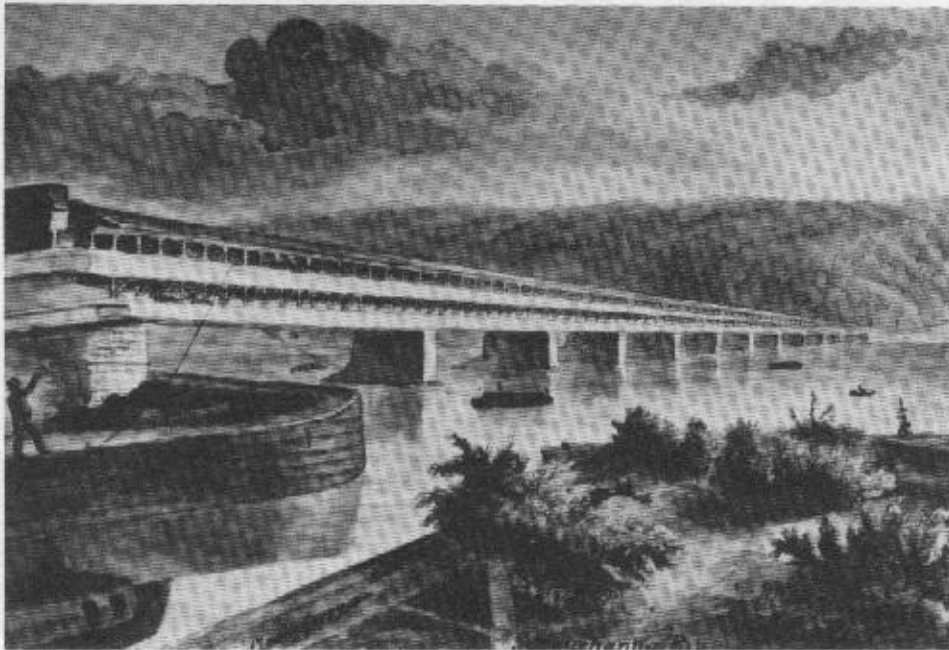
He relinquished this job in 1972 to join Tom Hahn and Bill Trout in the formation of the AMERICAN CANAL SOCIETY. This latter organization has now grown from these three members to nearly 800 dues-paying members—in the USA, Canada, the U.K. and other English-speaking countries, world wide.

"MYSTERY PICTURE"



Who can identify the year, canal, and place of this illustration of an American canal?

THE SIX CLARK'S FERRY BRIDGES



This drawing of the second Clarks Ferry Bridge (near Duncannon, PA) was made in 1840 by an unknown artist. It shows the bridge from Duncan's Island, with the entrance to Benvenue Lock in the left foreground, looking east across the Susquehanna River toward Peter's Mountain. It clearly shows the "two galleries, one above the other" mentioned by Charles Dickens in his travels along the Pennsylvania Main Line Canal. The "galleries" were used to permit the mule or horse teams to proceed in both directions simultaneously on the downstream side of the bridge. A dam, out of the picture to the right, provided slackwater for the river crossing of the heavily-laden canal boats. (Courtesy of Dr. Ernest Coleman).

By Ernest H. Coleman, M.D.

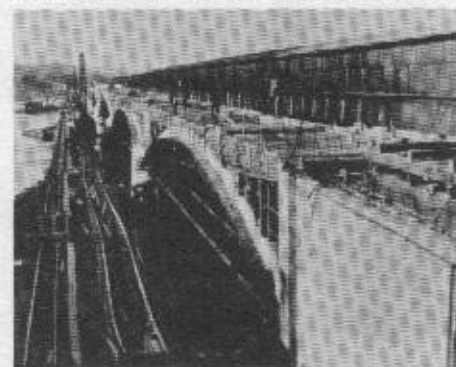
No history of Pennsylvania's Main Line in its so-called "System of Internal Improvements" would be complete without consideration of the five spectacular, consecutive wooden bridges of canal importance that once spanned the Susquehanna River about 16 miles above Harrisburg. These so-called "Clark's Ferry Bridges" were almost a half-mile long and, collectively, served the public for almost a century. Perhaps they were misnamed because their namesake, "Clark's Ferry" was approximately one mile downstream, as was a still earlier fording area for men and their wagons. However, the name "stuck" and has done so to the present day.

After a site review by a joint commission of men from five interested counties west of the Susquehanna, and with the concurrence of Pennsylvania's Canal Commission, it was decided to span the Susquehanna from its east bank to Duncan's Island from whence a network of improved roads, north, south and west was envisioned, plus canals north and west.

The first of these covered bridges was erected 1827-1828, as a combination vehicular, pedestrian, animal transport and general utility structure with a towpath gallery attached, for men and horses or mules to use in towing canal boats across the river. But, let us use writer Philip Nicklin's description to tell us what he saw while travelling westward in 1835: "It (the canal) debouches through a wide opening of solid masonry into the mighty river, here converted into a lake by an immense dam. As the boat entered the river, the horses ascended to a gallery high in air, attached to the side of a great bridge of timber, which here extends its numerous and

expanded arches across the river, and thus drew us across the wide expanse of water. Having passed the river, the boat entered the canal on the southwestern side of Duncan's Island, through a superb lock of solid masonry." Harriet Martineau, travelling eastward about two years later, left a similar but less detailed description of the bridge and its towpath gallery. The life span of this bridge was less than ten years. It was carried away in its entirety by "a remarkable freshet", most likely one of the Susquehanna River's devastating floods, of which there have been many!

Bridge No. 2 was commenced in 1837 and completed in 1838. Fortunately for covered bridge and canal "buffs" a painting of this bridge was made by an unknown visiting artist from abroad. A copy of the painting existed in



In 1925, Clarks Ferry Covered Bridge Number Five gave way to the new, reinforced, concrete-arch bridge designed by Modjeski and Masters of Harrisburg, a two-lane bridge which is still in use today. (Courtesy Dr. Ernest H. Coleman).

the home of the late Grace Hawley Duncan of Duncannon, PA, who permitted this writer to photograph it, with the results shown here. This painting supports its description by the great English novelist, Charles Dickens, in his book, "American Notes" (1842). He writes: When we crossed the Susquehanna River—over which there is an extraordinary bridge with two galleries, one above the other, so that, even there, two boat-teams meeting may pass without confusion—it was wild and grand!"

This bridge also had its hardships! During construction in 1837, one section fell during an "ice flood" and became lodged on a pier. Since it could not be returned to its former moorings it was set on fire and floated downstream, later to be replaced. Bridge No. 2 finally met with total disaster, but in stages. In mid-March of 1846, its eastern span was carried away during a flood and two months later the remainder was totally destroyed by fire, attributed to an arsonist.

Bridge No. 3 was promptly rebuilt, 1846-1847, in time for Philip Hone, (erstwhile Mayor of New York City), to describe it: "We came to the junction of the Juniata Rivers (?) where the boat crosses a dam, the towpath being conveyed across a long bridge of light and delicate construction, on piers of solid masonry." On September 10 and 11, 1850, it was totally destroyed by fire, this time of uncertain origin.

Bridge No. 4 came into existence in 1851-52 but became the property of the Pennsylvania Railroad Company in 1857 when, for seven and one-half million dollars it acquired from the Commonwealth of Pennsylvania its entire, financially-unsuccessful Main Line, consisting of a railroad from Philadelphia to Columbia on the Susquehanna River; the canal from Columbia to Holidaysburg, PA; the unique Allegheny-Portage Inclined-Plane Railroad (of world-wide fame in its day) and the Western Division Canal from Johnstown, PA to Pittsburgh. At the time P.R.R. Chief Engineer noted that the Clark's Ferry Bridge required immediate and expensive repairs to prevent its total loss, and moreover, "that it had been built in an insufficient and unworkman-like manner."

Despite improvements, Nature remained defiant. In March, 1859, a violent windstorm destroyed nine of the bridge's ten sections, all of which were replaced later that year (presumably with improvement to the remnant of bridge No. 4). Hence, a virtually new bridge—No. 5. Whatever else, this bridge seems to have endured everything man and Nature had to offer of a destructive nature until 1924-1925 when it was dismantled in favor of a usurper—a concrete, vehicular bridge—modern for its day—but now being considered for replacement. If its successor (known as Clark's Ferry Bridge No. 7) is not now on the drawing board, it is at least in the thinking stage.

Bridge No. 5 remains in the memories of an older generation of human beings who used it, and survived it. It was well-photographed both before and after it lost its towing path gallery, perhaps before 1915, the year it was sold to an organization known as Clark's Ferry Bridge Company—a decade or more after the P.R.R. had gone out of the canal business. There is abundant proof that it was a toll bridge, as its predecessors probably were, and

(Continued on Page Five)

PENNSYLVANIA EASTERN DIVISION CANAL TOUR

The Canal Society of New Jersey will be teaming up with the Pennsylvania Canal Society for the PCS Spring Tour, which is planned for the week-end of May 6, 7 and 8th, 1983 along the Eastern Division of the Pennsylvania Main Line Canal, from Duncan's Island to Columbia.

The Eastern Division ran 43 miles from the Clark's Ferry Slackwater crossing of the Susquehanna River (near Duncannon) to the Columbia Canal Basin. There were 14 lift-locks, 11 aqueducts, and one weigh-lock—including an outlet lock to the Susquehanna River at Columbia to allow a connection, across river, with the Susquehanna and Tidewater Canal, (Wrightsville to Havre de Grace, Maryland). It also connected at Middletown, with the Union Canal, which ran east through Lebanon to the Schuylkill Navigation system at Reading.

At Duncan's Island, the Eastern Division joined the Juniata Division, westbound to Pittsburgh, and the Susquehanna Division, northbound to the Erie Canal in New York State. At Clarks Ferry also the Wiconisco Canal provided a connection with Millersburg and the Lykens Valley coal mines. At Columbia the Eastern Division was served by the Philadelphia-Columbia Railroad, operated by the Canal Commissioners at Harrisburg as part of the State-owned canal system between Philadelphia and Pittsburgh. The Eastern Division Canal was thus an extremely important transportation link in south-central Pennsylvania in the 1833-1901 period.

Week-end headquarters for the affair is the Penn-Harris Motor Inn in Camp Hill, PA with a series of slide-shows Friday evening and a Saturday evening address by ACS Canal-Buff Larry Tise, who was recently named Director of the Pennsylvania Historical and Museum Commission. The Canal Tour, with twelve major stops, is scheduled for all-day Saturday, May 7th. Four buses have been reserved by the Tour Committee, which includes Ernest Coleman, Bob Mayo, Karl Yungel, Bob Keintz, Earl Heydinger and Bill Shank (Chairman.) Contact Bill at 809 Rathon Road, York, PA 17403 for registration details.

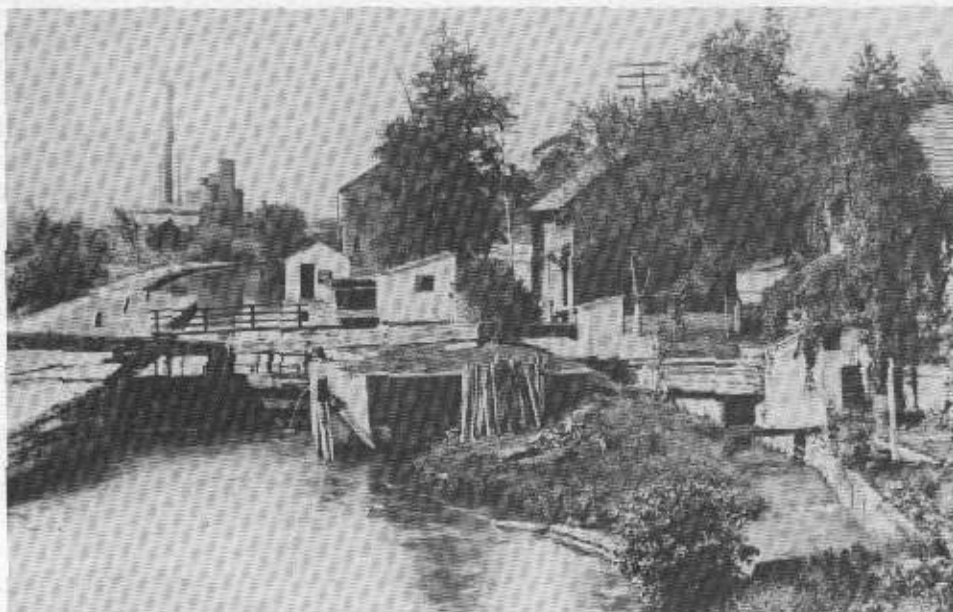
THE SIX CLARK'S FERRY BRIDGES

(Continued from Page Four)

as its concrete successor was until a few decades ago.

