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# THE MIDDLESEX CANAL

1793—1860

BY

CHRISTOPHER ROBERTS



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*To*

**W. R.**

## PREFACE

THE DISCOVERY of unusual collections of source material made possible a history of this early canal. The research of Mr. Walter R. Harper uncovered the official records of the canal corporation which afford a basis for continuous narrative and analysis. Later the writer traced another collection, now in the Baker Library, to the possession of the Baldwin family, descendants of the civil engineer who constructed the canal. Loammi Baldwin had kept a file of letters received and sent, had preserved copies of instructions to artisans and overseers, and had seldom destroyed even preliminary drafts of notices, regulations, and reports. The historian delights to honor a man with such a present sensitiveness to posterity. These papers cover the ten years of construction and the early years of operation, and in addition provide for the later years much material supplementary to the corporate records.

Favored by this available mass of evidence, I have attempted to treat the historical background and the technical difficulties which surrounded inland transportation in post-revolutionary Massachusetts. Many features of contemporary economic life are revealed in the intensive study of this one institution. Its history entails an account of early civil engineering, of initial experiment in corporate organization, and of the relations of a public utility to the state and to the community which it served. The knowledge of scientific methods and the stages of industrial organization at different periods are representatively exhibited in the activities and structure of this corporation. In its adjustments to competing modes of carriage, the Middlesex Canal faced problems that are duplicated today, and encountered under less complicated conditions many of the forces that impinge upon modern public utilities.

The first chapter is an outline based on familiar secondary material, with the emphasis placed on contemporary economic dimensions. Thereafter unpublished manuscripts predominate as sources. The simple statistical methods used correspond to limita-



tions imposed by the data, which unfortunately preclude the computing of index numbers that would be other than doubtful summaries. The treatment throughout is concrete and detailed, giving weight to the activities of contemporary individuals, retaining failures and other elements of anticlimax. The value of an intensive study of an economic microcosm through time may be said to arise, however, less from the details in themselves than from the insight which they afford into the nature of the very process of economic adaptation and change.

I am greatly indebted to Professor Edwin F. Gay, who suggested this study, for judicious advice, for innumerable acts of kindness, and for the stimulus of his unfailing interest during its progress. The generosity of Professor Arthur H. Cole, who placed his notes on the canal at my disposal, is gratefully acknowledged. My earliest interest in economic history came from contact with the penetrating mind and profound scholarship of Professor Abbott P. Usher; my debt to him, though general rather than specific, is very great.

It is a pleasure to record my appreciation of the profit derived from the aid and suggestions of Mr. Edward B. Carney, of Lowell, and of Mr. Thomas F. O'Malley and Mr. James Hall Brooks, of Cambridge. The scholarly advice and seasoned wisdom of Dr. Allan Evans of Harvard University have been of inestimable value. In no way do these acknowledgments imply a sharing of responsibility.

CHRISTOPHER ROBERTS

Cambridge, Massachusetts  
November 20, 1937

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## **APPENDIXES**

## APPENDIX A

### LOCATION AND GENERAL FEATURES<sup>1</sup>

THE MIDDLESEX CANAL found its source at its summit level in Billerica, Massachusetts. With the exception of a small amount drawn from Horn Pond, water came from the Concord River at Billerica Mill Pond, feeding the course to the southward to Charles River, twenty-two miles distant, and to the northward over a distance of nearly six miles to Merrimack River. The summit was 107 feet above the tidewater at Boston and twenty-seven feet above the Merrimack. The breadth was twenty feet at the bottom and thirty and a half feet at the water line.<sup>2</sup> The trough was built to carry a depth of three and a half feet; but, owing to silting after completion of the canal, the water was seldom more than three feet deep. General specifications in the early contracts for construction were varied over short distances in several locations where the presence of solid ledges of rock led to a diminution of the width, in some cases to fourteen feet. Occasional basins of much greater extent furnished landing places or havens where boats could congregate. The banks, one foot above the water line, were ten feet wide in general on the towing path side and five feet wide on the other. A specification that the slopes of all banks should be 33° was contained in the general plan outlined by the projectors and was embodied in contracts.<sup>3</sup>

