SHAWSHEEN AQUEDUCT, LOOKING NORTHEAST, MIDDLESEX CANAL, WILMINGTON—BILLERICA, MASSACHUSETTS

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Comparison of The Blackstone and Middlesex Canals

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THREE major canals were completed in Massachusetts in the first twenty-odd years of the nineteenth century: the Middlesex, that went from Boston to Lowell, or more correctly, from Charlestown to Middlesex Village in the outskirts of Lowell; the Blackstone that went from Worcester to Providence; and the Hampshire and Hampden, or Farmington, that went from Northampton to New Haven. Today we will just concern ourselves with the first two of these.

They were both conceived about the same time in the early 1790's. The Middlesex began operating in 1803 but the Blackstone didn't get going until twenty-five years later, a delay that proved disastrous. The reason for the delay was lack of cooperation on the part of the Massachusetts Legislature in granting the Blackstone its charter. The idea of a canal connecting Boston with the Merrimack River and diverting the great natural resources of New Hampshire away from Newburyport and into Boston met with wholehearted approval in the capital city; however, the idea of the landlocked treasures of Worcester County making their way to the market by way of Rhode Island, and seeing Providence benefit from business that rightly belonged to Boston, was unthinkable. When the Blackstone Canal finally got its charter in 1823, Bostonians dreaded more than ever the evil effects of such a waterway. A few months before it was completed, the Boston Centinal issued a stern warning: "If the canal is not counteracted by some similar enterprise in this town, Boston will be, in a very few years, reduced to a fishing village."

The situation was somewhat alleviated, three years after the canal went into operation, when the Boston and Worcester Railroad received its charter. The president of the House of Represen-

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tatives who signed the enacted bills was a gentleman by the name of Leverett Saltonstall.

But we're getting a little ahead of ourselves. During the first twenty years of the nineteenth century a number of canals were proposed to keep Boston from becoming commercially stagnant, among them one from Boston to Worcester to counteract the Blackstone, another from Boston to the Connecticut River to divert traffic away from the Farmington, and another from Boston to Troy, New York, to get a share of the Erie Canal business for Massachusetts. It is interesting to note that the route surveyed for this last project is very much the same as the route of the Boston and Maine Railroad. The surveyors recognized the necessity of tunneling through the Berkshires. To get over them would require 220 locks. These would not only consume an enormous quantity of water but it would take a boat two days to get through them, while a four-mile tunnel would only take an hour and twenty minutes. The location they chose was where the Hoosac Tunnel was bored many years later. The canal surveyors estimated the cost at less than a million dollars; actually it cost over ten million, which would have been the financial ruin of any canal company. All sorts of unforeseen obstacles kept cropping up, more and more money had to be raised and each raising was accompanied by the usual legal complications. At one point some frustrated party remarked that he knew a way of finishing that tunnel in no time—just put a group of lawyers at one end and a large fee at the other.

Getting back to our original subject, when the Blackstone was finally completed the Middlesex was a well-established institution and enjoying its era of greatest natural prosperity. I say natural because its biggest money-making days had an unnatural impulse behind them, namely construction of the Boston and Lowell Railroad. It has been said that the Middlesex Canal, "like an accusing ghost . . . seldom strays far from the Boston and Lowell Railroad to which it owes its untimely end." Rails, ties and other building materials were transported to their respective destinations on canal boats, and finally, the British-built locomotive traveled by boat to Lowell to be assembled in the machine shops there.

