

# Towpath Topics

Middlesex Canal Association P.O. Box 333 Billerica, MA 01821

[www.middlesexcanal.org](http://www.middlesexcanal.org)

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**Len Harmon** (photo courtesy of his wife Diane)

## **MCA Sponsored Events – 2024-2025 Schedule**

### **22nd Fall Bike Tour: 9:00am, Saturday, October 5, 2024**

Meet at Middlesex Canal plaque right at the entrance to Sullivan Square T Station, 1 Cambridge Street, Charlestown, MA 02129. Leaders will be Dick Bauer and Bill Kuttner.

### **Fall Walk: 1:30pm, Sunday, October 13, 2024, Billerica North to Chelmsford**

Meet at Billerica Falls, 71 Faulkner Street, Billerica, MA 01862.

### **Fall Meeting: 1:00pm, Sunday, October 27, 2024**

The speaker will be Neil Devins, Ph.D. His fascinating talk is entitled  
“The Panama Canal: History and a Recent Visit”

### **Winter Meeting: 1:00pm, Sunday, February 16, 2025**

Time, Location, and Speaker to be announced

Details will be posted on the MCA website: [www.middlesexcanal.org](http://www.middlesexcanal.org)

The Visitors Center/Museum is open Saturday and Sunday, Noon - 4:00pm, except on a holiday. The Board of Directors meets the 1st Wednesday of each month, 3:30-5:30pm, except July and August. Check the MCA website for updated information during the COVID-19 pandemic.

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### **Editors' Letter**

Hello Readers!

Welcome back to *Towpath Topics*. This issue is timed to coincide with the MCA Fall Meeting on October 27th at 1:00pm at the Faulkner Mill Reardon Meeting Room. Join us to hear Neil Devins' report on the Panama Canal.

As a follow-up to the April 2024 issue, we are reprinting what we are calling Part I of *River in the Sky* by Douglas Adams. Howard Winkler brought it to the attention of your editors, and we found it so enjoyable we wanted to share it. The style, the language, the narrative, all make it a treasured addition to the story of the canal.

Finally, we have events, a President's Message from J. Jeremiah Breen, and a museum construction update and tribute to Len Harmon by Betty Bigwood.

Any comments, criticisms, and submissions are encouraged!

Your Editors

### **MCA Sponsored Events**

**Fall Meeting:** The MCA will hold a public meeting on October 27, 2024 at 1:00pm in the Reardon Room at the Middlesex Canal and Museum located on 71 Faulkner Street in North Billerica, MA. Neil Devins, Ph.D., a long-time member and Membership Secretary of the MCA, will display pictures of his visit to the Panama Canal. But wait! It is not just a picture show, Dr. Devins will also discuss the fascinating history of the building of the Canal culled from various sources, including David McCullough's book *The Path*

Between the Seas. More information is available on the MCA website at [www.middlesexcanal.org](http://www.middlesexcanal.org).

For more information on the Fall Walk and the 22nd Annual Bicycle Tour please access the MCA website, [www.middlesexcanal.org](http://www.middlesexcanal.org).

### **Directions to Museum: 71 Faulkner Street in North Billerica, MA**

#### By Car: From Rte. 128/95

Take Route 3 (Northwest Expressway) toward Nashua, to Exit 78 (formerly Exit 28) "Treble Cove Road, North Billerica, Carlisle". At the end of the ramp, turn left onto Treble Cove Road toward North Billerica. At about ¾ mile, bear left at the fork. After another ¼ mile, at the traffic light, cross straight over Route 3A (Boston Road). Go about ¼ mile to a 3-way fork; take the middle road (Talbot Avenue) which will put St. Andrew's Church on your left. Go ¼ mile to a stop sign and bear right onto Old Elm Street. Go about ¼ mile to the bridge over the Concord River, where Old Elm Street becomes Faulkner Street; the Museum is on your left and you can park just beyond the bridge in the lot on your right. Watch out crossing the street!

#### From I-495

Take Exit 91 (formerly Exit 37) North Billerica, then south roughly 2 plus miles to the stop sign at Mt. Pleasant Street, turn right, then bear right at the Y, go 700' and turn left into the parking lot. The Museum is across the street (Faulkner Street). To get to the Visitor Center/Museum enter through the center door of the Faulkner Mill and proceed to the end of the hall.

#### By Train:

The Lowell Commuter line runs between Lowell and Boston's North Station. From the station side of the tracks at North Billerica, the Museum is a 3-minute walk down Station Street and Faulkner Street on the right side.

### **President's Message – Farsightedness of John Hancock**

by J. Breen

The population of Middlesex County grew four times faster than Essex County between 1810 and 1820 because of the Middlesex Canal. The population in the next two decades grew more than twice as fast, then the railroad rapidly replaced the canal. For example, Lawrence in Essex County was built as a mill city in the 1840s with a railroad between it and Boston Harbor. The new steam locomotive *Antelope* for its first run in 1848 between Lawrence and Boston ran the 26 miles at a mile a minute.<sup>1</sup>

Canal transportation enabled Lowell mills to be competitive with other mills which had water transportation like Manchester, England, Dover NH, Fall River and Salem, MA.

The thesis of this October 2024 *Towpath Topics* President's Message is that John Hancock and his compatriots were farsighted in seeing that a canal could be the basis for Boston to be still among largest cities in the United States a hundred years from 1790 when in the first national census it was the third

largest. In 1910, Boston was the fifth largest. The argument of the thesis is just begun in this message.