<sup>1</sup> Much of the information relating to the location of the canal was obtained through the aid and kindness of Mr. Edward B. Carney of Lowell, who has traced the route on foot several times. The writer went over the ground with him on one occasion. Further acknowledgment is made to Mr. Frank H. Kendall, Engineer of Middlesex County, Mr. Moses Whitcher Mann of West Medford, and Mr. Arthur C. Loring of Woburn. In his research Mr. Carney received aid from Mr. A. B. Corthell, Chief Engineer, and Mr. Frank B. Rowell, Research Engineer of the Boston and Maine Railroad, Mr. Edward F. Wyer of Woburn, and "a host of men, women, and children along the route of the canal." (E. B. Carney, "A Modern Ramble along the Middlesex Canal," MS.) This appendix is further based on field books, early surveys, plans, notes, etc., in the Baldwin Manuscripts; also, *Sections of the Middlesex Canal*, 1830, original: Baldwin MSS. *Profile of the Middlesex Canal*, 1830; *Plan and Profile of the Boston and Lowell Railroad*, 1836: Corporate Records; Mr. E. B. Carney's collection of maps and plans. Material has likewise been drawn from the following two books, specific references to which are given in the notes: G. L. Vose, *Notes on Early Transportation in Massachusetts* (1885); *The Official Reports of the Canal Commissioners of the State of New York* (1817). A detailed "Report on the Middlesex Canal, Nov. 1819," found among the records of the corporation, has proved useful.

<sup>2</sup> Contracts for construction: Baldwin MSS.

<sup>3</sup> *Plan and Profile of the Middlesex Canal* (1830).

There were twenty locks, eight aqueducts, and forty-eight bridges, as well as the necessary safety gates, culverts, sluiceways, and waste weirs. The twenty locks included two tide locks on the Charles and two guard locks on the Concord. The latter, by regulating in part the flow of water into the canal, helped to provide against danger to the banks from variations in the level of Concord River. Locks were ten to twelve feet wide and, though of several slightly different lengths, all were large enough to accommodate canalboats fully seventy-five feet long. The highest single lift was about ten feet and the average lift between seven and eight feet. Some of the locks were of stone, others of wood. In the latter, the wooden side walls were enclosed between walls of rough masonry formed a few feet back of the timber work. The timber constituted a compact box for the water; and the masonry, a retaining wall for the earth. Struts of wood braced the two walls apart.<sup>4</sup>

The head of the line was on the Merrimack at Middlesex Village about a mile above the present dam at Lowell. There the entrance was formed by a nearly semicircular basin, measuring about two hundred feet along the shore of the river and extending back from the river about one hundred feet. It was about five feet below the surface of the Merrimack at low water and about ten or twelve feet below the natural surface of the earth.<sup>5</sup> The basin led to a flight of three locks of durable stone masonry set in trass mortar,<sup>6</sup> which were the first and best-built locks on the canal. Through these, rafts and luggage boats were lifted to the summit level. The yards and tracks of the Boston and Maine Railroad now cover the ground formerly occupied by the locks.

Passing under the main street at Middlesex Village, the canal crossed Black Brook in a wooden aqueduct near the site occupied, when the canal was completed, by a glass factory. The aqueduct, with abutments 110 feet apart, was supported by ten wooden piers on stone foundations. Its trough, about ten feet above the stream below, was made of timber and plank, with the timber framed together by tenons and mortises and strengthened by braces. Had the construction been with knees and bolts, after the fashion of shipbuilding, it would doubtless have been more durable.<sup>7</sup>

Continuing across what is now Chelmsford Street and then at right angles to the present track of the Lowell-Framingham Railroad, the canal next traversed the Great Swamp, the location of a large portion of the two necessary miles of embankment between the Merrimack and Concord rivers. Carried over River Meadow Brook or Hales Brook in a small aqueduct, it continued to Billerica Mills, where a stone guard

<sup>4</sup> Vose: *Early Transportation in Massachusetts*, p. 9.

<sup>5</sup> *Official Reports of the Canal Commissioners of . . . New York* (1817), p. 116.

<sup>6</sup> *Ibid.*, p. 116.

<sup>7</sup> *Ibid.*, pp. 111, 112, 116.

lock, excavated in a ledge of rock, formed the entrance into Concord River Mill Pond. Remains of the guard lock may now be traced in the yard of Talbot's Mills.

Some rods below the line of the canal at this point, a dam about a hundred and fifty feet long and eight feet high was thrown across Concord River, creating the mill pond out of which water flowed to supply both arms of the canal. The water feeding the longer line toward Boston passed through a horizontal aperture of six feet by one foot, with a head of two feet of water above the upper part of the aperture.<sup>8</sup> Waste gates in the dam made it possible to regulate to some extent the height of the water. The fountain head of the canal was crossed by a floating towpath of which a section could be removed to permit logs, timber, or driftwood coming down Concord River to pass through to several sawmills below.<sup>9</sup> The trunk of the canal left Concord River by another stone guard lock and pushed on through about a half-mile of deep cutting. Some eight hundred feet of this was blasted through hard, granite rock.<sup>10</sup> Today the Billerica Car Shops of the Boston and Maine Railroad are set squarely in its former path, obliterating all traces; but beyond them for nearly a mile the canal is still found in almost navigable form.