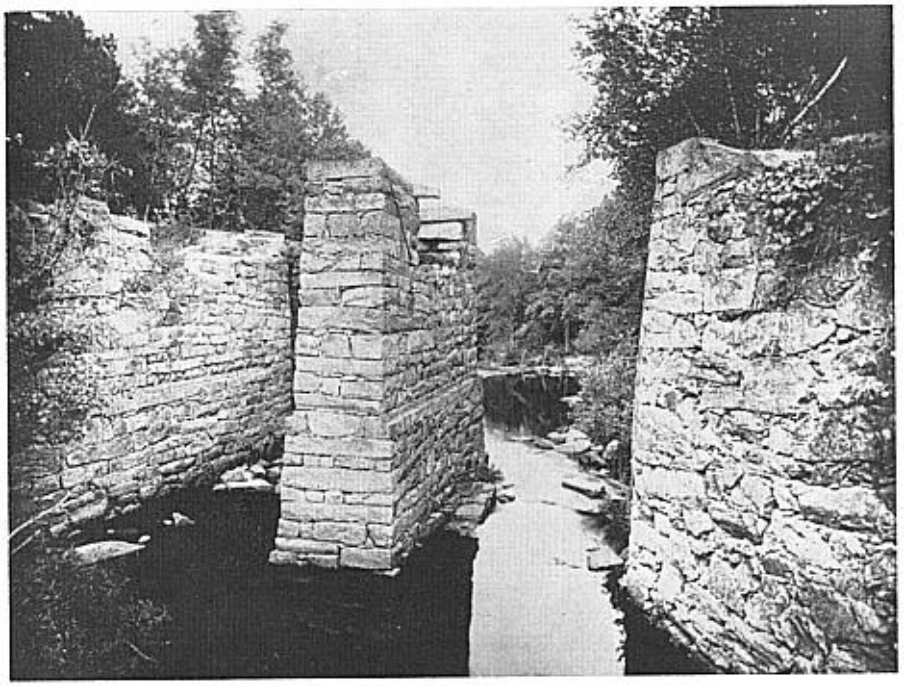
The Middlesex Canal operated nearly thirty-two years unharassed by railroad competition, the poor Blackstone, only seven. An original investor in the Middlesex Canal, by retaining his interest, would have recovered 75 per cent of his money; a Blackstone investor, $2.75 and the privilege of subscribing to stock in the Blackstone Canal Bank. The canal has been called the "greatest financial fiasco in the history of Providence."

The Blackstone was beset with other difficulties that did not effect the Middlesex. For water it depended on a source that was already earmarked for manufacturing. Many establishments had sprung up along the line during the years of delay and in order to assure an adequate water supply for the canal reservoirs had to be provided. Unfortunately the increase in supply fell far short of requirements, especially as more and more mills began using the water. The Middlesex, on the other hand, had its own millpond in North Billerica, formed by a dam in the Concord River. There was no competition with industrial establishments on the sluggish Concord. For twenty-one miles upstream from the millpond the rise was only three and a half feet. According to Henry Thoreau, the only bridge ever washed away on this

section was blown upstream by the wind.

Now compare this head of less than two inches per mile with the Blackstone's ten feet per mile and you can see why the water-power potentials of the latter were early recognized and utilized. Though "a very Tom Thumb of a river, as rivers go in America," according to the Technical World, the Blackstone is, "the hardest working . . . the one most harnessed to the millwheels of labor in the United States, probably the busiest in the world."

The Middlesex Canal, except for where it crossed the Concord River in its North Billerica reservoir, was confined to its own ditch for its entire length. Except for months when it was frozen over, uninterrupted service could be maintained. The Blackstone used slack water navigation in the river for about one tenth of its distance. This involved entering and leaving sixteen times. During periods of low water the boats would get stranded on the river shoals and during periods of flood the river sections were too swift to be navigated. This meant that clients had to wait for days or even weeks at a time for delivery or pickup of freight. Worcester warehouses bulged with stranded merchandise. As time went on merchants got more and more disgusted with these interruptions to service and, with the canal being closed four or five months in winter on account of ice, they naturally sought more reliable means of transportation.



SHAWSHEEN AQUEDUCT, MIDDLESEX CANAL, WILMINGTON—BILLERICA, MASSACHUSETTS

However, none of these difficulties

were anticipated. When the canal stock was offered in Providence there was a wild scramble for it and within three hours it was oversubscribed 100 per cent. Messengers were quickly dispatched to Worcester to see if any additional stock could be picked up there, but when they arrived they found that the Worcester quota had also been oversubscribed. Those who were not alloted any stock little realized, at the time, how fortunate they were!