With the demise of this covered wooden bridge and others of similar construction an interesting chapter in early Pennsylvania bridge building neared an end. Organic wood was surrendering to inorganic concrete and steel. The Susquehanna River, however, has not forgotten! At times of low water the vegetation-covered bases of the older Clark's Ferry Bridge piers became exposed, like giant stepping stones, perhaps showing the way to a promising future in either direction. Downstream, a long line of ripples reveals where the enormous canal dam was located and where, undoubtedly, some knowledge in the field of hydraulic engineering was acquired.

It has been stated that "The old order changeth," also, however, that "The past is prologue!" Certainly these old Clark's Ferry bridges deserve a respectable place in the history and development of transportation in Pennsylvania.



This view of the Steelton (PA) Lock on the Eastern Division of the Pennsylvania Main Line was made about 1890. Note the by-pass flume to the right and the steel mill in the background. This area will be visited this Spring by the Pennsylvania Canal Society. The lock is gone, but the old canal is still maintained, bank full, by the Bethlehem Steel Company as a source of process water for their plant. Unlike the old Eastern Division Canal, water now flows from south to north in the channel, supplied by a pumping station close to the Susquehanna River. (Shank collection).



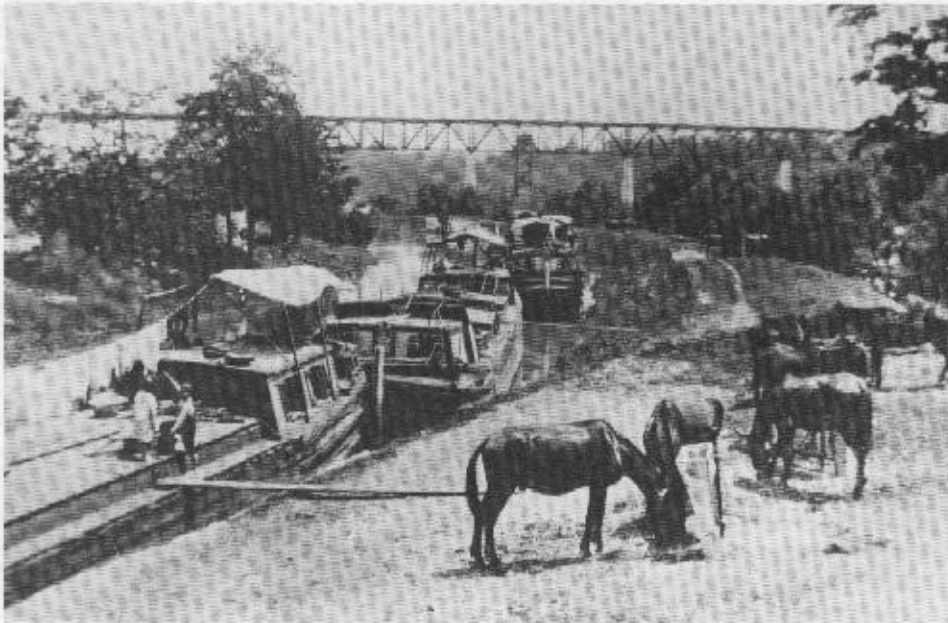
Photo taken recently on the frozen Susquehanna and Tidewater Canal at Wrightsville, PA. This will be one of the "stops" on the Pennsylvania Canal Society Tour May 7, 1983. In the background is the 1930 Columbia-Wrightsville Bridge. In the river can be seen one of the piers on which the old Tow-Path Bridge crossed the Susquehanna. (Photo by Glenn Dietz for the Lancaster Sunday News).

1983 DUES

We now have close to 800 members in the United States, Canada and the United Kingdom. Of these 800 we are happy to report that all but approximately 100 members have indicated their approval of our activities by sending Secretary Charlie Derr their dues checks for 1983 (with the

exception, of course, of our LIFE MEMBERS). Charlie will be sending a final "reminder" to those members who have not sent in their dues. Those who do not respond to this second notice by May 1, 1983 will be removed (reluctantly) from our mailing list.

3½ MARATHONS IN 3½ DAYS



This is the same towpath that the marathon bikers used, but conditions have changed greatly since the early 1900s when this photograph was taken. (Hahn Collection).

By Terry K. Woods

The Chesapeake & Ohio Canal ran 184.5 miles from Washington D.C. to Cumberland, Maryland and, from 1850 till 1925, it carried coal and numerous other items of freight upon its placid surface. Today it's dry, but as administered by the National Park Service, it offers nearly 185 miles of a hiking and biking trail through an historic and picturesque setting.

When two Akron, Ohio men first learned of the C. & O. Canal, however, it's doubtful if they were thinking either of the history or the scenery. They viewed it, instead, as a challenge. It was, in effect, seven 26.2 Marathons. For Mike Smith and Don Morris are long distance runners; both are members of the GOODYEAR WINGFOOT RUNNERS, of Akron, Ohio. Mike is currently President of that organization.

They first read of this trail in a 1979 issue of a running magazine which carried an article describing how a College Student ran the entire 184.5 miles in 5 days, carrying everything he needed with him in a back pack.

The idea of duplicating the feat appealed to Mike and Don, but neither felt they could spare 5 days away from their busy schedule, plus the time it would take to get to the C. & O. and back. With a bit of planning, though, they thought it could be done in less time—perhaps 3 days of running would be a good goal to shoot for. It soon became apparent that two men were not going to be able to run 60 miles a day for three days with everything they were going to need (they planned to spend at least one of the nights at one of the many campgrounds that were strung out along the route). A bicycle was therefore added and a basic change made to the plan.

A bicycle would be used as a pack animal to carry items too bulky and/or too heavy for the runners. The two men would then alternate between running and biking. This would cut their 'event' to 3½ Marathons in three days, plus an equal distance on the bike, but still could be considered quite an accomplishment.

September 1st, 2nd and 3rd, 1982 were picked for the big event. A great deal of thought and planning had gone into this trip. The bike, a 12 speed light-weight model, was loaded down with one 5 lb. tent, two hammocks, foam sheet mattresses, several changes of clothing, vitamins, a tool kit, water bottle, flashlight and a florescent camp light. An important item in their planning was the *Towpath Guide* to the C. & O. Canal, a four volume set published by the American Canal & Transportation Center. Largely through the use of the *Guide*, they were able to set up their schedule—daily mileage, meal breaks, stopping points for each night, etc.—to coincide with one of the formal campsites, water supplies or canal-side stores along the route.

The first day's journey began at 7:00 A.M. (at Cumberland, Maryland), with Mike starting off on the loaded bike and Don doing the initial running. After that first day, Don, who is a morning person, and preferred to get as much running in as possible during the early daylight hours, would start off while Mike cleaned up the campsite, then 'catch' him with the bike. With the runner attempting to set a pace of one of the trail's mile markers every 8 minutes (7½ miles an hour), he would usually be overtaken by the bicycle within 16 to 20 miles—which was just about a planned 'shift'.

It soon became apparent that the biker had the roughest time. The C. & O. Towpath is a cleared and maintained hiker-biker trail, but over the years, roots of trees growing alongside the trail have forced their way up above the surface of the Towpath giving a bike ride that Mike Smith has described as "not smooth".

Usually, the runner had little trouble with these obstructions. Once, however, on the morning of the first day, Mike caught a shoe tip on one of those roots and took a fall that badly cut up his right knee. The men were traveling fairly close together at that point. They both stopped at a Towpath Bar, Bill's Place, near Little Orleans, where the proprietor graciously allowed Mike to 'use the facilities' to clean up.

Even with this accident delaying them a bit, the duo were able to maintain their first day's schedule and managed to reach their planned over-night stop at Hancock - 123.5 miles from Washington - by 7:00 P.M. This first night was spent in a Motel as neither man knew what 60 miles of running and biking would do to their muscles.

Though the Towpath is 184.5 miles long, there were several sections where it was impossible to take a bike. The bike, therefore, traveled a total of 198 miles including detours. It was during a 6½ mile detour that a minor disaster struck. As luck would have it, Mike was astride the bike around 4:00 P.M. the second day, when five spokes on the rear wheel failed. He wasn't even on the same trail as Don then, so was forced to walk the loaded bike a mile and a half before they could once again join forces. This could have been even more serious than it was if they had failed to connect, but luck was with them.

The schedule went out the window right then and there. They spent the last few hours of their 'running day' breaking down the load, removing the rear wheel and taking it into nearby Hagerstown for repair. Then, in the dark, and it got very dark along the trail after sundown, they managed the four miles to the next campsite at Horseshoe Bend - 79.2 miles from Washington. With only 44.3 miles of trail under their feet and wheels that second day, they had to go back to the guidebook for new meal stops and campsites. Fortunately, they had carried one meal of freeze-dried food for emergencies and that's what they used after the Bike Emergency ruined their schedule.

One minor accident did occur to Don, but fortunately did no damage to man or equipment and, in retrospect, can be considered humorous. One of the more well-known features of the C. & O. Canal is the Paw-Paw Tunnel, a long shaft bored through solid rock. Don was on the bike when they arrived at the entrance, and it looked mighty dark inside. The expedition's lone flashlight had somehow been jarred "on" during its rough ride in the bike pack and the battery was dead and useless. Still, the other end of the tunnel showed brilliantly in the distance so Don had few qualms about getting through, until, less than 50 yards inside, he rode smack into a solid rock wall! More surprised than hurt, he remained dismounted and carefully, and with a lot of feeling along the wall with his hands, pushed the bike through the remainder of the tunnel.

With all their 'incidents' behind them, and only miles ahead, Don and Mike managed to make 53 of them on Friday. The last campground was 26.2 miles from Washington - too far to go before dark and impossible to travel in the dark with the root tangles lying in wait. So their time-table was lengthened by half a day and Washington was reached at 11:30 A.M. on Saturday, September 4th, 3½ Marathons in 3½ days!

On reflection, Mike and Don are pleased at accepting the challenge of the C. & O. run and enjoy a sense of accomplishment in attaining their goal. The minor problems they encountered only served to make their 'victory' just a little bit sweeter.

Both men consider their run quite an experience. Don visited the C. & O. again later in the fall to take a more leisurely look at some of the sights.