Continuing from here the canal, today a dry ditch, reached the site of the famous Shawsheen Aqueduct, which carried it some thirty to thirty-five feet above the Shawsheen River. About 188 feet in length,<sup>11</sup> The aqueduct rested on two abutments and three or more central stone piers, all laid without mortar, with a wooden brace or modest type of pier between each outside stone pier and the adjacent abutment. Large horizontal timbers, embedded between the piers at suitable distances, served as supports to the lower ends of the aqueduct braces. From each end of the aqueduct an embankment thirty to thirty-five feet high ran a distance of several hundred feet. As freight and packet boats could only proceed singly over the river, basins on either side allowed them to congregate while awaiting passage. From its height and from the general nature of the surrounding low land, the Shawsheen Aqueduct was one of the imposing sights on the canal.<sup>12</sup>

<sup>8</sup> *Official Reports of the Canal Commissioners*, pp. 115, 116.

<sup>9</sup> *Ibid.*, pp. 115, 116.

<sup>10</sup> *Ibid.*, pp. 115, 116.

<sup>11</sup> Report, November 1819: Corporate Records.

<sup>12</sup> The difficulty of determining dimensions of features of the Middlesex Canal may here be illustrated. The engineer's original proposal called for an aqueduct 620 feet long, spanning flat, low land for 444 feet of its length. A committee of the directors advised erecting banks on the low land for 442 feet and carrying the aqueduct over 170 feet. (June 17, 1799: Baldwin MSS. The discrepancy in the distance covered by these two reports is not explained.) Vose, writing in 1885, gives the length of this aqueduct as 40 feet, while the Canal Commissioners of the State of New York (1817) mention 140 feet. The length given in the text is that con-

A half-mile south of the Shawsheen came the first drop from the summit level through Nichol's Lock. Slight remains can be today identified. A mile and a half more, fairly evenly divided between excavation and embankment, and containing, over Lubber Brook, a small aqueduct known as Sinking Meadow Aqueduct, brought the canal to Gillis' or Jaques' Lock, the second descent toward Boston Harbor. At the sinking meadow, an embankment of some thirty rods was originally carried across a morass with subsoil of decayed vegetation. The earth and gravel brought on continued, for some years, to sink gradually into the marsh. Estimates of the depth to which the embankment sank vary from thirty-eight to sixty feet. The wall on the east was the first to hold firm; that on the west also ceased to settle, but continued for a time to spread. Material was carried on and impacted until the banks were consolidated.<sup>13</sup>

A house has been built on the ground of the second descending lock, the garden occupying the site of the basin. The old canal tavern still stands, recently occupied by tenants of whom one was a descendant of a tavern-keeper at Gillis' Lock. The towpath from here to Wilmington became the ground bed of a trolley line, which eventually reached a state of decay comparable to that of the canal.

Passing from Gillis' Lock over a small aqueduct, the canal encountered more obstacles some two miles beyond, near the site of the former Wilmington Poor Farm. Here an embankment, some eighty rods long and twenty-five feet high to the top of the towing path,<sup>14</sup> was thrown across Maple Meadow, and an aqueduct constructed over Maple Meadow Brook, a source of the Ipswich River. To avoid further passage through this treacherous meadow, the canal was turned sharply, making an abrupt bend which came to be called the Ox-Bow. The former entrance to the town of Woburn was reached a mile farther south, the route skirting or crossing the present state highway, then paralleling or merging with the roadbed of the Woburn branch of the Boston and Maine, through North Woburn, Central Square, and as far as the grounds of the present Woburn Public Library. A fairly high embankment, originally built during the winter over a sinking meadow in Woburn, caused some difficulty. By the end of the spring thaw, it had settled so that its top was level with the natural height of the ground. Another embankment was raised upon it.<sup>15</sup> In North Woburn the line runs beside the

tained in the report of November 1819, found with the records of the Middlesex Corporation. During the rebuilding of the aqueduct, about 1830, it was shortened by filling. The stone abutments and possibly two or more piers were either removed or buried.