<https://www2.census.gov/library/publications/decennial/1900/bulletins/demographic/13-population-ma.pdf>

COUNTIES.	1850	1840	1830	1820	1810	1800	1790
The State.	994,514	737,699	610,408	523,159	472,040	422,845	378,787
				11%			
Essex	131,300	94,987	82,850	74,653	671,888	61,106	57,918
	38	15	11	3.8	17	7	
				16			
Middlesex	161,388	106,611	77,961	61,472	52,789	46,928	42,787
	51	37	27	16	18	9	

Unusual, differential growth began in 1802 when a glass factory was built on the banks of the canal in Middlesex Village, where the canal connected to the Merrimack.<sup>2</sup> By 1820, the factory was producing 330,000' of window glass/year using sand shipped up the canal from New Jersey and 2,000 cords of wood floated down the Merrimack River from New Hampshire forests.<sup>3</sup> Much wood was needed to melt the sand at 2,600 degrees. The amount of window glass produced implies the canal was a supplier of glass to an international market.

Tanneries were built in Woburn using hides from around the world shipped up the canal and tanbark boated down from hemlock forests in New Hampshire. Woburn also was a source of pure water from its many springs. Before the canal, a village would make leather from local cattle and tanbark as the cost of transportation was high. The collecting of hides in Spanish California in 1833-35 is described in *Two Years before the Mast* by Richard Dana. The brig *Pilgrim*, built in Medford in 1825, is sailed around Cape Horn to collect hides from haciendas along the California coast. The following extract from the "History of Tanning in the State of Maine" describes what began with tanning enabled by the canal in Woburn becoming a national manufacturer of leather for shoes. Which led to shoe manufacturing being a national business in Massachusetts.

"In New England the tanning industry is largely localized in northeastern Massachusetts. The principal tanning sections are located in a territory within a 40-mile radius from the city of Boston. The southern part of Essex County, with Peabody and the neighboring towns of Danvers and **Woburn** as its principal center, is the recognized tanning region of New England. There are important tanneries also in Salem, Lynn, Lowell, Norwood, Winchester, and Worcester. The state of Massachusetts had all but

19 of the 137 New England tanning establishments reported by the 1925 census. In Connecticut and in Maine there were five establishments each; there were also 6 reported in New Hampshire, 2 in Rhode Island, and 1 in Vermont. Massachusetts thus accounts for all but a small proportion of this activity in New England. In the country as a whole Massachusetts is surpassed only by Pennsylvania, whose manufacturing income from this source in 1925 was only \$1,500,000 greater, although in value of products Pennsylvania surpassed Massachusetts by \$17,000,000. The other important leather-producing states are New York, Wisconsin, New Jersey, and Illinois, in the order given. The output of each of these states exceeded \$30,000,000, while that of Massachusetts exceeded \$70,000,000. Boston has the largest sole-leather market in the world. This has existed since early times and has developed with the growth of the boots and shoe industry of New England, Eighty-five per cent of the country's leather production goes into the manufacture of footwear. Most of the New England tanning is of stocks for upper shoe leather. There are also a number of establishments which tan sheepskins, Philadelphia is the principal market of the United States for goatskins and for kid leather, and most of the tanneries in the Pennsylvania area are engaged in making these types of leather." Emphasis added. Pp. 87-89 of 134pdf.

Riley, George Archibald, "History of Tanning in the State of Maine" (1935). Electronic Theses and Dissertations. 2419. <http://digitalcommons.library.umaine.edu/etd/2419>

#### Notes

1. *Wilmington Town Crier*, History: Andover & Wilmington RR became the Boston & Maine | News | homenewshere.com
2. Dorit Lammers, *German Glass Blowers in Chelmsford*. Chelmsford, 2005.
3. *History of Chelmsford* by Wilkes Allen, 1820, page 75.

#### Leonard H. Harmon by Betty Bigwood

At the annual meeting of the Middlesex Canal Commission on March 21, 2024, Leonard H. Harmon stepped down as Chairman of the Commission. It marked the end of a long era of leadership.

Len, together with Tom Smith and State Rep Nicholas Paleologos, formed the MCC in July of 1977. He saved the Baldwin Mansion from demolition. He, with others, built a replica of a canal boat which carried passengers along the canal. All this is well documented in previous articles in *Towpath Topics*.

Len was born in Charlestown, grew up in Billerica and raised his family in Woburn. He is a father to five, grandfather to ten, and great grandfather to one.

By trade he was a builder. I will always remember his love for his Mustang with the top-down driving in the light snow and the heater going full blast!

He remains on the Commission representing Woburn and continues restoring the Count Rumford house. Thomas Lincoln from Medford has agreed to succeed Len as chairman. Tom has big shoes to fill.

### WHAT'S HAPPENING AT 2 OLD ELM?

by Betty M. Bigwood

On Monday August the 26th my phone rang at 7pm. It was our Contractor, Bill Cogley. It was unusual only in that he had had a right knee replaced that morning, woke up from anesthesia at 1pm, walked up and down a few stairs guided by a physical therapist and was sent home at 4pm. How is that for modern medicine?

A lot has been done over the summer to prepare for the next two months when we will see the building come together: (1) framing the interior, (2) plumbing for the three bathrooms, kitchen and sewer pump connections, (3) interior wiring, (4) a state-of-the-art sprinkler system. To meet Conservation Commission requirements (1) a trench has been dug around the parking lot to prevent debris run off into the Concord River, (2) two feet of knotweed was removed, properly disposed of and filled with new topsoil and new grass planted, (3) bridge abutments were started at each end.