BOATS ON THE PORTAGE CANAL

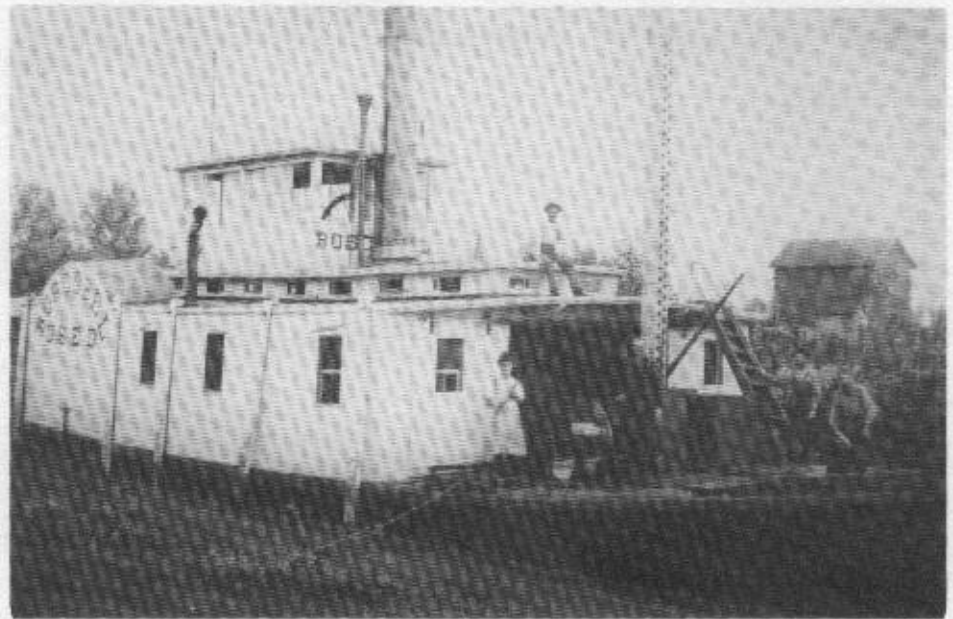
By Frederica Kleist

In May of 1851, the steamer, the JOHN MITCHELL, tried to pass from the Fox River through the Portage Canal to the Wisconsin River. The steamer, the ENTERPRISE was coming from the Wisconsin River. Neither would yield, so neither went through the canal. In 1856 a small steamer, the AQUILA, coming from Pittsburg by the way of the Ohio and Mississippi Rivers, ascended the Wisconsin River to Portage, entered the Fox and descended the river to Green Bay. This marked period is the beginning of the steamboat navigation.

In 1876 the canal was completed by the Army Corps of Engineers. On June 30th of that year, the steamer, the BOSCOBEL was the first boat to go through the completed canal. The BOSCOBEL was one of the most powerful tug boats of the day. It had 600 horsepower engines, and was as large as many of the freighters of the time. In 1901, a wrecking company bought the boat and it was used for salvage work. On November 29, 1909 the BOSCOBEL caught on fire. It was towed into Red Cliff Bay, in Lake Superior, where it sank.

Excerpts from the *Portage Daily Register* May 8th and 10th, 1909 indicate the following shipping activity: "The boats, the GRAND and the RAPIDS passed through Packwaukee bridge on May 7th at six o'clock. From that place to Portage is the most difficult as there are many short bends, and the government has neglected to keep the river dredged. A message to W. C. Raimer this afternoon, May 8th, stated that the boats had reached the Prieve place eight miles below Portage and that the tug HOLLISTER, which was towing the boats, was stuck in the mud. Mr. Raimer communicated with the Portage Boat and Engine Company, and in a short time five Portage boats were off to assist the boats. The Portage craft were captained by Messrs. W. C. Gault, H. Zastrow, Chas. Kutzke, N. H. Behnke and F. H. Runkel."

May 10th excerpts: "The larger steamers, the GRAND and the Rapids, arrived in Portage on Sunday evening. The approach of the big craft was watched with interest by many people and some boarded the boats when they reached the Ft. Winnebago lock and had an excursion on the canal. It took three hours from that point to the Wisconsin River lock. The steamer, RAPIDS, passed the DeWitt Street Bridge at 6 o'clock in tow of W. C. Gault's yacht, MAY. The RAPIDS made clean work of wires crossing the canal at Ketchum Point. Twenty lines of the Portage Telephone Company were torn down. At Adams Street near the York elevator four of the main wires of the Portage Electric Light Company caught on the smoke stack of the steamer and as the pole on the south side of the canal was about to break, electrician R. J. Forbes mounted the "Hurricane deck" and quickly cut the wires, which put the first ward in darkness Sunday night. As the RAPIDS was passing the DeWitt Street Bridge the stacks caught the wires of the local telephone company and ten of the wires were 47 feet above the water line and had to be cut in order to allow the boats to pass. The Wisconsin Telephone Company lines at DeWitt Street Bridge as well as the Western Union Telegraph Company lines were not molested as they were at least 50 feet above the water's edge.



The BOSCOBEL, the first vessel to use the Portage Canal in 1876. (Courtesy of Henry C. Abraham).

"As the RAPIDS was pulling into the Wisconsin River lock, its sister boat the GRAND could be seen approaching the Ketchum Point. The GRAND was in tow of the three yachts, one being that of N. R. Graham. The GRAND having no problem with the wires pulled into the Wisconsin River lock a half an hour after the steamer RAPIDS had arrived."

According to the lock tender's book (still in existence), it recorded that the ELLEN HARDY, a large stern-wheeler which plied between Sauk City and Portage, carried loads of wheat, salt, etc. to the wharf located near the residence of George Clemmons in the First Ward. Such boat names as GRANITE STATE, BOSCOBEL, WINNECONNE, CITY OF PORTAGE, DEKORRA, GUSSIE GIRDON, CITY OF BERLIN and the SHELDON and many others plied the canal in its heyday.

The boats, the GRAND and the RAPIDS, were piloted down the Wisconsin River by Liberty Cross and Jerry Hannifan.

Negotiations are in progress by Messrs. Ingram and Young to purchase the steamer the ANNIE M, to be used as a pleasure steamer.

Items of Note from Town of Fort Winnebago Records: "July 1865 Steamboat PORTAGE damaged the float bridge in the amount of \$30.00. \$10.00 was assessed to the Boat and \$20.00 assessed to operator W. T. Barden. (Canal was not completed but still allowed navigation). 1884 Steamboat the ELLEN HARDY damaged the Fox River Bridge.

According to old timers, after 1910 there were mostly pleasure boats on the canal. In 1951 the Wisconsin River Locks were welded shut and the Fort Winnebago Locks bulldozed in. Now, all that travels on this once busy, historic waterway are the present day canoes.

THAMES BARRIER

In *American Canals* #43 (Nov. 1982), p. 11 was an article "The Thames Barrier is Working". Those wishing more information are referred to *The Smithsonian* (Aug. 1982), p. 78.

CANAL VS RAILROAD

To: President Andrew Jackson,

The canal system of this country is being threatened by the spread of a new form of transportation known as 'railroads'. The federal government must preserve the canals for the following reasons:

One. If canal boats are supplanted by the 'railroads' serious unemployment will result. Captains, cooks, drivers, hostlers, repairmen and lock tenders will be left without means of livelihood, not to mention the numerous farmers now employed in growing hay for horses.

Two. Boat builders would suffer and towline, whip and harness makers would be left destitute.

Three. Canal boats are absolutely essential to the defense of the United States. In the event of the expected trouble with England, the Erie Canal would be the only means by which we could ever move the supplies so vital to waging modern war.

For the above-mentioned reasons the government should create an Interstate Commerce Commission to protect the American people from the evils of 'railroads' and to preserve the canals for posterity.

As you may well know, Mr. President, 'railroad' carriages are pulled at the enormous speed of 15 miles per hour by 'engines' which, in addition to endangering life and limb of passengers, roar and snort their way through the countryside, setting fire to crops, scaring the livestock and frightening women and children. The Almighty certainly never intended that people should travel at such breakneck speed.

Martin Van Buren
Governor of New York
January 31, 1829

(From *Dun's Review*, July 1980, submitted by Kay Sheldon).

MIGRATING SOUTH ON THE DELAWARE AND RARITAN



A graceful "S-Curve" on the Delaware and Raritan Canal below Kingston, N.J., circa 1925.

By Diane Jones Sliney

(This article first appeared in *Time Off*, the magazine supplement to the *Princeton Packet*, November 3, 1981).

When days shorten and temperatures drop, the promise of winter prompts certain northeasterners to begin their seasonal migration to more temperate climes. Today most of these travelers bound for Florida and points south clog metropolitan airports or head for the turnpikes and interstates.

But during the early decades of this century many southward bound travelers hired a crew or piloted their own pleasure boats along the inland North-South water route, a series of canals from New England to Florida. The Delaware and Raritan Canal, originally a 44-mile long artery from New Brunswick to Bordentown, formed an important part of the migratory route.

After 1900 and especially in the 1920s, when commercial navigation on the canal had slowed to a trickle, gasoline-powered yachts displaced barges and cargo vessels on the waterway. Although the canal was in decline after nearly a century of service and despite the fact it was poorly maintained and inefficiently operated, pleasure boat traffic nearly doubled between 1923 and 1929. Boat owners persevered because the D and R was an essential link between two major centers of pleasure boating, Long Island Sound and the Chesapeake Bay. In addition, the canal cut off nearly 200 miles from the more hazardous ocean route around Cape May.

In the autumn yachts sailed out of New England and New York harbors, around Staten Island to Perth Amboy and up the Raritan River to New Brunswick where they entered the lock and the first level of the canal. Here toll was paid to the lock tender who issued a permit for passage through all 14 locks.

Small conventional craft joined large awesome vessels with liveried crews and captains on this semi-annual navigational ritual. Since the canal did not operate between 6 p.m. and 6 a.m. boats often tied up for a night at one of the quaint villages or towns along the canal banks—perhaps in Bound Brook or

Griggstown or Princeton. Sometimes the owners or crew invited spectators to board for a tour. There are those today who recall the familiar "See you in spring" salutation of affable passengers who would make good their promise the next spring with the added gift of an orange or grapefruit tossed ashore.

The more spectacular vessels carried some of America's socially prominent, who could be seen on deck reclining in wicker furniture and attended by white coated stewards. The undisputed queen of these vessels was the streamlined black Corsair owned by J. P. Morgan. The finest private yacht afloat she sported gold-plated bathroom fixtures and dining service as well as wood-burning fireplaces. Although local residents recall seeing this oversized yacht struggling through the locks, canal buffs have not yet located a photograph of the event.

A propitious departure time for the trip south was imperative as the following two turn of the century accounts indicate. An early October journey by the 30-foot sloop Ramallah from Fall River, Mass., provided hours of pleasant sightseeing for those on board. Having heard "terrible stories of the way these iron-bound canal boats ram into yachts," the RAMALLAH had taken precautions: extra cork fenders and long wooden ones also and an extra dollar slipped to the mule driver to "poke along his old mules lively and to be careful of us in the locks."

In the 10-Mile lock area at Zarephath the party was "charmed with the scenery along the route which was diversified with farms and broad meadow lands and groves of trees."

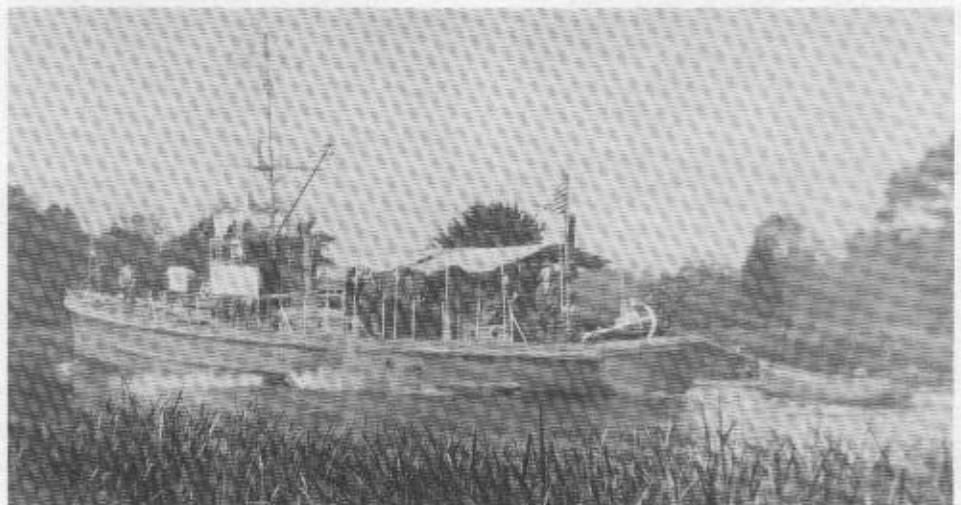
In the vicinity of Griggstown "one could look back as far as the eye could reach and see the tall and graceful willow trees on each side of the bank with their boughs almost meeting, and making a nearly perfect archway, while underneath lay the smooth water of the canal."