<sup>13</sup> Report of committee of operations, Oct. 8, 1801: Corporate Records; *ibid.*, October 1802. *Official Reports of the Canal Commissioners*, p. 113.

<sup>14</sup> *Official Reports of the Canal Commissioners*, p. 113.

<sup>15</sup> *Ibid.*, p. 113; reports, committee of operations, Oct. 8, 1801 and October 1802; memo. of superintendent, May 27, 1802: Corporate Records.



Baldwin Mansion, built in part in 1660, before which in a public square stands a statue of Loammi Baldwin, the engineer of the canal.

One of the chief engineering features of the Middlesex Canal, was reached after its passage behind the site of the present Woburn Public Library. Here three sets of double locks, called Stoddard or Horn Pond Locks, accomplished a descent of fifty feet. The middle set of locks was separated from the set above and the one below by basinlike widenings to equalize the draft of water by locking.<sup>16</sup> High above Horn Pond stood a spacious, much frequented canal tavern.

Stone Lock, a nine-foot drop, was situated about a half-mile farther on, at the crossing of Horn Pond Brook. Water was here taken in from Horn Pond, the only source in addition to Concord River. A mile and a half below, just north of the Abbajona River, then called Symmes River, were Gardner's Locks, which were double. The bed of Symmes River formerly occupied part of the Upper Basin of Mystic Lakes; the basin did not then exist. An aqueduct with abutments 127 feet apart and with three intervening stone piers<sup>17</sup> effected the crossing of Symmes River. The remains of piers or abutments are still visible at the point where the Abbajona River connects the Mystic Lakes with the Upper Basin, not far from the bronze tablet, with its historical record of the canal, erected on Mystic Parkway.

Running close along the shore of Mystic Lakes, the line passed through the estate of Peter C. Brooks, where an elliptical stone arch of admirable proportions carried a farm road over the canal.<sup>18</sup> Farther south, about a mile and a half, came Gilson's Lock, followed by an aqueduct, 135 feet long, borne over Mystic River by two stone abutments and three stone piers.<sup>19</sup> Each pier and abutment was twelve feet high, twenty feet long, and about six feet in width.<sup>20</sup> The surface of the water in the aqueduct was about ten feet above that in the river at high tide.<sup>21</sup> One mile beyond, the Medford Branch Canal, about one-quarter mile long, with a lock and basin at the upper end and a lock at the lower, connected the Mystic River with the main canal.<sup>22</sup> On the banks of this river, after the coming of the Middlesex Canal, grew the excellent shipyards which

<sup>16</sup> Vose, *Notes on Early Transportation in Massachusetts*, p. 10.

<sup>17</sup> Report, November 1819: Corporate Records. Cf. *Official Reports of the Canal Commissioners*, p. 112.

<sup>18</sup> The arch was built in 1821. (Report, Jan. 16, 1822: Corporate Records.) It is said to have been designed by George Rufford Baldwin. (M. W. Mann, "The Middlesex Canal; An Eighteenth Century Enterprise," *Boston Society Publications*, VI, 69-87.)

<sup>19</sup> Report, November 1819: Corporate Records.

<sup>20</sup> Letter of J. L. Sullivan to DeWitt Clinton, March 7, 1817, in *Official Reports of the Canal Commissioners*, pp. 111, 135.

<sup>21</sup> *Official Reports of the Canal Commissioners*, pp. 111, 135.

<sup>22</sup> Survey and Estimate, Medford Branch Canal, February 1804; Plan Medford Branch Canal, 1804, 1805: Baldwin MSS. Contract re Medford Branch Canal, October 1804: Corporate Records.

made the name of Medford famous in the ports of the world; and "Medford-built" became synonymous with the best of finished workmanship.

From the crossing of Mystic River to the end of the line, practically all traces of the canal have disappeared. It passed through land now occupied by the Riverina Mills of the American Woolen Company; then under the present railroad tracks, along West Street, parallel to or in Summer Street, and wound a tortuous course, avoiding the hills on the west and the Mystic Marshes on the east. A little damp pool near Hancock Avenue, in the rear of a brick building, said to have been a hat factory when the canal was in operation, is the last vestige that remains in this populous section.