There was no wild scramble for Middlesex Canal stock. In those days American canaling was in its infancy and the stock had a speculative flavor. But by the Blackstone's time, canals had proved themselves to be a growing and reliable form of transportation and the shares a promising investment. The Middlesex was a pioneering enterprise and a courageous undertaking. It penetrated a countryside of sparse population—Medford, Woburn and Chelmsford, all small villages, with Lowell nonexistant and Boston itself a town of only 20,000. The Santee Canal in South Carolina, the only one to antedate the Middlesex, was still under construction. Pennsylvania canals, for which surveys were being made, were still very much on paper and the Erie only a dream. When the route for the Middlesex was first laid out, surveying and leveling instruments were unknown in New England. Loammi Baldwin of Woburn, the chief engineer, and Samuel Thompson of the same town, spent a week making elevations by a method Thompson had devised which consisted of squinting along a carpenter's level and making laborious calculations. His mistakes were amazing, to say the least. For instance, he estimated that the Concord River in Billerica was sixteen and a half feet lower than the Merrimack at Middlesex Village where the canal would enter it. Actually it was twenty-five feet higher, or an error of forty-one feet in six miles!

Perhaps the best thing that came out of this original survey was the Baldwin apple. While working in Wilmington the surveyors noticed an unusual number of woodpeckers all, apparently, flying towards a certain spot. On investigation they found a wild apple tree with unusually good fruit. Baldwin, the engineer, did much to propagate and promote this apple. At first it was called the pecker apple on account of the woodpeckers.

The directors realized that an accurate survey would be necessary before proceeding with the construction of the canal and they sent Baldwin to Pennsylvania to consult an Englishman named Mr. Weston who was surveying for canals there. Mr. Weston consented to come to Massachusetts and survey for the Middlesex. Baldwin wrote back that "Mrs. Weston has more than once expressed a passionate desire of visiting Boston and has frequently told me that she longed to be acquainted with ladies and gentlemen of that metropolis. She observed that all English gentlemen and ladies enjoyed themselves better in Boston than any place on the continent. I daresay that in my important business this is a very trifling circumstance to report to you—however, I declare that almost my only hope of securing Mr. Weston's assistance . . . rests on this circumstance." It was Mr. Weston's levels that inspired confidence in the feasibility of the canal.

By the time the Blackstone came along, the art of leveling and surveying was pretty well established here. The company employed a Benjamin Wright who, they said, was "a skillful engineer under whose superintendence and estimates, the middle section of that stupen-

dous work, the Erie Canal was constructed." His big mistake, as already mentioned, was using slack water in the river. Experience had earlier demonstrated to DeWitt Clinton and others that this sort of thing was not practical. Perhaps it was done for the sake of economy. However, there was no penny-pinching in construction of the locks. With one exception, they were all made of hand-cut granite and there were forty-eight of them. The twenty-eight locks on the Middlesex Canal, with the exception of three, were originally made of wood and they all had to be replaced with stone after a few years. The Blackstone engineers undoubtedly bore this fact in mind in deciding against wood.

Construction of both canals was by hand labor—picks, shovels and wheelbarrows. It took nine years to build the Middlesex; the Blackstone took only four. Building the Middlesex was a constant succession of trial and error; finding the proper lining to make the ditch watertight, devising a method for making hydraulic cement, etc., etc. The ingenious Baldwin overcame all these obstacles in the end, but they all took an abnormal amount of time—at least that was the opinion of the weary stockholders who grew tired of assessment after assessment with no prospect of any immediate return on their money.

In 1797, six years before the canal was completed, the management, in an effort to cheer the weary stockholders, ordered the opening of the six-mile section between the Concord and Merrimack Rivers. Baldwin protested violently but he was overruled. The passengers embarked on two horse-drawn barges. As they proceeded along the canal the workmen marched beside them on either bank carrying their tools over their shoulders. They had received instructions from a notice that stated in part: "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 such as shall do honor to themselves and those concerned will consider themselves honored thereby." Once through the locks at Middlesex Village, the passengers disembarked and walked to Howard's Tavern for a handsome feast, and as they walked they passed between two rows of workmen still "martially holding their tools."

Over the next few years excursions were held on this section from time to time to console the discouraged stockholders and to impress prominent citizens. The boats were decorated "gaudier than a circus wagon" to add cheer to an otherwise drab situation.

No such junkets were necessary on the Blackstone. By now the technology of canal building was established and hopeful stockholders saw no delays other than those caused by the whims of the weather, or perhaps an occasional personnel problem. A few months before completion the following appeared in the paper, "The unusual supply of rain descending in continual showers, has been particularly unfavorable to the progress of the work. The contractors have been delayed in their operations by the fountains and streams bursting from the earth shadowed by constant clouds, and poured down from every hillside."