A few years later on Thanksgiving Day the crew of the 28-foot yawl LOTUS from City Island, N.Y., passed through the D and R Canal and described a very different kind of journey. After a harrowing experience dodging the ice floes of the Raritan River and a

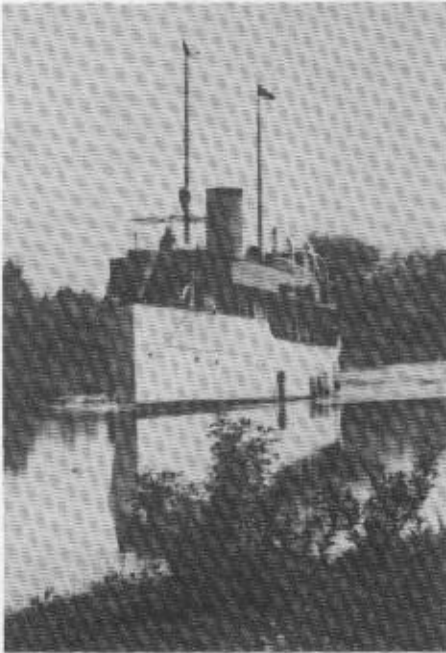
(Continued on Page Nine)



A handsome steam yacht passes through the D. & R. Canal.



United States Navy Submarine Chaser #252 motors south in the Delaware and Raritan Canal through Griggstown, New Jersey in 1927. Bow view of the sister ship #440 appears on p. 113, top, in Bill McKelvey's *THE DELAWARE AND RARITAN CANAL: A PICTORIAL HISTORY*. (Photo courtesy of George Rightmire).



The D. & R. Canal handled some fairly deep-draft pleasure boats. This large steam yacht passes through with no difficulty, circa 1920.

(Continued from Page Eight)

series of delays in New Brunswick, the crew finally disembarked and proceeded on foot to inspect the lock and canal which "as far as one could see were solid full of broken up ice."

The mule team and driver engaged in New Brunswick for a tow through the waterway were not equal to the task. The ice breaker tug RELIEF agreed to assist by towing the craft for a portion of the journey. Lumber was then purchased en route and ice fenders fashioned for the trip behind the barge. After tying up for a night the LOTUS found herself frozen solid in ice; manpower and heavy spars were required to free the craft. Periodically the tug was obliged to drop the yawl, "while she steamed ahead alone and broke up the ice, then came back and took hold...again." It may be assumed that this journey was one of the last of the season before the canal was closed and drained for that winter.

Many letters to the editors of area newspapers yield proof that relations between the yachtsmen and the D and R Canal Company (by now wholly owned by the Pennsylvania Railroad) were strained. Lowered costs and a deepening of the canal were the universal concerns of all canal users. While in 1931 the smallest craft paid \$27 to pass through the 44-mile waterway, that same boat could pass through the Panama AND the Suez Canals, a total of 150 miles, for only \$14. This 'excessive' charge became known as the "tariff of abominations."

But increased revenues were apparently not reinvested in capital improvements. Seemingly immune to modernization, canal management retained the locks, "all hand operated by 'ancients' " and the hand operated, slow moving bridges—"an absolute joke alongside the modern canal machinery to be found elsewhere."

Critics charged that "when one approaches in a boat, the lock is always filled the wrong way and a yacht has to wait until ancient sluices have been opened or closed and a

single lock keeper takes his own time about opening and closing the necessary lock gates."

Also there was much public criticism about the low water level, a draft of four to five feet instead of the claimed seven feet; many a yacht was marooned on a dry mud bank in the center of the canal. Consumers called for proper dredging and competent supervision to keep the canal bed clear of stones and sand bars.

Finally, shipping and pleasure boat interest groups lobbied for 24-hour service as a means of expediting existing canal traffic and attracting new customers to the waterway.

These requests were met by recurrent threats of abandonment. Finally citing lack of use as the main factor in the decision, the Canal Company failed to open the D and R after the winter of 1933. In protest, persistent marine organizations waged a spirited battle to save the waterway. Attempts to revitalize the canal continued until 1937 when the Canal Commission launched its final effort. Before a meeting with the Army Corps of Engineers in Newark, canal proponents averred that 3,000 pleasure craft had pledged to use the canal annually and that boat builders had promised to use the canal extensively for boat deliveries.

Despite these optimistic projections the federal government elected not to revive the waterway. Portions of the canal were filled in and permanent bridges were constructed. Yet the D and R Canal remains essentially intact. Today it provides water to local municipalities and serves as a recreational source for canoeists.

(The photographs on these pages are reproduced courtesy of William J. McKelvey, Jr., and are taken from his book *The Delaware & Raritan Canal*, Canal Press Inc., 1975. Many of the photographs are from private collections).

CANADIAN CANAL SOCIETY

Congratulations to the Canadian Canal Society for the publication of its first newsletter, entitled CANALS CANADA, to be published quarterly. Membership dues in the society includes a subscription to this publication. The membership year is February 1 through January 31. Classes of membership are individual \$10; Family \$15; Contributing \$25 up. Checks payable to the Canadian Canal Society, in care of the Secretary, Canadian Canal Society, P.O. Box 1652, St. Catharines, Ontario L2R 7K1, Canada.

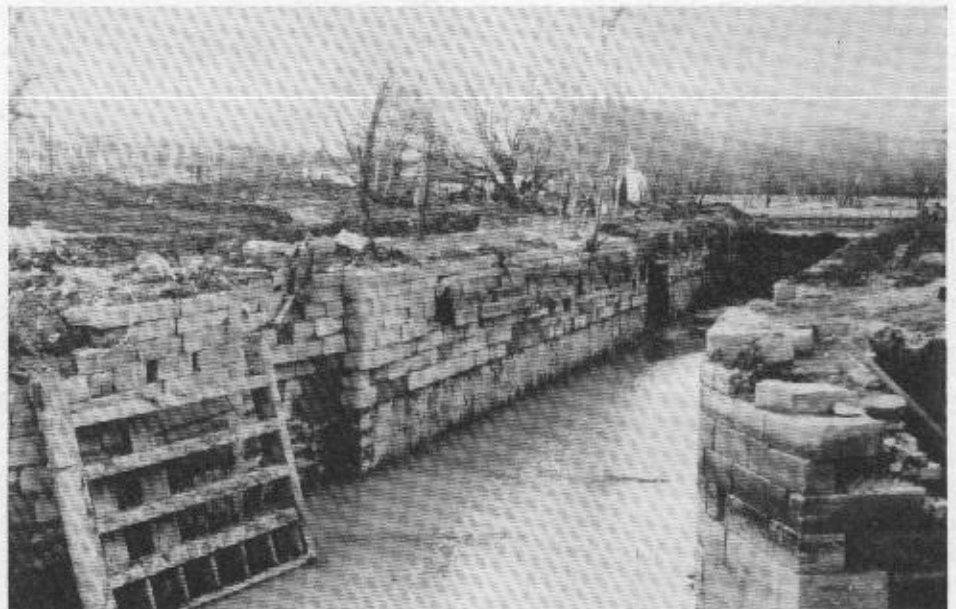
CLASSIFIED AD

CANAL TRIPS IN ENGLAND AND WALES—The new 1983 Anglo-Welsh canal catalog has arrived chock-full of interesting canal and river trips for those interested in taking a drive-it-yourself vacation. Lots of nice photos and a canal map to entice you on a trip you will never forget. Capacity of boats from two to ten persons.

FRENCH CANAL AND RIVER TRIPS—For those who prefer to have someone else do the driving and yet enjoy the pleasures of a waterways vacation. Lowest price trip available in France is around \$100 per person per week. Meals not provided, but ample restaurants along the way as well as a galley aboard the boat. Book a single passage, or the entire boat.

American Representative for Anglo-Welsh (U.K. trips) and Waterways Exploration (for French trips) is American Canal and Transportation Center, P.O. Box 310, Shepherdstown, WV 25443. Ask us for a brochure for either or both companies.

THE DELAWARE AND RARITAN CANAL TODAY



This photo (made recently by Mitchell Dakelman of Highland Park, New Jersey) shows Outlet Lock Number 14 of the Delaware and Raritan Canal, New Brunswick, NJ being readied for restoration. This is part of a two-year project of New Jersey DOT to re-build a 500-foot section of the old canal. Cofferdams have been erected at both ends of this section to enable workers to get at the canal and lock walls below the level of the Raritan River. We are indebted also to Bill McKelvey for giving us the details of this operation.

OHIO CANAL SEMINAR

The Canal Society of Ohio is having a Canal History Seminar instead of their usual Spring Tour. It will be held on April 15 and 16, 1983, at Roscoe Canal Village and will include talks by Dr. Bill Trout, President of the Virginia Canals and Navigations Society, on "Canals on Computer"; various projects of the American Canal Society; and "The Canals of Virginia." Vernon Will of the Ohio Historical Society will speak on "Location, Indexing and Preservation of Historic Canal Photographs". There will be visits to interesting sites in Roscoe Village, an inspection of the Triple Locks at Coshocton; and slide shows and anecdotes of canal life in Ohio and elsewhere. Contact: Donna Dolick, Roscoe Village Foundation, Whitewoman Street, Coshocton, Ohio 43812; or John Droegge, 2937 Neil Avenue, Columbus, Ohio 43202.

MIAMI-ERIE CANAL BOAT A-BUILDING

From Captain Robert H. Brooker we have learned that he and his associates are in the process of building a full-scale Canal Boat to be used on the Maumee River at Grand Rapids, Ohio. Their construction will be based upon the St. Helena Canal Boat, and will conform to Coast Guard Regulations. They are hoping to have the new boat in operation (out of their present dock in Providence Metro Park) by July 1, 1983. They presently operate the only steam-powered stern-wheeler in Ohio. For further details write Capt. Robert H. Brooker, 2674 Middlesex Drive, Toledo, Ohio 43606.

AUTHOR ABOARD DURING DELTA QUEEN MISHAP

Leslie C. Swanson of Moline, IL., author of the two books, *Canals of Mid-America*, and *Steamboat Calliopes*, had an unscheduled "brush" with the Mississippi River Dam Rollers on a recent trip of the famed passenger ship, the Delta Queen.

Swanson said the crew handled the situation in a very admirable and professional manner. After leaving the boat the passengers had dinner at a Hannibal motel and were later transported to St. Louis in a fleet of buses. The ship resumed its schedule shortly after at New Orleans.



STOP COMPLAINING... IF THE EPA SAYS IT'S SAFE TO MOVE BACK HERE TO THE LONE CANAL... IT'S SAFE TO MOVE BACK...

RENOVATION FOR 180 YEAR OLD CANAL TUNNEL

(The following item from "TUNNELS AND TUNNELING" for January 1983, was submitted to us by ACS Director Robert S. Mayo.)

One of the oldest and most important tunnels on the British canal system, the 2812-meter (approximately 1-3/4 miles) long Blisworth Tunnel built in 1797, is to be repaired. The tunnel is situated near Stoke Bruerne on the main line of the Grand Union canal between London and the Midlands.

The failed brick lining in the central part of the tunnel is to be completely replaced with a precast concrete segmental lining installed behind a shield of the type made by Grosvenor Steel. Blisworth Tunnel, the longest navigable tunnel in Britain, has a long history of maintenance problems and has several times in its 180 year history required repairs ranging from replacing the brick floor to totally relining sections.