Running along the westerly part of the old Mystic Trotting Park, the canal came out at the coal pocket on the Mystic River near the Somerville town line, turning inland once more to the western end of Broadway Park, where a stone monument marks its former path. It then curved around to the base of Mount Benedict — Ploughed Hill of revolutionary times. From here to Dorrance Street in Charlestown the route passes through congested districts. Crossing the old Medford turnpike and the rails of the Boston and Maine, it finally passes up the spur track of a lumber company and meets the high brick wall around the Sullivan Square Terminal of the Boston Elevated, which effectually estops further investigation. Near this was the Malden Road Lock and some six hundred feet farther a lock, 114 feet long,<sup>23</sup> leading to the mill pond. Still another lock, with double gates that might be worked in either direction, according to the state of the tide, let canal boats from the mill pond into Charles River. Today the site of this mill pond is dry land, covered with streets and buildings.

Once in Charles River, the boats might be poled, sculled, or sailed to any part of Boston; but a short branch canal penetrated the city at the present site of the Boston and Maine Railroad Station. Entering at the river front, it crossed Causeway Street and passed inward three city blocks, running between Haverhill and Canal streets and ending at Haymarket Square.<sup>24</sup>

<sup>23</sup> Report, November 1819: Corporate Records.

<sup>24</sup> Map of Boston and Lowell Railroad, 1832 (B. F. Perham).

## APPENDIX B

There follow some details in summary form of the achievements and employments of engineers of the Baldwin family,<sup>1</sup> who secured their early training on the Middlesex Canal:

### LOAMMI BALDWIN, 2ND, 1780-1838

- 1800- graduated from Harvard College.
- 1802- built for the town of Groton, Mass., a fire engine, "Torrent #1," which threw a stream of water through a  $\frac{3}{8}$ -inch nozzle to a height of 75 feet. Its 100 feet of 2-inch hose was first made at a harness shop and sewed with wax thread. The engine was used for more than eighty years.
- 1805-1806 published a memoir of Count Rumford.
- 1806-1807 studied civil engineering in England.
- 1809- published: *Thoughts on the Study of Political Economy As Connected with the Population, Industry, and Paper Currency of the United States* — a creditable although not remarkable pamphlet.
- 1814- designed and erected Fort Strong, Boston Harbor, for the defense of the port in the War of 1812.
- 1816- surveyed for the state a route for a canal from Contoocook River, N. H., through Sunapee Lake and Sugar River to Connecticut River.
- 1817-1820 employed on several internal improvements in Virginia.
- 1819- employed on the Boston and Roxbury Milldam.
- 1821- engineer of the Union Canal in Pennsylvania.
- 1824- inspected public works and manufactures in Europe, in company with Francis C. Lowell.
- 1825- served on the committee of design for the Bunker Hill Monument, Charlestown, Mass. The construction and interior details were done by Baldwin.
- 1825- employed by the state to survey for a canal from Boston to the Connecticut River and thence to the Hudson River. His report is one of the most complete engineering documents of the time. It proposes to tunnel the Hoosac Mountain practically at the site later selected for passage by the railroad.

<sup>1</sup>Of the careers of two of the five brothers, sons of Loammi Baldwin, little is known. Cyrus Baldwin managed the Merrimack terminal of the Middlesex Canal and was inspector of gunpowder for a time. B. F. Baldwin was employed on the construction of the Boston and Roxbury Milldam; a number of maps in the Massachusetts archives and the Baldwin Manuscripts testify to his skill as a draftsman.

## THE MIDDLESEX CANAL

- 1826- acted as engineer of the Salem Milldam Corporation which was organized for developing water power at Beverly, Mass.
- 1827-1834 planned and built his two greatest works, the government dry docks at Charlestown, Mass., and at Norfolk, Va. These were among the leading engineering structures of their time in the United States. They were designed and executed throughout by Baldwin.
- 1826-1835 engaged at various times on the survey of New York Harbor for the location of a government dry dock.
- 1827- acted as consulting engineer of a government board of examination for the improvement of the navy yards.
- 1827- appointed by the Governor of Massachusetts to secure surveys and an estimate for a railroad from Boston to the Hudson River. [see James F. Baldwin]
- 1834- published an elaborate report on the introduction of pure water into Boston. It amounts to a treatise on the supplying of water to municipalities and contains a comparative treatment of the methods employed in ten European cities and two American cities.
- 1835- surveyed and reported on the possible development of water power in the Androscoggin River, Maine.
- 1836- surveyed and reported on the best means of developing water power for the Amoskeag Manufacturing Company at Manchester, N. H.
- 1836- surveyed for a canal to connect Altamaha River with Brunswick, Georgia, and submitted a report. This canal was commenced but never completed.
- other works — projected a dam across the Kennebec at Augusta, Maine. designed and constructed Holworthy Hall, Harvard College. furnished plans for a marine railway at Pensacola, Fla. acted as consulting engineer for the Louisville and Portland Canal and for the Harrisburg Canal. [see G. L. Vose, *A Sketch of the Life and Works of Loammi Baldwin, Civil Engineer* (Boston, 1885)]

## JAMES FOWLE BALDWIN, 1782-1862

- 1827-1829 employed as engineer by Massachusetts for the first survey for a railroad from Boston to Albany.
- 1831-1836 employed as engineer and constructor of the Boston and Lowell Railroad.
- 1837-1838 employed by the city of Boston as a commissioner for introducing soft water from Lake Cochituate.