The first excursion, a ten-mile trip from Providence, took place three months before the canal was opened for its entire length. Passengers embarked on the *Lady Carrington*, a very grand and beautiful vessel. She had a "palatial cabin running most of the length of her body," which was "conveniently and neatly arranged." She was painted white and had red cur-

tains in her windows and left Providence July 1, 1828, amid "a salute of artillary . . . seconded by the cheers of those on board and the shouts of hundreds of spectators who crowded the banks and surrounding eminences." There was a band of music aboard of eight or ten pieces. The trip was most successful.

On a second excursion three days later, a man was sitting on the railing telling a story when suddenly the boat struck the canal bank and he went overboard. After being pulled back in, all wet through, he resumed his place on the railing and said, "as I was saying," and continued with the story as if nothing had happened.

With the opening of the Canal the *Lady Carrington* took passengers from Worcester to Providence or towns along the way but it was never a successful competitor with the stagecoach for passenger travel. The trip took fourteen hours with sometimes an overnight stop, either spending the night at a canal tavern or using sleeping accommodations aboard the boat, while the stagecoach left at 8:00 in the morning and arrived at 5:00 in the afternoon. However, the boat was considered "a pleasant conveyance for invalids who desire to travel or to take the sea air."

The Middlesex Canal did a more successful passenger business. The trip to Middlesex Village took seven hours (and cost 75¢) and it connected with a ferry to Boston on the Charlestown end and a stage to Lowell on the upper end, that is, after Lowell became a place of some consequence. When the canal was dug there was no Lowell—just a small settlement known as East "Chumpsford" (trans., Chelmsford). Lowell didn't become a great textile center until several years later. The most pretentious of the passenger liners was the *Governor Sullivan*, sometimes referred to as the *General Sullivan*. It had a carpeted cabin and upholstered seats and was considered a model of comfort and elegance. It was towed by two horses at a trot and had right of way over all other craft. The passenger on the *Governor Sullivan* was "protected by iron rules from the dangers of collision; undaunted by squalls of wind, realizing, should the craft be capsized he had nothing to do but walk ashore [he] . . . had plenty of time for observation and reflection. Seated in summer under a capacious awning he traveled the valley of the Mystic [where] . . . soft bits of characteristic New England scenery, clear cut as cameos, lingered caressingly in his vision; green meadows, fields riotous with blossomed clover, fragrant orchards and quaint old farmhouses with a background of low hills wooded to their summit."

When the textile mills were built on the Merrimack, large quantities of coal and raw materials were shipped to them from Boston and finished goods returned, using canal transportation in both directions. But at first, cargoes were represented primarily by granite, lumber and agricultural products from the Merrimack Valley and vicinity. For many years, the shipyards on the Mystic River and the Navy Yard at Charlestown relied on the canal for the greater part of the lumber they used in shipbuilding. With locks around the various falls on the Merrimack, a vast area was opened up, Plymouth, New Hampshire being the upper limit of the river navigation.

On the Blackstone Canal, cargoes shipped to Worcester included such commodities as salt, lime, coal and lumber. Soon after it opened a local paper announced that "a quantity of cherry plank

and joists was landed in this town . . . which grew in Michigan or Ohio at the head of Lake Erie, from which it was shipped down the lake to Buffalo, thence by the Erie Canal to Albany, from that place to Providence by sloop navigation and from Providence to this place by the Blackstone Canal—a distance . . . of at least 900 miles, four hundred of which is artificial navigation. It is thus that articles are made valuable in one section of the country where otherwise there would be no market for them, and another section is supplied at a fair rate with that which it must otherwise do without or buy at . . . exhorbitant prices."

Cargoes that came overland to the Port of Worcester to be shipped out by canal included dairy products, agricultural products, chairs and coal from the Worcester coal mine. When the canal was built it was expected that this coal would contribute substantially to profits. Professor Hitchcock in his *Geology of Massachusetts* said of the coal, "it will be considered by posterity, if not by the present generation, as a treasure of great value." It was considered "suitable for furnaces where intense heat and great fires are required." It received much publicity in the local papers. For instance, "Captain Thomas has fitted up a stove for burning it in his barroom where for about a week past he has not used a particle of any other fuel, and has had as handsome and as good a fire as we have ever witnessed of either the Lehigh or Schuylkil coal." It is possible that these opinions were influenced by a touch of what Captain Thomas served in his barroom.