Because no plans were left by the Engineers constructing the tunnel, the British Waterways Board (the owner) has had to make its own records and put together all the known information. A contract for the repairs has been awarded by BWB to John Mowlem. The shield is expected on site in April 1983 and the programme is expected to take up to 90 weeks to complete. An enlarged chamber will be built inside the tunnel so that the shield can be assembled ready for its drive. Charcon rings of 19.6 feet inside diameter are expected to be used and these will be infilled with concrete on those segments that will eventually be under water in the re-opened canal.

The canal has already been dammed and the northern two-thirds of the tunnel emptied of water. Site roads, including a concrete road on the bed of the northern one third of the tunnel to provide access to the start of the reconstruction, have been completed by John Mowlem under a preliminary contract, now complete.

Concrete tunnels are the oldest tunnel structures in the UK, and pre-date the railways by at least 50 years, the major sewers of London by 80 years, and the London underground railway tunnels by one hundred years. The restoration work in disturbed ground that has been worked before could prove difficult because it is not the same as constructing a new tunnel in virgin ground. Changes in stress patterns in the ground have occurred during the last 180 years.

The operation of breaking out the old lining and constructing new concrete rings will take place with the work force protected and the ground supported by the shield with a forepoling facility, which will be progressively jacked forward to complete the relining of the middle third of the tunnel. Every step of the work must be preceded by investigatory probing, and problems dealt with as they arrive. Consulting engineer is Mott, Hay and Anderson.

CANAL CALENDAR

March 26, 1983 - Second Annual Canal Symposium, Lafayette College, Easton, PA. (See details last issue of A.C.). For registration forms, write: Center for Canal History and Technology, 200 S. Delaware Drive, P.O. Box 877, Easton, PA 18042.

April 15-16, 1983 - Canal History Seminar, sponsored by the Canal Society of Ohio, at Roscoe Canal Village, Coshocton, Ohio. (See details, this issue). Contact: John Droegge, 2937 Neil Avenue, Columbus, Ohio 43202.

April 23, 1983 - Annual Justice Douglas Hike on the C. & O. Canal. For details, write: P.O. Box 66, Glen Echo, MD 20768.

May 6-8, 1983 - Joint Tour of the Pennsylvania Canal Society and the Canal Society of New Jersey, Eastern Division PA Main Line Canal (See details this issue). Contact: Bill Shank, 809 Rathton Road, York, PA 17403.

June 4, 1983 - "Oldtime" (Canal) Market Day, sponsored by Old Freemansburg, (PA) Association. Write C. W. Derr, 117 Main St., Freemansburg, PA 18017.

June 4, 1983 - Roebling Aqueduct Symposium and Field Trip, starting at Eddy Farm Resort (Port Jarvis, NY). National Park Service dedication program involved. For complete details contact: Center for Canal History and Technology, 200 S. Delaware Drive, P.O. Box 877, Easton, PA 18042.

June 25, 1983 - Lehigh Canal Festival (with musical program) sponsored by Friends of the Hugh Moore Park at Easton, PA. For more information write: Canal Museum, P.O. Box 877, Easton, PA 18042.

June 25-27, 1983 - Champlain Canal Cruise on "Emita II". (See details last issue. All-inclusive fare estimated at \$300). Contact: Hayward Madden, 5847 Decker Road, Livonia, New York 14487.

June 27 - July 1, 1983 - Joint trip of Canal Society of New Jersey and Delaware and Hudson Canal Society along the path of the old Erie Canal. (Estimated cost \$250). Contact: Paul Ross, 18 Circle Ave., Ellenville, New York 12428.

October 7-10, 1983 - Steamship Historical Society Fall Meeting in Pittsburgh, PA, including a two-night cruise on the DELTA QUEEN, Pittsburgh to Wheeling, and return. Contact: your travel agent about the DELTA QUEEN trip SOON! (Fare: \$190 and upward).

The St. Lawrence River Canals Vessel

BY JAMES GILMORE

As a special service to members of the AMERICAN CANAL SOCIETY, we are distributing this reprint of an article published in the 1956 TRANSACTIONS of the Society of Naval Architects and Marine Engineers. We are indebted to James Wilson, ACS member and long-time member of the Steamship Historical Society of America, for calling it to our attention.

James Gilmore's article is significant because it was published a few years before the formal opening of the St. Lawrence Seaway, by Queen Elizabeth and President Eisenhower in June of 1959. In it Gilmore covers the past history of navigational canals along the lower St. Lawrence and the vessels used on them — all soon to become obsolete. The tremendous size of the Seaway permitted full-size ocean-going vessels to travel, for the first time, into the heartland of North America.

For further information on the Seaway, read AMERICAN CANALS, Issue No. 30 (August 1979); BEST FROM AMERICAN CANALS (March 1980); or TOWPATHS TO TUGBOATS (May 1982).

Distributed by
American Canal Society
809 Rathton Road, York, PA 17403

February 1983

The St. Lawrence River Canals Vessel

BY JAMES GILMORE,¹ MEMBER

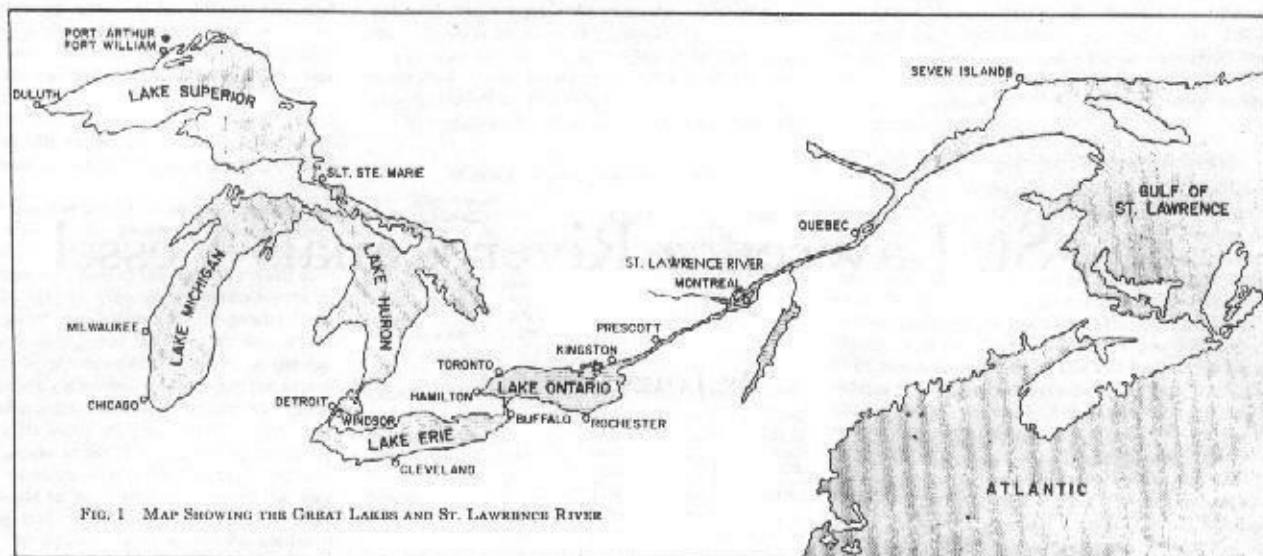


FIG. 1 MAP SHOWING THE GREAT LAKES AND ST. LAWRENCE RIVER

INTRODUCTION

When the St. Lawrence Seaway project is opened to shipping, a type of ship, long familiar on the St. Lawrence River and in the Great Lakes, to all intents and purposes, will become obsolete. There are presently in existence about 180 Canadian registered St. Lawrence River canal vessels or "Canallers" as they are familiarly known from the Gulf of St. Lawrence to the Head of the Lakes, and the history and development of this type of ship are closely related to the development of Canada.

It is, therefore, appropriate on the eve of their relegation to a minor from a major role in Canadian shipping that a survey of these interesting vessels should be made. The specialized type of ship known as the "Canaller" is, of course, the result of the difficult geographical features of the St. Lawrence River and the limitations of the canals built to overcome these difficulties and the first part of this paper will deal with the development of these canals and the corresponding types of vessels leading to the emergence of the present day "full" Canaller.

The water route from the lakehead to the open sea is divided into three main parts; open water navigation on the lakes themselves, river and canal navigation on the upper St. Lawrence River between Kingston and Montreal, and almost unrestricted navigation on the lower St. Lawrence and the Gulf. The upper St. Lawrence section is, of course, the portion most closely associated with the canaller and the part which has restricted free navigation since Canada was first visited by Europeans.

When Jacques Cartier was exploring the St. Lawrence in 1535, he arrived on what is now the Island of Montreal after more than 1000 miles of fairly easy river navigation which, he believed, would eventually lead him to the middle of the then newly discovered continent. His hopes suffered a setback however, when he climbed Mount Royal and saw the Lachine Rapids blocking his path to the west.

These rapids are the first of a series between Montreal and Lake Ontario which have seriously hindered navigation ever since the days of Jacques Cartier and although a succession of canals has been built over the past 250 years the rapids will not be completely overcome until the Seaway is opened.

(Maps of the Great Lakes and St. Lawrence River, and the rapids and canals from Lake St. Francis to Lake St. Louis, are shown, respectively as Figs. 1 and 2.)

THE SULPICIAN'S CANAL

The first attack on the problem was made by the Sulpician Order of Montreal. A member of the order, Father Fenelon, made a survey of a route for a canal to by-pass the Lachine Rapids and, in 1680, his report was submitted to the governor of the colony.

The proposed canal would enable canoes to ascend the river into Lake St. Louis which would in turn give access to the Ottawa and upper St. Lawrence rivers. The proposal required the excavation of a channel about one mile long commencing at Lachine, above the rapids, to Little Lake St. Peter. This lake was later filled in and no trace of it now remains. From the lake to Montreal the Little St. Peter River was to be deepened to make a channel 12 ft. wide with a minimum depth of 18 in. when the St. Lawrence was at its lowest level. The deepening of the river was carried out but official support was apparently lacking and no work was done on the channel. A few years later Dollier de Casson, Superior of the Sulpicians, who was also an engineer of some repute, proposed that the work be done by the settlers at Lachine on a communal basis. Preparations for this were completed in the Summer of 1689, but in August of that year most of the settlers at Lachine were massacred in an Indian raid.

In 1700 the Sulpicians arranged a contract for the work with a Montreal contractor named Gideon de Catholigne for the then large sum of £9000 with the stipulation that the work was to be completed by June of 1701. However, the contractor ran into difficulties and in February of 1701, when the work was about three quarters finished, the money was exhausted.

The remaining work was never completed although many attempts were made to revive interest during the next 30 years and at one point Louis XIV of France became personally interested in the scheme. It is probable, however, that at periods of high water canoes were able to use the partially finished channel.

In spite of these handicaps, traffic on the river increased rapidly, the cargoes of trade goods to, and furs from the West, being carried mainly in canoes. The birch canoes were light enough to be portaged around the unnavigable parts of the river. The canoes had, of course, a very small carrying capacity.

One reference (1)² suggests that during the French regime, some small wooden locks were built at Cascades, Coteau and Long Sault in an attempt to improve the route when bateaux appeared on the scene. No authentic records have, however, been found to substantiate this.

THE MILITARY CANALS

No real progress in improving navigation was made until the United States War of Independence (1775-1783) made better transport along the river a military necessity for the British Government who were by then in control of Canada. The building of canals and other improvement works were undertaken by the Royal Engineers during the period 1779-1783.