Over the next few weeks:

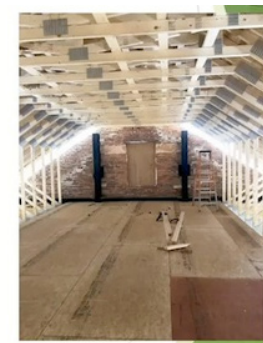
- (1) The gypsum board will be nailed up.
- (2) The platform lift will be installed.
- (3) The HVAC system will be completed.
- (4) Screw piles will be placed in the ground on the NW side to hold the welded frame of the huge exterior HVAC system and screw piles will also be placed at the new entrance to steady it.
- (5) National Grid will install a gas line on the north side of the building entering about two thirds along the way – protected by a plastic cover. All our efforts to use a commercial heat pump system were met by obstacles.
- (6) A clear coat of sealer will be painted on all exposed wood.
- (7) The bridge will arrive and be installed by Bill Cogley and his crew. At the final planning the bridge length needed an additional 5 ft., which changed the specs of the frame which proved costly (so far ~\$25,000) and time consuming.
- (8) Yellow stripes will be painted by Cogley's crew to delineate car spaces. J Breen spent untold hours on the phone with Pace to obtain a deed restriction for a portion of this parking lot without which we would never have been allowed to have a project.

Our plate is full. We still plan to move in with no date set. There will be three features unfinished – the large staircase, the kitchen and the final flooring. We are most appreciative for the Billerica Community Preservation grant of \$301,000 for a total of \$680,001, but were very disappointed when we were denied a grant from the Massachusetts Cultural Council which has supported us in the past.

Previous CPA Funding:  
\$100,000 (Fall 2018)

Current CPA Funds Requested:  
**\$280,000**

Funds will be used primarily  
for plumbing & electrical work  
and an elevator for ADA  
Accessibility



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Editors' Note: If you recall in the last issue we asked if any current members of the MCA recalled Douglas P. Adams, who was the President of the MCA a half-century ago. MCA Treasurer Emeritus and board member, Howard Winkler, shared his recollection of Adams' Middlesex Canal related book entitled "River in the Sky." In this issue we are including the first section of this publication. The remainder of the text will appear in subsequent issues as space permits.

### **RIVER IN THE SKY: The Story of the Middlesex Canal** by Douglas P. Adams, Professor of Mechanical Engineering, M.I.T., President, Bay State Historical League, Vice-President, Middlesex Canal Association

#### WHERE NATURE LOST – COULD MAN NOW WIN?

Once in a blue moon the hands of Man and Nature are set to oddly similar tasks. The Merrimack River, draining the heartland of southeast New Hampshire, drives its cold burden in a near beeline southward for Boston Bay until, in a sudden left-face, it inexplicably strikes with equal resolution northeastward for the sea. Armed with modern learning, geologists sought evidence to support a prehistoric total straightness for this river – all the way to Boston. Then, surprisingly, their searches were actually rewarded with a massive river delta in Boston Bay just below South Boston. Straight indeed would have been an old Merrimack River coming right down through what is now Horn Pond, Aberjona Creek, the Mystic Lakes, Spy Pond, Fresh Pond, into the present Charles, and the lower reaches of the old Back Bay into salt water at Boston's old "outer harbor." The assurance of a simplified, ancient route was supported

for several years by ground water investigations based on hundreds of seismic soundings. Recently, with the most modern sounding instrumentation, there stood revealed the hills and river valleys of the Boston of a million years ago. But sadly, it is now known that the river delta below South Boston belonged not to the Merrimack but to the ancient Charles, then a swifter, larger river. Shorter, faster streams from higher land also fed it from the north, and it was one of these that had carved the southward valley originally mistaken for the old Merrimack's. No river had ever actually penetrated the hidden rocky ridge that to this very day shoulders the hasty Merrimack northeastwards to the sea.

Since those relatively ancient early days, down from Labrador and fanning out over New England—a vast continental ice sheet had slowly advanced, a good (if incredible) mile thick. White and silent on the surface, it fearfully mauled the land beneath it. Its slow but inexorable hand deliberately ripped whole hillsides from their moorings, ground them to powder and piled the debris in strange shape. It filled and utterly buried many old valleys, tripping and forcing enormous' chunks of ice down deep into some of them and then covering them with debris. The later melting of these buried blocks in our warmer times has dotted these valleys with the depressions holding Horn Pond, the Mystic Lakes, Spy Pond, Fresh Pond and a myriad of smaller water bodies. Nature had never "straightened" the Merrimack, but viewed from above a strategic, rather mysterious route from Boston almost to the Merrimack is apparent through the above ponds and across the headwaters of streams - the path of an earlier, shorter, faster stream.

Leaving Nature for a moment and turning to less potent but more spirited Man, the American Revolution by 1783 had brought success in arms and a new confidence to the Colonials. An enormous spirit of adventure swept the hearts of men already steeped and daily living in adventure. The national government had passed largely to conservative men who operated in the still-persistent image of the defeated British but who were indeed marvelous money-makers, establishing many fortunes lasting down to our times. Their industry, skill and daring now proceeded to fill the oceans with Yankee-built ships – the world's finest. Shortly their ingenuity would also design and evolve techniques of manufacturing dominant to this day and paying large dividends. Driving and resourceful, they were for their times the ship-builders, financiers, writers and politicians.