In developing the mine a shaft was driven three hundred feet into the hill and at one time twenty men were employed there. However, when Colonel Amos Binney, its chief promoter, died the mine was closed and it was reported that the mineral "which might be made to give motion to the wheels of manufacturing . . . has been permitted to rest undisturbed in its bed." People who used the coal, the publicity notwithstanding, were inclined to feel it vastly overrated. One user caustically remarked that the residual ash weighed more than the coal itself!

The Blackstone had not been operating many months when boatmen discovered that short hauls were the most profitable, especially in stretches with fewer locks. Worcester people felt neglected. The inhabitants, the newspaper said, "have derived but little benefit from the . . . canal during . . . the last fortnight, although they had hundreds of tons of freight which they were anxious to get up. The reason is that all the boats now on the canal can be more profitably employed in doing the business of the lower end of the route. We hope our citizens will take measures to have a regular line of boats from this place early in the spring."

On the pleasanter side, there were excursion boats that took passengers on holiday jaunts. One of the better remembered was a picnic in Waterford where the Congregational Society of that town played host to the Uxbridge Congregational Society. "So together with many from North Uxbridge they made a goodly number. They went by canal. The boat was decorated with festoons and evergreens and . . . a kind of bannerette . . . called Gideon's Lamp." The trip took three hours and progress was so slow that many of the passengers got out and walked. At one sharp turn the boat nearly upset. When they got to the picnic spot there was a scarcity of lunch. "The

Uxbridge guests expected the Waterford people to furnish the repast so went without any food. The Waterford people evidently did not so intend their invitation, so when lunch time came the Uxbridge people were not invited to partake with them." One of the passengers came to the rescue and bought a barrel of crackers and a quantity of cheese out of which the Uxbridge people made their lunch.

On the Middlesex Canal, Horn Pond in Woburn was a favorite place to go on a holiday, being readily accessible by boat. Pleasure barges took passengers on scenic trips around the lake while "Kendall's Brass Band and the Brigade Band of Boston rendered sweet harmony and the crowds wandered from the groves to the lake and back to the canal where shots of lumber, rafts and canal boats were continually passing through the locks."

One young lady, writing in her diary about a trip to Horn Pond, mentions stopping near some water lilies. Some of the ladies expressed a desire for them and Daniel Webster, who happened to be aboard, remarked: "If I was a young man I should not let a young lady ask for those flowers in vain." Whereupon two gallant men "dashed into the lake and wading about gathered a number of lilies, brought them to shore and distributed them at the great risk of their health as they were obliged to wear their wet clothes the rest of the afternoon. Fortunately they were attired in black silk or stuff pantaloons which were not injured in appearance." The diary also states that the young lady's mother considered it very thoughtless of Mr. Webster to say what he did and to encourage the young men to run the risk of pneumonia.

The Blackstone had one thorn in its side that the Middlesex managed to avoid—sabotage. There were constant disputes between boatmen and millowners. The millowners said that the canal was using too much water; the boatmen maintained, and correctly, that there wouldn't be all that water there except for the reservoirs built by the canal company. As early as 1829, the second year of operation, the embankment of a canal feeder near Millbury was destroyed by some laborers in the employ of a manufacturing establishment. The event received much adverse publicity and the embarrassed millowner, who had ordered the work done, made reparation. As time went on, sabotage became less and less of a transgression and millowners openly indulged in it. In order to conserve their dwindling water supply they sometimes dumped large stones into the locks by night, rendering them inoperative; the boatmen retaliated by threatening to burn the mills and armed guards had to be hired to prevent any such disaster.