At this time the main type of boat in use was the bateau which had displaced the canoe. The bateau was a fairly heavily built boat much stronger than a canoe and having a shape somewhat similar to the present East Coast dory although a good deal larger. The common type of bateau was about 35 to 40 ft long with a relatively narrow beam of about 5 ft 6 in. The boat had a flat bottom and heavily raked stem and stern with flared sides. Construction was quite simple and the boats were built with whatever lumber came to hand, tamarack being a common material. Thwarts were provided for the crew of about 13. These boats were rugged and could run the rapids

¹ Partner, Mills, Gilmore & German, Montreal, P. Q., Canada.
Presented at the Spring Meeting, Montreal, Canada, May 3-4, 1956, of THE SOCIETY OF NAVAL ARCHITECTS AND MARINE ENGINEERS.

² Numbers in parentheses refer to the bibliography at the end of the paper.

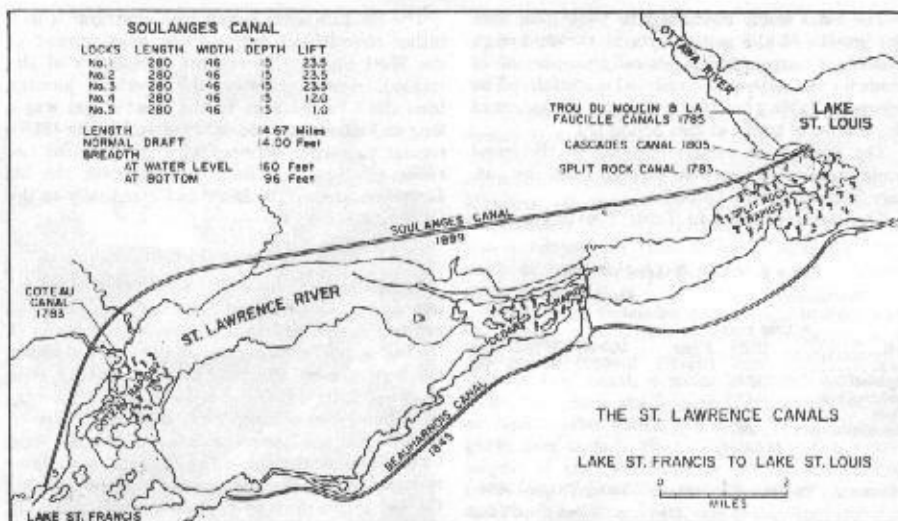


FIG. 2. MAP SHOWING RAPIDS AND CANALS—LAKE ST. FRANCIS TO LAKE ST. LOUIS

quite successfully and being of simple construction were easy to replace if lost. Going upstream a bateau was rowed and portaged and had a dead-weight of about $3\frac{1}{2}$ tons, with a slightly greater load for downstream passages.

The canals and channels, channels being distinct from canals in that they were part of the existing waterways deepened and bounded by rock walls, built by the engineers were designed to accommodate these bateaux and were 6 to 7 ft wide with a depth of about $2\frac{1}{2}$ ft. The first series of channels was built along the north shoreline of the Lachine Rapids but did not appear to have been too successful as records show that many voyages were started from Lachine, cargoes being taken overland from Montreal. Figures given in an old record (1) show that in 1782, shortly after the channels were opened, the total receipts for the season were:

283 bateaux at 10 shillings
2 canoes at 5 shillings
1 "boat" at 5 shillings

with a total revenue of £132/5/0 or about \$530.00 (U.S.) at the rate of exchange at that time.³ The craft were presumably bound upstream as those coming downstream normally ran the rapids.

Having obtained access into Lake St. Louis, the next barrier was the series of rapids extending over about 12 miles of the river in three groups: Split Rock, Cedar and Coteau Rapids. The first series at the entrance to the river from the lake was overcome by the construction of three small canals. The first, the "La Faucille" canal was 410 ft long with one lock. The second, "Trou du Moulin" was close to the first and 120 ft long without locks. "Split Rock" canal was completed from 1782-1783 and had one lock.

Cedar Rapids, about 4 miles upstream from Split Rock, was navigable for boats but Coteau Rapids required the construction of a fourth canal, completed in 1782, across the point of land at the mouth of the Delisle River (2, 3).

In the late 1790's the movement of grain from Upper Canada to the Montreal area began and it is interesting to note that the usual method of transport was to build a large raft or ark of logs which was loaded with grain and floated downstream. On arrival in Montreal the rafts were broken up and the lumber sold. No records have been found to show what proportion of the grain survived the journey but it is presumed that these ventures were limited to periods when water conditions on the river were favorable.

³ For convenience many of the cost figures, referred to prior to 1830, have been converted to U.S. dollars, using the rate of exchange reported current during the particular period.

A few years later, in 1800, the need for improvement became urgent and, in addition, the "La Faucille" and "Trou du Moulin" canals had proved to be prone to severe damage by ice each spring. A survey was undertaken by Colonel Mann and in 1804 reconstruction was begun.

The old shoreline channel at Lachine was improved, enlarged and made continuous along the length of the rapids. The "La Faucille" and "Trou du Moulin" were abandoned and a new canal, the "Cascades," was built across Cascades Point. This canal was about 1500 ft long and had two locks each 100 ft by 20 ft at the lower entrance and guard gates at the upper entrance. This canal lay in a north-south direction crossing the line of the present Soulanges canal at about lock No. 2. During the same period the Split Rock and Coteau canals were enlarged and the main construction was completed in 1805 (2, 3).

With the enlargement of the canals, trade rapidly increased but even after the improvement, transporting a cargo from Montreal to Kingston was a major undertaking. The bateaux and Durham boats, a later type of boat, illustrated in Fig. 3 were usually taken upstream in "brigades" of five or more so that, when the occasion arose, the crews would be able to assist each other. The brigades were sometimes assembled at Lachine, their cargoes having been brought from Montreal by road and at other times towed and rowed through the Lachine channel. At Cascades Point about three quarters of the cargo of a Durham boat was unloaded and carted to the head of the Cedars rapids. The boat was then locked through the Cascades and Split Rock canals and dragged up the Cedars rapids where the cargo was reloaded. The boat then passed through the Coteau lock and into Lake St. Francis. At the Long Sault rapids above Cornwall the process was repeated after which the boat could be sailed to Kingston. After 1818 a steam towboat was used in this section but unfortunately no details of this vessel can be found. On the average it took 13 days to transport the 8-ton cargo of a Durham boat from Montreal to Kingston and the following items show this expensive process:

Toll charges Cascades and Coteau locks . . .	£2-10-0
Towing costs at rapids	5-10-0
Land carriage 8 tons Cascades to Cedars . . .	3-0-0
and at Cornwall	3-0-0
Towage Prescott to Kingston	3-15-0
Wages 5 men, 12 days at 3/6 per day	12-12-0

£30-7-0
(approx \$120.00 U.S.)

These costs were, for their day, very high and were of course reflected in the price of all goods used in Upper Canada which had to be brought from the Gulf and Europe and were the prime reason for the continuous pressure by the settlers in Upper Canada for improvements in the system.

In spite of the high costs, large numbers of Durham boats and bateaux used the canals as can be seen from the following Coteau lock records:

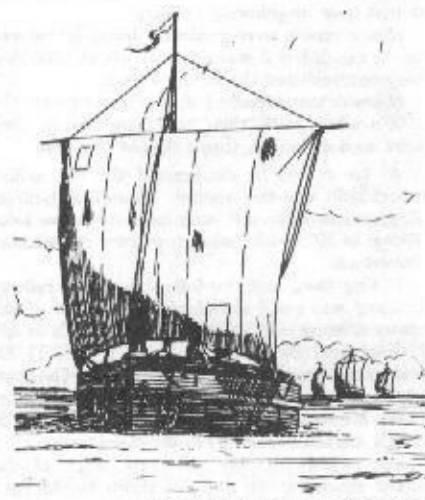
	Durham boats	Bateaux
1818	315	679
1819	339	573
1820	561	430
1821	342	634
1824	268	596

In addition, about one boat in eight stemmed the rapids at Coteau so the total number of boats going upstream was quite considerable and about 5000 long tons were transported annually.

Proceeding downstream the going was much easier and the voyage from Kingston to Montreal averaged about 4 days and cost only about \$25.00, the cargoes being mainly grain and averaging about 15,000 tons per year. The drop in the number of passages from 1821-1824 was mainly the result of a premature trade act introduced by the British Government which had an adverse effect on trade, and also two poor crop years in 1823-1824 (1).

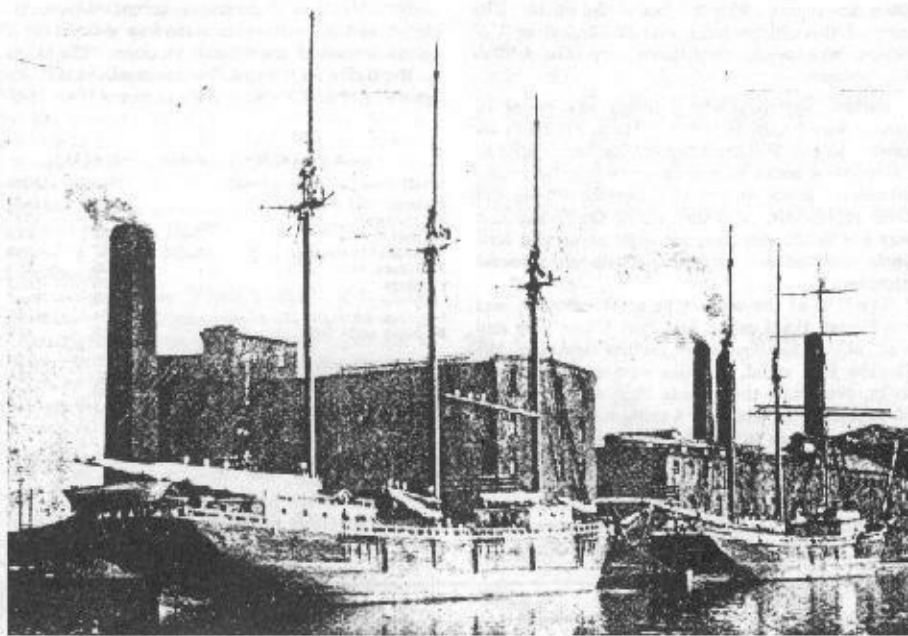
During the War of 1812 traffic along the canal was heavy, most of the military stores for the lakes region being shipped via the canals. Being so close to the border, vessels in the canals were in constant danger of attack from the U.S. side and a convoy system was adopted. Armed luggers were stationed at various points along the river, Lake St. Francis in particular, and the Durham boats were escorted through the various sections in convoys of fifteen to twenty.

During 1814 and 1815 naval building was going on at a furious pace on both sides. All the guns and rigging equipment for the vessels built for the Royal Navy at Kingston were transported by barge and Durham boat from Montreal and complete sets of frames for the 32-gun frigates were made in England and shipped via the canals from Montreal to Kingston. The transportation of these unwieldy items was a difficult and enormously expensive undertaking costing over \$50,000 per ship set (4).



(Courtesy of Canada Steamship Lines, Ltd.)

FIG. 3. DURHAM BOATS, ABOUT 1810 BY G. A. COTHEBERTSON



(Courtesy of Redpath Sugar Ltd.)

FIG. 4 SAILING VESSELS IN LACHINE CANAL, ABOUT 1880

THE FIRST COMMERCIAL CANAL

During this period many efforts were made to obtain a better canal at Lachine, mainly because of the obvious inefficiency of the system then existing and also because of the discussions which were going on at the time for the building of the New York State Barge Canal system. The building of this canal was seen as a serious threat to the trade and rapidly expanding cities on the Canadian side of the border and the Government of Lower Canada decided to introduce legislation for the building of a proper canal at Lachine. This Bill had a chequered career and was subjected to much inquiry after being passed in 1815, being finally repealed in 1819. At this time a joint stock company with a capital of \$600,000 was authorized but this also was repealed when in 1821 the government decided to undertake the building on its own account and to reimburse the stockholders in the joint stock company.