In 1790 these men, Bostonians all, were searching, hungrily for avenues of trade and commerce and were fretful and unhappy at the prospects. Portsmouth had the Merrimack, Providence the Blackstone, New Haven the Connecticut, New York its Hudson River, Philadelphia the Delaware and Schuylkill, Baltimore the Susquehanna, Washington the Potomac, Savannah the Santee,

New Orleans the entire Mississippi, and Boston – the puny Charles!! Unerring instinct shortly focused their ambitions and limitless drive on the nearest great stream, the Merrimack. Here the wealth of New Hampshire and, through eyes bigger than silver dollars, that of Vermont and even lower Canada apparently promised large returns to whomever should show how that river could be transformed from a distant, obdurate country stream into a working artery of commerce contiguous to the self-esteemed but quite worthy Hub of the Universe.

Should Boston or should Portsmouth be heir to such wealth? New Hampshire's General James Sullivan, still aglow as a Revolutionary War hero, now Massachusetts Attorney General and later Governor of Massachusetts, first faced the task and pointed the way to harnessing the vast New England hinterland by connecting the Merrimack with the port of Boston. Man would thus effectively finally straighten the Merrimack! Thus, the question Sullivan really posed was whether Man could succeed where Nature had tossed in the sponge.

Strong men will draw each other's company; Sullivan had the good fortune to get in touch with Loammi Baldwin, a self-trained Woburn engineer of tremendous integrity, natural ability and energy. After a false start or two, they conceived a 27-mile-long canal which would eventually connect the docks of Boston with the Merrimack River. For many miles above the meeting point that great river itself was to be subjugated, further to yield to the steel wills of scheming men.

Considering those ancient days, for people like us in modern times the enormity of this undertaking simply cannot be grasped. If this project seems visionary to the modern reader, then that is precisely how the Middlesex Canal seemed to "those of little faith" in 1793 - indeed it seemed a "River in the Sky".

Man, now succeeded in this Herculean task largely because Nature's earlier efforts had actually left little solid rock to be removed. Overcoming all obstacles, experimenting with men, material, processes and economies, eternally sweating and driving, in ten short years the Bostonians wove a silver thread, extensive portions of which can be seen today, from sea level at Charlestown to the Merrimack bend. It was the first traction canal on the continent the greatest engineering feat attempted in the colonies to date and the cynosure, of American eyes. Visitors from every state marveled at its engineering competence while enviously (often vainly) planning their own canals. Turnpike operators cursed and merchants praised the safety, ease and enormous efficiency of the wonder creation. It solved great problems and brought a warming sense of achievement.

Once in place, fresh timber quickly silvered, the moist brown banks turned green and the 27-mile journey became a major mode of enjoyment, a fun-fest for all groups and ages, combining the camaraderie of shipboard with backyard-garden comfort and safety. A man, even a boy, could fall overboard, regain his footing, walk ashore, shortly clamber aboard and with reasonable dignity resume the pleasure of his extraordinary cruise.

#### THE COURSE OF THE CANAL – ITS HILLS AND DALES.

The Canal has been largely obliterated by the groping fingers of progress, yet its route is known in detail from its excellent original records (now largely in the Harvard Business School). Many interim maps have also been kept in the records of communities that grew up along its path. Perhaps the most startling and unhappy change occurs where the broad railroad and freight yards between Cambridge and Charlestown now lie, for in 1793 purling blue water stretched between these two cities; and a millpond extended up almost to Main Street, (see map). Two-way locks through a dam at the foot of the present Mill Street permitted passage at any height of tide and was the formal entrance to the Canal. The Bunker Hill tavern stood close by to sustain already weary morning workers, travelers from Boston come to take the ride, or to help climax a pleasant day for those returning. A mill using the tide-power was here, perched on the dam toward the Charlestown side, and many buildings and dwellings pertinent to the terminus of a major artery of commerce. Moving northward, the Canal emerged from the Mill Pond onto the Somerville end of the very narrow Neck at Sullivan Square, passed under or very close to the present Terminal Building, and then moved over toward the Mystic. It curved back in close to Broadway and the present swimming pool in Foss Park, Somerville, (see marker there) up along the Mystic banks a few score feet from the river, into Boston Avenue in Medford where it crossed on a pier-supported, twelve-foot trestle just high enough to keep it out of the highest tides. Thence by Boston Avenue, Sagamore Avenue into Winchester and up the east banks of the Mystic Lakes where it cut northwest across the Upper Lake just below the end, went North between Wedge and Winter Ponds into Woburn and very close to the eastern edge of Horn Pond. Now, surprisingly, came the steepest ascent of the entire canal, with a series of three double locks, each a lift of some eight feet raising cargo a total of some fifty feet, plunk along the line of present Arlington Road. Then it passed north to Woburn Center, where it boasted much prized docks (see later) just behind the present Public Library. The Canal soon went past Central Square, and under the present Route 128 (a marker announces it). Those who say all traces of the Canal have vanished should come here and look, for here; it can still be seen to the east of the Loammi Baldwin Statue and Mansion just beyond that Route 128. Now bearing steadily Northwest, it passed through South Wilmington across Maple

Creek (the headwaters of the Ipswich River) and then a trifle west of Silver Lake on into Billerica. It crossed the Shawsheen, (a lower Merrimack River tributary) on an aqueduct atop beautiful dry-stone piers (still standing) some thirty high. It crossed the placid Concord River wall above the rapids of its lower course in North Billerica, the horses using a good old Yankee contrivance, a floating towpath, no less, at this point. The Concord River was the source of all the canal water. It flowed from both sides of it into the Canal in opposite directions, northward toward the Merrimack and southward toward the Charles. Entry into the Merrimack was in East Chelmsford, then called the town of Merrimack, Lowell being non-existent.