Tolls on the Blackstone reached their peak in 1832, three years before completion of the Boston and Worcester Railroad. That year nearly $19,000 in tolls was collected, rather a puny figure when one considers that the canal cost $750,000. They also paid the first and biggest dividend that year: $1.00. Receipts slumped badly with the advent of the railroad and continued downward during the remainder of the canal's existence. The last toll was collected in 1848, a year after the canal was dealt a fatal blow by the advent of the Worcester and Providence Railroad. Passengers could now make the trip in two hours instead of fourteen by boat or nine by stagecoach. The canal could only operate from an hour before sunrise un-

til an hour after sunset; the railroad could run at night. When the Boston and Worcester Railroad went into operation thirteen years earlier, night railroading was not permitted except when unavoidable. Locomotives were not equipped with headlights. Once a train got delayed outside Worcester and had

VIEW LOOKING SOUTH DOWN THE MIDDLESEX CANAL, SCHOOL STREET, NORTH WOBURN, MASSACHUSETTS

to complete its journey after dark. The engineer reported that he "ran into some cattle at 9 P.M. and killed two of them. It was so dark, could not see."

Tolls on the Middlesex reached a peak in 1833. The figure reflected business stimulated by construction of the Boston and Lowell Railroad. That year a dividend of $30 a share was paid but with it came this note of warning: "In a short time a large part of the tolls will be paid to another corporation." Three years later, in 1836, the canal lost its Lowell tonnage to the railroad, but continued to operate reasonably profitably for another six years, by which time the railroad had been extended to Concord, New Hampshire; and after that tolls rapidly faded out until 1853 when the last one was collected.

When abandonment appeared inevitable a scheme was proposed for using the ditch as an aqueduct to bolster Boston's diminishing water supply. Caleb Eddy, the manager, wrote: "If the canal cannot put out the fire of the locomotive, it

may be made to stop the ravages of that element in the city of Boston." Boston wells were going dry and the water in them was becoming contaminated. "One specimen," Eddy wrote, "which gave 3% animal and vegetable putrescent matter, was publicly sold as a mineral water; it was believed that water having such a remarkable fetid odor and nauseous taste could be no other than that of a sulfur spring; but its medicinal powers vanished with the discovery that the spring arose from a neighboring drain."

The Concord River water had been analyzed by "four of the most distinguished and able chemists in the country, all of whom agree that it is in every respect of the requisite purity for drinking and for culinary and for all other purposes." One of these distinguished chemists became even more distinguished later: his name was Professor Webster and he murdered Dr. Parkman in his Cambridge laboratory and disposed of the body in his incinerator.

Not only would Boston benefit from this project; also, vast tracts of meadowland in Wayland and Sudbury could be restored, if the flatboards on the Billerica dam were removed. This dam had been enlarged during a modernization program in 1830, causing water to back up over the Sudbury meadows and ruin, according to one authority, 10,000 acres of the most valuable meadowland in the state. This figure increased substantially over the years with silting from the sluggish stream. Considerable litigation had brought no benefit to the proprietors of the Sudbury meadows as there was a clause in the Middlesex Canal charter that couldn't be surmounted. When the aqueduct proposition failed the canal faced abandonment. It had been, as one of its original proprietors put it, "A magnanimous enterprise."

Today portions of canal and towpath can still be seen, especially in Woburn and Wilmington, but each year a little more becomes obliterated by the bulldozer as it levels the ground for real estate development. Two aqueducts, one in Billerica and the other in Woburn, have been spared destruction.

Parts of the Blackstone can also be seen. In Pawtucket, several miles of canal and towpath are being preserved as a recreational park. One lock still remains almost intact—a fine example of the labor and skill that went into hand-cut granite. When the canal was abandoned the other locks were dismantled and sold for building stones.

The Blackstone has been spoken of as a "magnificent enterprise." "To the Providence and Worcester Railroad it was a sort of forerunner, hinting at the grades, furnishing a path, and opening an avenue for the transportation of heavy freight; . . . every town along the whole line is deeply indebted to it for the present growth and prosperity."

Had it been built twenty-five years earlier and confined to its own ditch it probably would have been a very lucrative enterprise even after the advent of the railroad. By controlling water rights on the river and selling power to the mills it could have continued prosperous even though the form of transportation it offered had become outmoded.

Upon completion of the Providence and Worcester Railroad a toast was given at a meeting in Worcester, hinting at the relative importance of the two methods of transportation: "The two unions between Worcester and Providence. The first was as weak as water, the last as strong as iron."