The construction of the canal across the southwest corner of the Island of Montreal, following fairly closely the route of the Sulpician project, was completed in 1825. The completed canal was $8\frac{1}{2}$ miles long with the canal prism 48 ft at the waterline and 28 ft at the bottom. Seven locks each 100 ft \times 20 ft \times 5 ft depth were built to overcome the lift of about 45 ft between the harbor at Montreal and the level of Lake St. Louis. The total cost of the project was \$438,000 of which \$50,000 was contributed by the British Government on condition that government stores were allowed to pass free of tolls (3).

A canal system around some of the worst rapids on the route was therefore in existence in 1825 and the effect on the traffic was considerable. By 1831 the average traffic per season was 700 Durham boats and 1300 bateaux bound upstream, the west-bound cargo having increased to 21,000 tons annually—almost four times as much as in 1824. Much of the downstream traffic was still being carried in lumber scows which shot the rapids, the downbound boat cargoes increasing only slightly to 66,000 tons per year.

The year 1832, however, saw a marked reduction in the number of vessels using the Cascades and Coteau canals. This was due to the opening of the canals on the Ottawa River. The Ottawa-Rideau-Kingston canal system had been projected immediately after the war of 1812 to provide an

alternative route between Upper and Lower Canada in the event of any recurrence of hostilities between the United States and Canada. This system proved to be easier for westbound traffic than the shorter St. Lawrence route and the arrangements used by one company, Messrs. McPherson & Crane were typical of many. This company owned a fleet of thirteen steamers together with many bateaux and barges which were towed up the Ottawa and Rideau rivers to Kingston, returning via the St. Lawrence.

In November 1829 the first Welland canal, connecting Lake Erie with Lake Ontario was completed, thus opening a continuous waterway from the Gulf of St. Lawrence to Sault Ste. Marie. The lock dimensions of this canal were 110 ft \times 22 ft \times 8 ft (3, 5).

Steam-powered vessels had been in use on the lower part of Lake Ontario since 1816 when the SS *Frontenac* (the old name for Kingston, Ontario) a three-masted side wheeler, went into service. It was, however, several years before machinery

was developed which was sufficiently powerful to enable steamers to attack the rapids.

After about 1833 vessels were able to descend as far as Dickenson's Landing, named after Horace Dickenson the owner of the Cornwall stage, and were able to stem the rapids on the return trip.

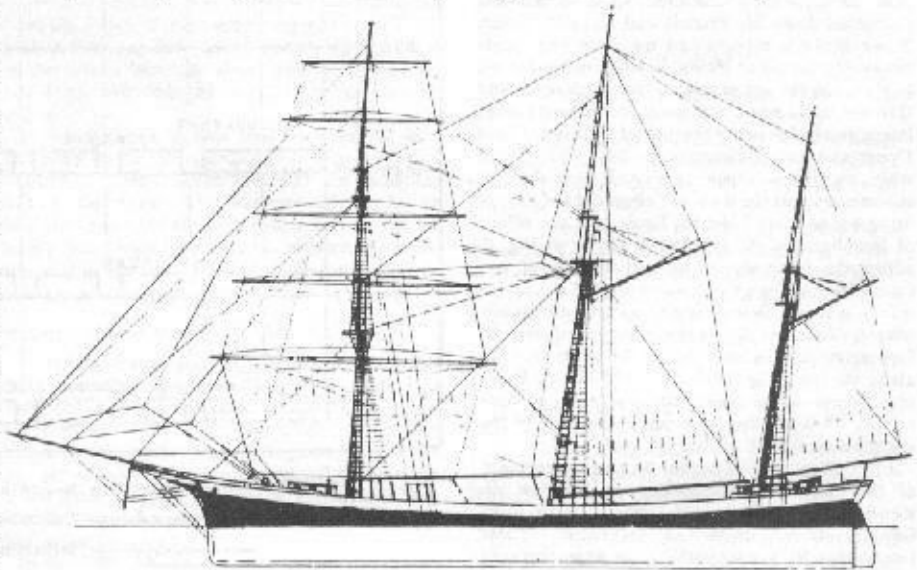
The *Dolphin*, typical of many vessels of the period, sailed every morning from Prescott to Dickenson's Landing at the head of the Long Sault rapids, where the passengers disembarked and were taken by stage to the village of Cornwall. From there they went by steamer through Lake St. Francis to Coteau du Lac where another stage was required to by-pass the Coteau to Cascades rapids section. Another steamer plied on Lake St. Louis, the passengers finally reaching Montreal by stage coach from Lachine.

It is interesting to note that in 1838 the *Dolphin* descended as far as Cornwall, whether by accident or design is not known, but getting the ship back up the Long Sault to Dickenson's Landing was a mammoth task involving 4 weeks' labor with twenty yoke of oxen aided by the ship's engine and an unknown number of men and many horses (1).

Also in 1838 a large sternwheeler, the *Troquois*, was built to run on the same route between Prescott and Dickenson's Landing but the vessel had so much difficulty at the Rapide Plat rapids that posts had to be sunk into the bank at intervals to which the ship could be moored for "breathers" for both crew and engines.

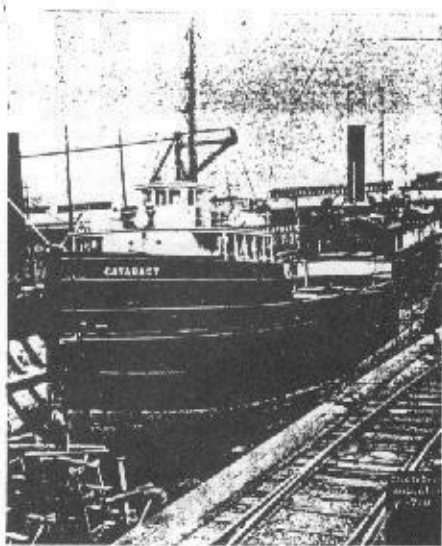
Another ship, the *Ontario* was built in 1840 and was intended to be powerful enough to navigate all the rapids. However, on its first return voyage from Montreal it was unable to ascend the Long Sault rapids. The ship returned to Montreal and was eventually sold, later operating successfully on the Montreal-Quebec trade.

In 1841 the *Vandalia* was built at Oswego, N.Y. and fitted with an Ericsson screw propeller, the first propeller-driven ship to be built in North America. The introduction of the propeller had a marked effect on the canal trade as, for the first time, steam-powered vessels could be built to the full lock dimensions, having previously been seriously restricted in hull width by the overhang of the side paddle-wheel boxes. The *Vandalia* had another novel feature which is now commonplace—the machinery was placed aft leaving a long clear hold available for cargo.



(Courtesy of Canada Steamship Lines, Ltd.)

FIG. 5 SAILPLAN OF THE BARCHENTINE JAMES F. JOY OF 1866. THIS TYPE WAS COMMON IN THE LAKES AND CANALS AT THAT TIME



(Courtesy of Capt. H. Baxter.)

FIG. 6 STEAMER CATARACT BUILT IN 1874 AT SOPHESBURG, ONT. COMPOSITE HULL AND COMPOUND ENGINE.

THE SECOND COMMERCIAL CANAL

In 1833 government commissions were appointed to investigate navigational conditions on the river and to make recommendations as to the most effective improvements. Their report recommended that a uniform system of locks all 200 ft X 45 ft with 9 ft of water over the sills be constructed along the entire route.

The Cornwall canal was the first of the new canals to be undertaken but was not completed until 1843. A lack of co-ordination seems to have existed in this period as the Second Welland canal, begun in 1841 was built to much smaller dimensions, 150 ft X 26½ ft X 9 ft and had to be completely rebuilt a few years later, in 1870, when the entire system was enlarged to 270 ft X 45 ft X 14 ft.

The Cornwall canal, overcoming one of the river's worst rapids, the Long Sault, was built on the site of the present canal which is, in fact, simply an enlargement of the first. The canal is 11 miles long with 6 locks and has guard gates at the west end at Dickenson's Landing.

The second stage of this development was the Beauharnois canal. This canal was built to bypass the Coteau to Cascades rapids section and connected Lake St. Francis and Lake St. Louis. Many surveys, reports and inquiries were made before the Board of Public Works finally decided to abandon the old canals on the north shore and this new canal was commenced on the south shore immediately following the act of Union between Upper and Lower Canadas in 1841. The canal, which is still in existence though now disused, commences near the town of Valleyfield and sweeps in an arc to enter Lake St. Louis near the village of Beauharnois. This route is shown in Fig. 2. When the canal was completed in 1845, it was found that the depth of water at the upper entrance was insufficient and two dams eventually were built across the main channel of the St. Lawrence just below Valleyfield with a dyke along the low lying south shore of Lake St. Francis. These dams raised the water to a satisfactory level and the canal was operated until the completion of the Soulanges in 1899.

In 1843 work was started on the enlargement of the existing Lachine canal to the new dimensions, three of the old lower entrance locks being combined into two in the process. These two locks, with much modification, now form part of the present system. The lower locks were arranged for a depth of 16 ft enabling seagoing vessels to reach the industrial sites which were

then developing along the line of the canal. The cost of this enlargement was \$2,149,000 part of which was again contributed by the British Government.

Farther upstream a completely new series of canals was begun in 1846. These canals, now known as the Williamsburg canals, were built to overcome a series of rapids extending for about 30 miles. Boats were at that time able to ascend these rapids but, as in the case of the *Iroquois*, it was a difficult operation for most ships and seriously depleted their cargo capacities when bound upstream.

The first of the series (the most easterly) was the Farran Point canal, just over 1 mile long and with one lock. Ten miles farther upstream the Rapide Plat canal, 4 miles long and with two locks, overcomes the Rapide Plat, a large stretch of rapids, after which a 4-mile stretch of navigable river leads to the Galop canal. This is the largest of the Williamsburg canals and is 7½ miles long and has 3 locks. The canal was originally built in two sections, one at Cardinal and one at Iroquois but was subsequently made continuous by the junction canal along the river bank (2, 3).