- 1839- acted as engineer of the Locks and Canals Corporation of Lowell, for the measurement and improvement of water power.
- 1840- employed by Massachusetts to fix the boundaries of Boston Harbor.
- 1841- employed by Massachusetts in designing improvements and planning the repair of the Charles River and Warren bridges.
- 1842- acted as engineer of the Locks and Canals Corporation of Lowell, in further measurement and improvement of water power.
- 1842- employed by the United States War Department to measure water power at Springfield, Mass.
- 1843-18(?) served as engineer of the Locks and Canals Corporation of Lowell.

GEORGE RUMFORD BALDWIN, 1798-1888

[G. R. Baldwin's diaries, with the Baldwin Manuscripts, cover more than fifty years and contain daily entries of his engineering activities. I have consulted them only cursorily.]

G. R. Baldwin was employed by the Boston and Lowell Railroad from 1831 to 1832 to secure technical details and information from England and Scotland. Among his other occupations were the designing and building of the Boston Marine Railway and the waterworks at Quebec. He was employed by Massachusetts on the work on the South Boston flats and on surveys for the Cape Cod Canal. He was consulting engineer for the waterworks at Charlestown, Mass., for the Shubenacadie Canal in Nova Scotia, and for early railroads in New Hampshire, Maine, and Vermont.

## APPENDIX C

### STATE OF OWNERSHIP OF MIDDLESEX CANAL SHARES AFTER THE 96TH ASSESSMENT OF MAY 1806

Adams, John . . . . .	13	Gray, William . . . . .	24	Parkman, Samuel . . . . .	10
Adams, John Q. . . . .	7	Greenough, David S. . . . .	5	Payne, William . . . . .	30
Alexander, Giles . . . . .	1	Guild, Mrs. Elizabeth . . . . .	2	Payson, Phillip . . . . .	1
Allen, James, Jr. . . . .	2	Hall, Andrew . . . . .	1	Phillips, John . . . . .	2
Allen, Jeremiah . . . . .	6	Hall, Benjamin . . . . .	4	Phillips & Holden . . . . .	1
Amory, Jonathan . . . . .	8	Hall, Benjamin, Jr. . . . .	2	Pomeroy, Samuel W. . . . .	2
Andrews, Ebenezer J. . . . .	4	Hall, Dudley . . . . .	1	Prince, John . . . . .	9
Atkins, Henry . . . . .	7	Hall, Ebenezer . . . . .	1	Quincy, Josiah . . . . .	5
Balch, Nathaniel . . . . .	3	Hall, Joseph . . . . .	5	Quincy, Mrs. Anne . . . . .	2
Baldwin, Cyrus . . . . .	2	Hall, Mrs. Mary . . . . .	1	Russell, Miss Sarah . . . . .	5
Baldwin, Loammi . . . . .	11	Hall, Nathaniel . . . . .	2	Sigourney, Andrew . . . . .	5
Barrell, Joseph . . . . .	7	Hall, Richard . . . . .	5	Sigourney, Daniel . . . . .	1
Barrell, Nathaniel . . . . .	4	Hartshorn, Oliver . . . . .	4	Sigourney, Elisha . . . . .	1
Barrett, John . . . . .	5	Hazard, Ebenezer . . . . .	3	Sigourney, John C. . . . .	1
Bartlett, George . . . . .	2	Hill, William . . . . .	10*	Smith, William . . . . .	14
Bartlett, Josiah . . . . .	1	Hitchborn, Benj. . . . .	16	Storer, Charles . . . . .	23
Bigelow, Abraham . . . . .	1	Homes, William . . . . .	5	Storer, Ebenezer . . . . .	20
Bishop, John . . . . .	10	Howard, Rev. Simeon . . . . .	4	Sullivan, George . . . . .	14
Blake, Edward . . . . .	2	Jackson, Henry . . . . .	8	Sullivan, James . . . . .	1
Brattle, Thomas . . . . .	10	Jackson, John . . . . .	2	Sullivan, John L. . . . .	14
Brooks, Peter C. . . . .	6	Jaques, Samuel . . . . .	1	Temple, Mrs. Elizabeth . . . . .	3
Codman, John . . . . .	6	Jones, John C. . . . .	20	Temple, Grenville . . . . .	6
Coolidge, Benj. . . . .	3	Joy, Benjamin . . . . .	70	Thompson, Samuel . . . . .	1
Coolidge, Joseph . . . . .	15	Joy, John, Jr. . . . .	40	Thompson, Thomas . . . . .	3
Coolidge, Joseph, Jr. . . . .	6	Lambert, William . . . . .	12	Touro, Abraham . . . . .	7
Dalton, Peter R. . . . .	5	Mackay, Capt. Mungo . . . . .	20	Tudor, William . . . . .	5
Derby, Capt. John . . . . .	15	Mackay, Mrs. Ruth . . . . .	2	Walley, Thomas . . . . .	8
Devens, Richard . . . . .	3	Middlesex Canal Co. . . . .	1	Warren, Capt. Isaac . . . . .	1
Dexter, Aaron . . . . .	6	Miller, Charles . . . . .	5	Warren, John . . . . .	8
Dunn, Samuel . . . . .	5	Morse, Rev. Jedediah . . . . .	10	Watson, Marston . . . . .	4
Durant, Cornelius . . . . .	10	Oliver, Ebenezer . . . . .	2	Weld, Benjamin . . . . .	22
Gore, Christopher . . . . .	35	Otis, Samuel A. . . . .	9	Wendell, Oliver . . . . .	2
Gore, John . . . . .	35	Parker, Isaac . . . . .	1	Winthrop, James . . . . .	4
Gray, John . . . . .	6	Parker, John . . . . .	5		