So there it was. Now then, – what prompted the conception of this form for the Middlesex Canal? Was there at all central, seminal thought stream to merge, the ambitions of driving men with the uncompromising realities of obdurate Nature? How did it ever come to be?

The renowned Sullivan, as well as Baldwin, had probably traversed every one of the streams mentioned and had some direct as well as much intuitive knowledge of their rates of rise and their course lengths to the sea. Thus, he knew he was starting at sea-level with the Charles and Mystic, working up into the headwaters of the latter above Horn Pond, and into the source basin of the Ipswich River in Wilmington. This left him high up now so that he could hopefully gain altitude slowly for the Concord River – the last great obstacle. Unfortunately for this happy set-up, the Shawsheen, entering the Merrimack lower down than the Concord, cut back up southwestward down quite low in front of him. But by fingering the rim of the Ipswich Basin and hugging and even building high ground beyond he could envisage crossing the Shawsheen on the 30-foot piers above mentioned and then head on up into the Concord.

The ticklish business now remained of developing support for these intuitive ideas which had so early been seeded in the fertile colonial mind. Factual data was needed first since few would believe in anyone else's intuition. The instruments for measuring, believably said to be the first used for leveling in America, gave the rise from Charlestown to the Concord River at 68 feet, though actually 105 feet. They also announced that the Merrimack was 16 feet above the Concord, though actually 27 feet below. The figures, supplied by a local sear, violated the vibrant intuition of every Yankee mind. An eminent English surveyor, William Weston, was accordingly hired under whom instrumentation, though still extremely crude, was quickly improved enough to show that the Concord River was itself fortunately the high point of the route. All it took now was the surprisingly small pitch of a foot or two per mile to keep the water flowing, which meant, in the absence of other sources, 20 miles to Charlestown and to the Merrimack.

## THE CANAL IS PUT THROUGH. ASSESSMENTS AND WORKMEN.

John Hancock, a man of vanity, signer-in-florid of the Declaration of Independence, apologetic rebuffer of President Washington, ousted Treasurer of Harvard University, capped a truly unusual career on June 22, 1793, by attaching his immortal signature as Governor of Massachusetts to an Act incorporating the Middlesex Canal Proprietors, and thereupon shortly expired.

The list of the stockholders in this, strange, new venture quickly embraced most of the Brahmin line of Boston. In this case, the cards were stacked against these canny men, for while the opening price was \$25 per share, assessments were quickly made on them for further contributions as costs soared beyond all preconception until shares at the 1803 opening were worth \$1,500 apiece. Though much of their risk money was lost to these adventurers, their fellow country-men were the gainers ten thousand-fold.

A man of Baldwin's integrity and skill would naturally employ only the best of construction plans and execution. Ground was broken in Billerica, on September 10, 1794, and the work proceeded to this end first. The locks and parking pool at the entrance to the Merrimack (still intact though completely buried beneath the East Chelmsford Railroad tracks) were of stone. Progress southward was made in a thin manner but not fast enough to suit some stockholders who seemed highly allergic to constant assessments of their shares. By 1797 the directors, yielding to pressures, insisted on opening a section between the Merrimack River and North Billerica. This did a great deal of damage to the section and yielded small returns (since it was not used for another five years); even James Sullivan became convinced that unless the line were put through to Boston at a faster rate, the whole project would soon die.

Such haste meant a great deal of wooden construction in locks and buttresses, which would otherwise have been of stone. On this basis, the rest of this canal was "rushed through" with a minimum of stone. Alas, the ensuing repairs and replacements over the next thirty years (often made perforce while the canal was in operation thus slowing it or shutting it down altogether) long postponed dividends and eventually scarcely permitted breaking even.

Baldwin was a man of broad sensitivities and although direct-spoken knew the value of discrete public relations. Concerning the premature 1797 trip, a Doctoral dissertation on the Canal by Christopher Roberts describes his instructions to the workmen: "Workman, instructed to carry tools proper to their several callings over their shoulders, walking on either bank, flanked the boats. The expedition passed through the locks. The huzzas of the ambulating workmen and of local inhabitants accompanied the successful passage." The workmen were orderly; they had read a long notice which ended: "It is requested that the dress of the workmen be decent and clean, their movements

active but regular, their behavior civil and respectful: in short, their general conduct shall do honor to themselves, and those concerned will consider themselves honored thereby."

Proceeded by such genteel laborers, the directors and their friends walked the short distance from the locks to Howard's Tavern, passing between the two rows of men drawn up before the door still martially holding their tools. "When the directors had entered, the workmen fell out and went above to Mr. Howard's large upper chamber, where they consumed 150 lbs. of good beef roasted, excellent gravy, two bushels of potatoes, bread made from two bushels of meal, and a barrel of cider." Such was the wisdom and the cunning of the hand that husbanded the physical assets of the canal, the vanities and aspirations of the directors and, far from least, the loyalties of the workmen. He would have had a harder time today.

These workmen were largely any natives who could find the time to put in on the canal. For a while they were paid \$7 per month plus their board and were supposed to work throughout the daylight hours with just enough time out to eat lunch. Many of them could do little but move earth with shovels into very crude wheelbarrows from which the banks and tow path were built, up, or into wagons for short haulage.

The stone masons were a different breed and built such beautiful monuments as the dry, 30-foot piers across the Shawsheen, still standing today. There was some familiarity with a poor, black, blasting powder, as dangerous to the operator as to the intended rock due to very little knowledge of fusing. Fortunately, as noted earlier, nature had carved away most of the rock barrier.