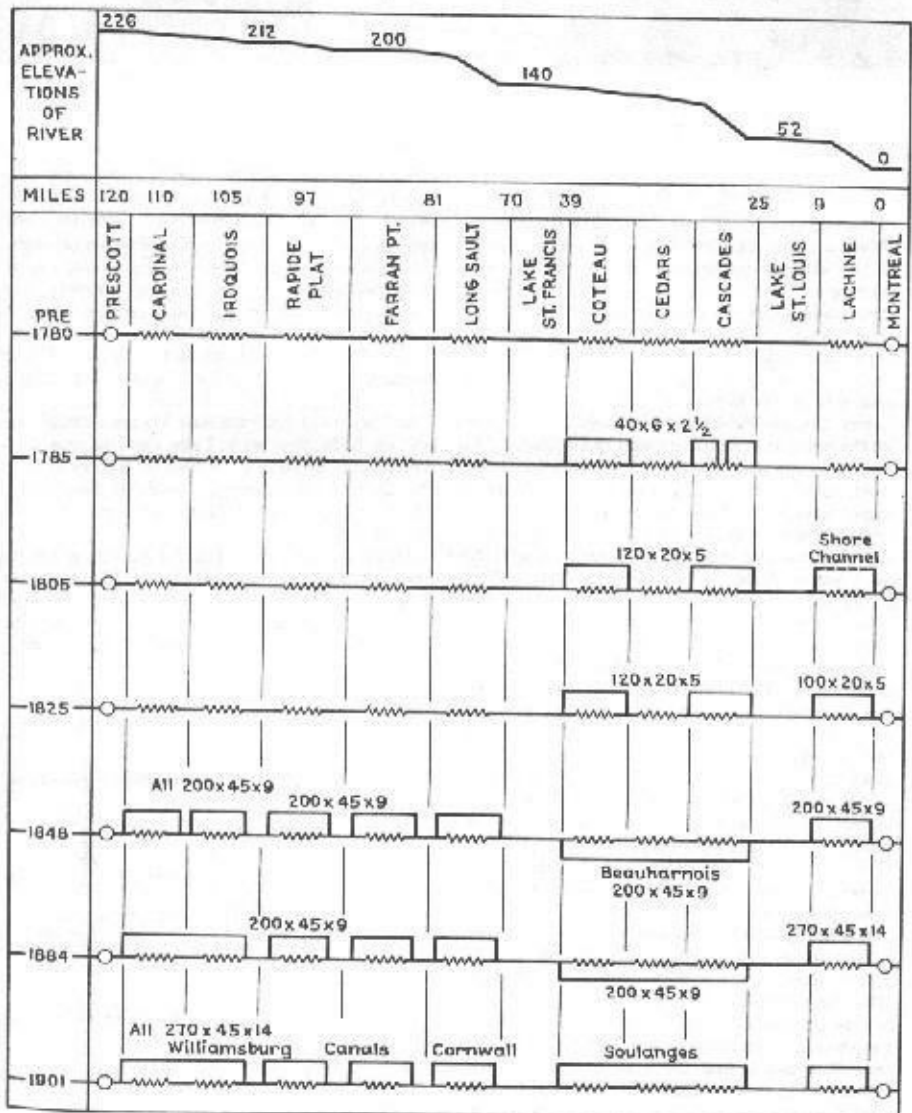
By 1848 all of these improvements were completed and a continuous waterway existed with canals around all the difficult sections. The effect on the traffic on the canal was immediate and the figures given in Table 1 for the years 1848-1849

TABLE 1 TRAFFIC ON EARLY CANALS (6)

Westbound (all in long tons)	1848	1849
Railroad and pig iron	1870	11439
Earthenware	473	1047
Liquors	537	925
Sugar and molasses	627	990
Furniture, etc.	620	918
Castings	4225	5565
Salt, coal	4863	6141
Merchandise	9864	12851
Building materials	76	415
	23530	40738
Passengers	18040	20814
Vessels	2890	2703
Toll receipts	£11,061	£15,740

indicate the volume of westbound cargoes through the Lachine canal.

The completion of the chain of canals around all the important rapids signalled the beginning of a period of furious activity along the river and



LEGEND ——— Indicates Rapid Named at Head of Diagram
 ——— Indicates Rapid Bypassed by North Shore Canal
 ——— Indicates Rapid Bypassed by South Shore Canal

Figures given thus—120x20x5—are Size of Smallest Lock

FIG. 7 DIAGRAM ILLUSTRATING DEVELOPMENT OF THE ST. LAWRENCE CANALS SYSTEMS

large numbers of ships were built to ply between the lake ports and Montreal.

Canallers were, at this time, vessels of about 175 ft maximum over-all length, with a beam of 35 ft and drawing about 8 ft. Those intended for the passage through to Lake Erie were restricted to about 135 ft in length to pass through the locks of the Second Welland Canal which was completed in 1845.

These ships were mainly sailing vessels, wood built and generally rigged as 2 or 3 masted schooners with a square rigged fore topsail, brigantines or barkentines.

These rigs became almost standard in the lakes and canals after many years of experimenting. Square-rigged vessels proved to be unwieldy in the narrow channels and in the variable wind conditions of the lakes. The crew requirements of the square-rigged vessel were usually greater than those of schooner rig and this was an important factor in the highly competitive trade in the canals. The topsail schooner and brigantine represented a compromise between the two extremes, the square sails being of great value when running downstream under the prevailing westerly winds. In addition the schooner-type rig enabled the booms to be swung well out of the way when loading and discharging, whereas the mass of stays of the square rigger seriously hindered cargo handling. The bowsprit of these ships was frequently inclined upwards at a steep angle to clear the lock gates. This feature may be seen in Fig. 4, the forward vessel being a regular canal type with barkentine rig (see Fig. 5).

These vessels were full formed with almost vertical sides and a small bilge radius, the sterns being cut up to a square-ended deck. The bow was built more nearly vertical than the ocean-going vessels of the period, in order to obtain the maximum displacement on the length available between the lock gates.

One of the unusual features of these vessels was the fitting of centerboards or drop keels, quite similar to those fitted on modern sailing dinghies. Two types were in use, the pivoted and vertical types, both being raised and lowered by a tackle hung from the crossbeams. These were necessary to prevent the relatively shallow draft vessels making leeway in the open water. Leeboards, such as were common in the sailing vessels operating in similar conditions on the Dutch coasts were tried but found to be impracticable for ships using the locks.

The deadweight capacity of these vessels was only about $\frac{1}{8}$ that of their modern counterpart and averaged about 350 long tons.

When canalling, these vessels were towed by teams of horses which, in many cases, were carried in the forecabin, others being hired as required from neighboring farmers.

Steam vessels were gradually being introduced to the canals but it was not until about 1880 that they outnumbered the sailing vessels.

Many of the old sailing ships survived until the 1900's when, with their topmasts struck, they were used as barges, towed by the steamers.

As far as can be determined the last sailing vessel built was the wooden *Minnetosa* built at Kingston in 1892 and sunk in a storm on Lake Huron in 1905 while being towed by the steamer *Westmont*.

During these and the following years, railway building was going ahead rapidly—much of the material being shipped west via the canals as can be seen from the figures in Table 1, over 11,000 tons of iron being transported in 1849. The completion of the Grand Trunk railway in 1855 between Montreal and Brockville—well clear of the rapids, caused a recession in the canal trade.

The railway quickly absorbed much of the mixed general traffic and the down bound flour cargoes, but the canallers retained the bulk of the grain trade—ships having a great advantage then, as now, in the carriage of bulk cargoes.

The total traffic continued to keep pace with the growth of the settlements in the mid-west, westbound cargoes being generally supplies of all kinds for the settlers and railroad materials. The figures in Table 2 for 1864 give some indication of the volume of traffic at this period (7).

The number of vessels engaged in the canal trade during this year can be seen from the passage figures given in Table 3.

The steamers listed in Table 3 were generally

TABLE 2 CANAL TRAFFIC OF 1864

	Canal		Rail
	Westbound	Eastbound	
	long tons		
Salt.....	8580	Flour..	468968 389637 bbl
Fish.....	1550	Grain..	3769039 424572 bn
Pig iron.....	18420		
Railroad iron.....	6200		
Nails.....	3021		
Miscellaneous.....	390		

TABLE 3 VESSELS ENGAGED IN CANAL TRADE, 1864

	Up	Down	Total
	Canadian steamers.....	1207	1206
Canadian-sailing vessels.....	3526	3037	7463
U.S. vessels.....	116	111	226
Totals.....	5148	4954	10102
Passengers.....	6750	14771	

similar to those built in the 1870's, referred to later. The sailing vessels listed also included a number of barges which were towed in open water by steam towboats and through the canals by horses. These barges were of wooden construction about 186 ft X 44 ft 6 in. X 8 ft draft and were capable of carrying a cargo deadweight of about 750 to 800 tons. Most of the barges were equipped with a small lug-sail to assist the towboats in open water and for steering purposes, their large rudders being arranged to turn at right angles to the ship to clear the lock gates.

No data on these vessels, beyond those already given, have been found. It is probable that the only plans of these vessels, like many others of their type, were in the minds of their builders.

The package freighter appears to have had its beginning about this time, a regular service being commenced from Chicago to Montreal in 1865 using four ships which, in their day, were described as "first class steamers" (7).

The steamer *Ontario*, built in 1874, was probably typical of the vessels used during the latter part of the life of the Second Commercial canal. This ship was built of wood by J. Simpson of Chatham, Ontario and was 181 ft long by 35 ft beam with a depth of 12 ft 3 in. This vessel was similar to the *Cataract*, Fig. 6, though much larger and was fitted with a low-pressure two-cylinder engine. The pressure used was only about 15 psi and as a result large cylinders, 34 in. and 36 in. were required (8).

It is interesting to note that these vessels were still being built of wood although iron or composite construction was quite common for seagoing ships at that time. This was probably due to the fact that many of the ships were built by small family businesses familiar with wooden construction and in addition wood was plentiful whereas iron was mostly imported.

Inception of International Traffic

It was about this time that the first international traffic through the canals began. Initially this trade was carried on in vessels, built on the lakes, which loaded with grain, flour, or lumber, and traded mostly to Liverpool, England, where the ship as well as the cargo was sold. This was due to the acute shortage of ships in England at that time and wooden vessels could then be built very cheaply on the lakes.

In the 1850's European registered ships began trading through the canals. These vessels brought immigrant passengers to Canada and the U.S. and returned with grain and flour.

The St. Lawrence canals also contributed in a rather roundabout way to the development of the West Coast. Before the completion of the transcontinental railway, the overland journey from the Chicago area to the West Coast was a long and hazardous undertaking and in the 1850's regular passenger services were in operation between Chicago and San Francisco via the St. Lawrence, around the Horn and eventually to the California coast (4).

THE THIRD AND FINAL COMMERCIAL CANAL

Immediately following the Act of Confederation in 1867, the Federal Government decided to institute a new program for the improvement of the canals. The object was to provide a continuous system from the Sea to Lake Superior with locks 270 ft by 45 ft with a 14 ft draft. This involved major reconstruction of the Lachine Canal, especially at the lower end, where new locks were built alongside the old. The old locks were later enlarged to the new dimensions so that a double channel with a draft of 17 ft on one side and 15 ft on the other was obtained. These led to a basin equipped with a large number of wharves clear of the navigation channel and close to the city of Montreal. As in the earlier developments the intention was to provide a deep channel for seagoing ships, one of which may be seen in Fig. 4.

Work on the Cornwall-Williamsburg canals, overcoming what is now generally known as the International Rapids section of the river, was commenced in 1876. The 200 ft locks of the old canals were enlarged and deepened in stages, the canals being opened for traffic in 1901 although some work was not completed until 1913.

The Cascades-Coteau section again proved difficult and, as in the improvements of 1841, many surveys were made of this portion of the river before it was finally decided to abandon the Beauharnois Canal and build a new canal on the north shore. The main reason was that even 9 ft draft had been difficult to obtain in the Beauharnois Canal and to obtain a draft of 14 ft it was necessary to have the canal entrance farther west which was possible only on the north side. The new canal, the Soulanges, is shown on the map, Fig. 2 and was commenced in 1892 and completed in 1899.

The gradual development, Fig. 7, of the St. Lawrence River canals system as we know it today was therefore completed by 1901, 200 years after the Sulpician Fathers made the first attempt to defeat the rapids.

BIBLIOGRAPHY

- 1 "Canada, an Encyclopedia of the Country," 1900.
- 2 "The Canadian Canals," by William Kingsford, Rollo & Adam, Toronto, Canada, 1865.
- 3 "Canals of Canada," Department of Transport, Canada, 1953.
- 4 "Freshwater," by G. A. Cuthbertson, Toronto, Canada, Macmillan Company, 1931.
- 5 "The Welland Ship Canal," Department of Railways and Canals, Canada (now Department of Transport), 1933.
- 6 The "Montreal Star" files 1880 to 1855.
- 7 "Report for 1867," Montreal Board of Trade.
- 8 "Lloyd's Register," London, England, and New York, N. Y., from 1873 to 1955.
- 9 "Motor Ship and Motor Boat," 1910-1912.
- 10 "Inland Seas," Journal of the Great Lakes Historical Society, Summer, 1948.
- 11 "Marine Engineer," 1932.
- 12 "Canal Statistics," Dominion Bureau of Statistics, Canada, 1954; also for general reference—"Steam Navigation," by James Croil, and, Canada Steamship Lines Marine Historical Collection.