800 shares      See Hill \*  
101 stockholders

\* The number of shares owned by William Hill is doubtful. His account shows 10, 11, and 12 shares with various transfers and illegible notations. The 10 shares here attributed to him may have been owned by others, not listed at this time.

## APPENDIX D

### THE SUPERINTENDENT'S NOTES ON MEN EMPLOYED AND WAGES 1800 AND 1801 \*

"Pocket Memorandum Canal & Other things. October 3, 1799 to  
December 1801." (Baldwin MSS)

#### March 1800

John Chapman, Tewksbury, for 1 mo. from 10 March @ 12. doll.  
 Reuben Durront, Billerica 7/6  
 Timo. Hill Jun of Amherst, Carpenter, 16 d. per mo.  
 Timo. Clough, stone layer, New Salem @ 16  
 Joseph Pittingill, stone layer, Salem @ 14  
 Joshua Atwood, Carpenter 17

#### April 1800

Ezekl Page of Hancock 18  
 Zachariah Spaulding, Chelmsford, Carpenter 18  
 John Robinson of Derry, Carpenter 22  
 John Austin }  
 John Austin, Jun. } 20  
 Edw. Pettie 19  
 Rich.d Pettie 19  
 David Pettingill & Man dol. 35; June 6 him alone 24  
 Henry Dowing 18

#### May 1800

James Lunds 15  
 John Austin 20 [see above]  
 Daniel Allen of Chester 1 week at 12  
 Aaron Fletcher, Carpenter, asks 20 dol. pr. mo.  
 James Wilson, Windham, asks 20.  
 Reuben Johnson to be Blacksmith, Stone work, or any other work @  
 11 dol. gave some encouragement, if he does well 12 dolls.  
 George Tufts, Carpenter, 28 dol. & board himself  
 [4 names in May with no wages stated]

#### June 1800

Abraham Emerson, Master Stone layer @ 20  
 Webster 13 dol.  
 his son 9  
 Nathaniel Levermore of Shirly, stone layer, 14 doll.  
 Abel Witherbee of Harvard, stone layer 14  
 Jonath.n Burnham, blacksmith, stone layer &c 14 dol. or 15  
 James Baldwin 1 dol. pr. day, his 2 jornemen @ 15½ doll. pr. mo.

#### July 1800

agreed to give Nath. Levermore 16 doll. pr. mo. for future

\* During these years most of the hiring of men was done by Jaques, an overseer.  
 His accounts are not available.

## August 1800

agreed with M. Jarvus [?], Lemingburg [?], a carpenter, from 16 to 18 doll. pr. month with 2 men from N. Concord, one a Stone blower, both will work at Stone work @ 10 doll. pr. mo.