The workmen came on when their haying did not require them at home and evaporated when it did. They tended to be a rough lot, but seldom as murderous as on the later western canals where militia had to be brought in to end bloodshed between gangs of foreign-born laborers. Much of the work quickly became "wet," especially maintenance, when the water once started to flow, and required working partly submerged in water. In one stretch, the laving of boat bottoms by long grass rooted in the canal so slowed the boats that a man was hired to manipulate an underwater scythe through four-foot-deep water. It is not known how far he got in one day or who got the concession on the hay.

If these men were poverty-stricken, it did not show up in the nourishment provided them, as recorded in the minutely careful logs of the management. Their tough hide and sinew as observed above was maintained on the stoutest fare they could ask. Their energy frequently burned up immense quantities of whiskey and rum on whose limitless seas indeed the entire youthful country appeared able to navigate with considerable skill.

## BRIDGES, LOCKS, AND AQUEDUCTS. MUSCRATS, HATS, AND BOATS

The Canal was traced across the bosom of the countryside which mankind as well as nature had already bent to its will. Man's efforts at that time scarcely suggested his accomplishments in the years ahead. Boston, the Metropolis, champion of Freedom with a voice heard around the world, tweaker of the British Lion's tail, builder and purveyor of ships to every known port, boasted a population of 20,000 (about that of Charlestown today). Medford, Wilmington, Woburn and Chelmsford were insignificant hamlets, Lowell was not to be incorporated for forty years. Somerville was not even set apart from Charlestown until 1842.

Thus, some fifty bridges were sufficient at that time to meld the halves of the countryside effectively sundered by the continuous 27-mile cleft of the canal. These were of greatly varying design, though necessarily providing stoutness and clearance. A struggling farmer would perhaps have the simplest wooden structure enabling him to manage both halves of his bifurcated property, but triangular ocean voyages in slaves, molasses, and rum brought profits that could build as handsome and permanent a work of art as the splendid stone arch bridge on the Brooks Estate in West Medford (known to many readers before its demolition).

These bridges were supplemented by seven aqueducts at obvious places. No bridge or aqueduct was a covered structure. Water and sunshine weathered them very quickly, so they were shortened whenever possible. One spanned the Mystic River, another (whose foundations were recently unearthed) the Aberjona a third the treacherous Maple Brook swampland in South Wilmington. But the most famous passed over the Shawsheen River at a height of some thirty feet. The lovely, dry-stone pier to support the center of this span is still standing today, a superb monument to the infinite cunning of man pitted against a remorseless nature.

The "big ditch" of its day had a trapezoidal cross-section, the ditch being 20 feet wide at the bottom and 30 feet wide at the top. The lifting and lowering of its precious stream was done by locks of five to seven feet lift, some twenty in number, and spaced rather evenly apart except for the Horn Pond rise, where a total lift of forty-five feet or so was accomplished by 3 sets of double locks. In such a pair, one led directly into the other, so that the water released did not have to be stored temporarily in any relief basin. Each pair, however, had sizeable "basins" between them, permitting intermediate storage for immediate use below of some 10,000 cubic feet of water.

The canal was drained shallow in winter to prevent heavy ice action and to discourage winter habitation of the banks by animals. During these months it was frozen solid much of the time, affording many a Boston Latin School boy

a thrilling trip on skates to Lowell and back by moonlight. In the Spring it was drained completely to permit repair of the banks and the recovery of articles lost overboard during the preceding season.

The canal was a source of supreme joy to small boys who fished in it (especially for alewives), tossed pebbles onto barges as they went under bridges, or searched for lost articles when the water was drained in the Spring. Larger boys worked hard on the muskrat bounty. These creatures abounded in the banks and so constantly threatened them with collapse that a sizeable bounty was usually offered for them. Once accrued for the complete carcass, the skin alone could then be sold to a certain factory for a second take. Here the handsome pelts of the luckless rodents were transformed into rather becoming headgear in numbers sufficient to cap a noticeable fraction of the pates of eastern Massachusetts.

Many boats were owned by private parties, though these had to pay a small tax to the corporation. A freight or "luggage" boat could be built for \$200. One was said to have been built 3½ miles away from the canal and dragged to it by 40 yokes of oxen. These boats were from forty to seventy feet long, just able to fit into the locks, and nine feet wide in the middle. They were a little narrower at their ends and flat bottomed across their widths, but the bottom sloped or rounded up from the middle toward both ends. The sides were vertical and cut off level across the top. They were about three feet deep inside at the middle, one foot at the ends, with sides supported by stout knees. The seams were caulked with oakum and pitch. A load of 20 tons would make them draw about two feet in the middle, but the ends would still be out of water. The ends also were vertical. A single stout vertical thwart just forward of the middle center carried the towing-post to which the pulling-rope was attached. These boats could be steered some by a long rudder. With the low water of midsummer, frequently only about half a load could be carried. These were mostly cargo boats designed for speed of 2½ miles per hour on the canal. Once on the Merrimack they could sometimes be sailed but were usually poled up it. They were towed later across the Charles River to Boston by an ingenious system of buoys.

The urchin, staring up at barges crossing the Shawsheen aqueduct, barely visible from the Shawsheen bridge below, saw indeed a "river in the sky." Even as the canal steadily took form, the incredulous yeoman farmer likewise, viewed it as a river in the sky, his version of "pie in the sky." To the Boston investor, canal craft were his dreamboats in the sky which alas were never destined to bring him the cargo of wealth on which he had gambled. But the vision, skill, and integrity of Loammi Baldwin irradiated brightly every foot of the work; faith in him did not waiver. In ten years from the opening, the riches, of the New Hampshire hinterland, like smallish sticks in a draining pool, begin to whirl toward the center, noticeably to gravitate toward the metropolis.



## PROCEDURES AND RULES.

At the top of the pecking order of canal craft came the packets. These were the clippers of the canal, permitted to pass all other craft. Sometimes they were drawn by two horses and could lawfully attain a rate of four miles per hour, but not faster because of the danger of damage to the walls of the canal. They did not carry substantial amounts of freight but performed a passenger service of no small achievement for its time. At one time there were two of these, The General Washington and General Sullivan. Gaudily painted, they had carpeted, upholstered cabins and promenade decks. They could go from Charlestown to Chelmsford in 7½ hours offering one continuous panorama of eye-melting sylvan beauty. The trip became the thing for Bostonians to do for a two-day outing.

Then came the freighters, forty to fifty tons burden. These could make the trip from Charlestown to Chelmsford in twelve hours, and constituted the bulk of the traffic.

The minds of men like founders Sullivan and Baldwin were mosaics of many visions and one of these had been the neat hoof-action of the ox, for a single yoke of these compliant beasts could ease 800 tons of timber at one crack down the canal. Many score would have been required for overland passage of this timber. This immense burden consisted of spars seventy feet in length in ten booms of 80 tons apiece dragged one behind the other. Quick figures show that each 80-ton boom would have displaced about a third of the cross section of the canal (it would never have to meet a boom going UP the canal). They were unhooked, passed separately (shot) through each lock and then rechained.

A much-bruited statement by Daniel Webster proclaimed that the forests of Winnepesaukee increased \$10,000,000 in value with the advent of the canal. Indeed, these forest denizens, no longer reachable in eastern Massachusetts, soon bobbed all over the world's harbors as eye-popping spars of Yankee "best-built" shipping.

The pace of such leviathan loads was 1½ miles per hour, and all boats had the right to pass them. It took a week for such a chain to traverse the entire length of the canal, but the massive timbers arrived in long lengths and tip-top condition.

So, complex a traffic pattern naturally needed rules that were clear and unambiguous. Baldwin was the man to draw and develop them, though today they bear the name of his successor, John Langdon Sullivan (son of the founder James Sullivan). Some read as follows:

"No boat (after the first of May next) shall be received into the Canal unless the names of the owner be marked thereon with paint, conspicuously, and the boat numbered (from one to the greatest number owned by the same person), in order that the boat may be properly designated in the passport." (The latter was necessary for the boat to be allowed through the locks).

Boats were required to be not less than forty feet in length, which ruled out pirate ruffraff. Two men, a driver (who also poled) and a steersman, usually made

up the crew, and by 1830 they received wages of \$30 per month. The manner of passing was clearly set forth "The boat or raft to be passed, immediately upon being come up with, shall slack its towing line and make room between itself and the towing path, so that the boat passing and the cattle or horses drawing the same shall go over the towing-line of the boat or raft to be passed."

When a boat approached a lock, its captain sounded its horn to secure prompt attention from the lock tender. On Sundays, travel in the canal was not forbidden, but blowing of signal horns was forbidden. Because of the liability of damage to the banks of the canal after dark, the following rule was in effect: "No boat or raft shall be passed through any lock after dark, viz, after seven o'clock in spring and autumn, nor after nine in summer, but on moonlight evenings they may be passed until ten o'clock, and not after, nor before daylight at any season." There was no daylight saving in those days, don't forget!

Very specific horn-blowing was also used near mealtime as a lock was approached to signal the proprietor that a certain number of persons were on their way to the eating facilities of his establishment. This permitted packet people arriving in a basin near a tavern lock to embark for shore, at a safe rate of speed unhurried by their hunger pangs (perennially acute in those times).

As many as fifteen or twenty barges might park for the night at a single basin. Lodging could be had for six cents (eight cents for a bed to yourself). A splendid meal cost only 25 cents, sometimes nothing if one bought liquor. Blackstrap or flip could be had for three cents a glass. With his physical wants so pampered, conviviality could almost be demanded and apparently was seldom absent. To the question, "Plenty of drunkenness among the workmen?" one old boatman replied, "Bless your heart, no! Mr. Eddy (later superintendent) didn't put up with no drunkards on the canal. They could drink all night, sir, and be steady as an eight-day clock in the morning." Oh, for the fortitude of those days!

## THE MERRIMACK RIVER NAVIGATION SYSTEM

Any plan common to the minds of James Sullivan and Loammi Baldwin was not apt to be a half-way thing. The scheme to dig a continuous ditch from Boston to the Merrimack bend with the necessary lifting paraphernalia to get craft "over the hump" and down, the other side would have been a weak and puny thing without the follow-up that eventually did indeed prove a very essential ingredient of that broad scheme.

The plan for the Canal presumed from the start that the Merrimack would eventually be opened all the way up to Concord from above its junction with the Canal at Lowell. Here was an operating unit that could be self-sufficient because the vast raw material preserves of the White Mountain fastnesses lay in bondage behind it for whatever wealth could be milked from it once transportation was available.

Many parties were willing to join in the liberation of this river from the numerous rapids that precluded safe transportation. Names of eventual destinations like

Lake Sunapee, the Connecticut River, the Gulf of Mexico, and other points west were loosely bandied about. Whether anyone took them seriously will never now be known. The immediate task, the overwhelming urgency of the Merrimack channel itself, mustered the greatest sincerity, the utmost conviction and above all sustained, distilled action.

To open the Merrimack as far as Concord (N.H.) to direct-sailing commerce, five major obstreperous stretches of white water, swirling rapids and falls had to be by-passed by digging canals around them and providing locks affording the necessary vertical lift up and through the canals.

The Pawtucket Falls were bypassed by entering the Merrimack just above them. In the years ahead, the power from these falls created and supported the city of Lowell once its raw materials could come and go over the Canal.

The Bow Locks and Canal Company was incorporated in New Hampshire with aid from the Middlesex Canal Company. It was long a schoolboy maxim, "The Merrimack River turns more spindles than any other river in the world." A history of the rapids in this Lowell-Concord stretch gives an indication why. The first canal in question occurred at the Wicassee Falls at Tyngsboro, Massachusetts, where there was one lock, a dam, and a short canal with a three-foot fall in a third of a mile, then 13 miles beyond were Cromwell's Falls over the line into New Hampshire with one lock, one dam, and a short canal to accommodate a 6-foot fall in two-thirds of a mile. Five miles more to Moor's Falls near the town of Merrimack, New Hampshire with a 6-foot fall in 70 feet; followed by Coos Falls, with a 3-foot fall in 50 feet; Goff's Falls, 6-foot fall in 600 feet; Short's Falls, with a 7-foot fall in 33 feet; Griffin's and Merrill's, with a 3-foot fall in 165 feet. Now came the Union Locks and Canals with seven locks, dams, and improvements. Then there was the tremendous Amoskeag Canal near Manchester (formerly known as Blodget's Canal) only half a mile above Merrill's. Here there were several dams and nine locks raising the river level 54 feet in half a mile. Higher yet lay the Hookset Canal with three locks in about 800 feet and finally the Bow Canal at Sewall's Falls, with four locks in three-fourths of a mile.

The story of the separate incorporation of these canals, the attendant machinations, final respective successes, and the inevitable political and financial hoopla cannot be recorded here. Suffice it to say Josiah Quincy in 1816 could underline in the corporation report the magic words, "THE WORK IS DONE." Now the wealth of the hinterland could pour without interruption toward the salt-water Mecca. Now indeed, Thoreau could contemplate with affectionate eye for a full eight months of the year the breast of his beloved stream and coo, "With their broad sails set, (the canal boats) moved slowly up the stream in the sluggish and fitful breeze like one-winged antediluvian birds and as if impelled by some mysterious counter current," and again, perhaps with an extra dose of license, "From the steeples of Newbury you may review the river stretching far up into the country with many a white sail glancing over it like an inland sea."

No boat of the Middlesex Canal Corporation was permitted to enter the Merrimack, but only those of private enterprises – carriers, some fifty in number. On every trip the boats ran to Concord, New Hampshire, the freight station for transshipment to the limitless back country of Vermont and New Hampshire. The average time turned out to be four days down and five days up on the river.

It was not easy to arrange for full loads both ways, so the companies went into the business of supplying salt, lime, plaster, and wood upstream, while wood stored on the riverbank and sold downward served as a filler. Thus, boating companies became traders. At all times, problems of this economy were indeed pressing.

Towards economy, there was developed the first steamboat in Massachusetts. John Langdon Sullivan had contrived a steamboat in 1810, but it had insufficient power. A later model of such a powered boat moved at seven miles per hour on the river and four in the canal, successfully pulling strings of boats. Later the claims of Sullivan and Fulton clashed – and Fulton won. In 1818, a tugboat with a Morey engine was very successful in towing two loaded boats against the river current. Unfortunately, the problem of towing through locks slowed the process down and it was abandoned two years later.

Competition with land transportation and altogether too soon the railroads, steadily lowered tolls from 1815 to 1842. Factories on the Merrimack took root, but the canal itself faltered. Its freight, in flexible response, took on a totally new character – that of the needs and the products of the great factories (largely textiles) until the rhythmic panting of the locomotive began to disturb the scene.

There is something tragic in the fact that the work of two men, James F. Baldwin in Massachusetts (through his survey for the railroad to Lowell), and George R. Baldwin in England unwitting serpent sons of Loammi by sending information about railroads in England back to the Boston and Lowell railroad firm, expedited the demise of the canal. Imagine then, the spectacle, as at three miles per hour the parts of the locomotive STEPHENSON built, at Newcastle-on-the-Tyne, traveled by canal from Boston to Lowell. Shortly, on June 24, 1835, railroad service was opened to passengers; cotton and coal followed by January and the venom of defeat dripped slowly into the canal.

TO BE CONTINUED

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**Back Issues** – More than 60 years of back issues of *Towpath Topics*, together with an index to the content of all issues, are also available from our website <http://middlesexcanal.org/towpath>. These are an excellent resource for anyone who wishes to learn more about the canal and should be particularly useful for historic researchers.

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**Web Site** – The URL for the Middlesex Canal Association’s website is [www.middlesexcanal.org](http://www.middlesexcanal.org). Our webmaster, Robert Winters, keeps the site up to date. Events, articles and other information will sometimes appear there before it can get to you through *Towpath Topics*. Please check the site from time to time for new entries.

The **first issue** of the Middlesex Canal Association newsletter was published in October, 1963. Originally named “Canal News”, the first issue featured a contest to name the newsletter. A year later, the newsletter was renamed “Towpath Topics.”

*Towpath Topics* is edited and published by **Debra Fox**, **Alec Ingraham**, and **Robert Winters**. Corrections, contributions and ideas for future issues are always welcome.