Henry Willard @ 13 doll. Stonework

agreed with worker C. Chamber [?], stone 12

[There follow thirteen names with no statement of wages]

## March 1801

agreed with Mr. Whittle @ 7/ p. day

March 7 or 8 — the water let into canal to the west of Concord River — went up in boat to head with Leonard Jarvus — canal all clear of Ice agreed with Elephalet Brown to work for the season at 10 doll. pr. mo.

Jonathan Marbel of Dracutt, carpenter, agreed to work at 18 doll. pr. mo.

Sam'l Noyes of Andover, carpenter, agreed at 19 dolls. per mo, thro season — he wishes to have 20 if he earns it but I do not agree to give

Barnett Hughes of L. Derry, carpenter, @ 19 doll. pr. mo. for season

Phineas Davison of Andover agrees to work in Stone work for the season at 13 or at most 14 doll. pr. month as I shall think right

Asa Winn of Billerica to assist at Stonework @ 11 or 12 doll, pr. mo. for season

William Richardson of Billerica the same as above for the Season to come on Apr. 1.

Mr. Bigelow of Bolton agrees to work in stone blowing & Laying . . . engages for Season @ 12 or 13 doll.

## April 1801

Mr. David Tarbell of Nottingham, a carpenter, agrees to work the Season at 19 doll, pr. mo. or at most 20 doll. as I think he may Earn.

Joseph Tarbell of Nottingham, a blacksmith & Stone working to have 13 doll. per mo. & he say that he will earn 14 or 15 doll. perhaps shall give him 14 doll. pr. mo.

Wm. Ayers, stone work, told him should not give him but say 14

Sam'l Sproke Jun of Nottingham, carpenter, asks 18 doll. to come first of May if I send for him at Mr. Pelnams . . . dont expect to give him more than 17 doll.

Edson, Brick layer & Stone layer, at the Fox House on Fast Day, to work for 18 doll. at most pr. mo.

Joseph Kinney to work on Canal or Farm at 10 doll. for season.

Mr. Isaac Hobart of Hollis, Stone layer & master workman engages at 14 doll. pr. mo. at least perhaps I may give him 15, but do not agree to give more than 14 doll. for the season pr. month.

Sam'l Ridcut of Hollis in the Stone work at 12 doll. pr. mo.

Jacob Hobert of Hollis in Stone work at 12 doll, pr. mo.

Jacob Silver of Smithfield, R. I., Master workman in Stone laying Engaged for the Season if he suits us at 14 doll. pr. mo. . . if I think proper, to allow him 15 doll. but under no obligation.

Herbert Thorndeck of Tewksbury Engages in the Stone work & dig.g at lock at 13 doll. pr. mo. — may dig some at the locks &c.



Jeremiah Tyler may work in the Stone work but would not agree to give him more than 12 doll.

#### May 1801

Levy Leach of New Salem in Mass. engages for the Season in the Stone work at 12 doll. pr. month

David Capen agrees as Leach does above. I may allow them one doll. more if I think fit, but am not to be held.

James Ashley of Shootsbury engages in the Stone work at 12 doll. per month by Season Jarvus [?] Ashley his son @ 8 doll. pr. mo. by Season

Ebenezer Ball of Hollis engages as a blacksmith & Stone worker by Season at 14 doll. pr. mo. to be Regular & keep the tools & shop in good order & secure, to come next Monday or Tuesday — read this to him when he engaged — said that he would suit me

agreed with Mr. John Johnson of Cantaberry to work in Stone at 13½ pr. mo.

Mr. [?] Chase of Northfield, carpenter, agrees to work the season for 16 to 18 doll. as Mr. Hall shall say, but not to be less than 16 nor more than 18.

#### June 1801

agreed with Mr. John Eaton of Plainfield, N. H., a good Stone layer at 14 doll. pr. month at least, but not more than 15 for Season.

agreed with Mr. Wells to work as carpenter or Stone work or for myself at 13 or 14 doll.s as I shall think he earns, but he say that he expects 14 doll.s

Joe Snow agreed to work at Stone work for the season at 13 or 14

#### July 1801

agreed with John Weeks for him to work at carpenters business @ 20 Dollars pr. mo. & his man @ 13 doll.s

John Kean agreed to work on Canal at 15 doll. pr. mo. & to exert himself

#### September 1801

Sam.l Wilder of Lineal agrees to work in the Stone work until the last of October next at 13 doll. pr. mo.

#### October 1801

agreed with Oliver Fletcher to work at Stone or other work @ 11 doll. pr. month.

agreed with Rich.d Briggs to work at Stone work or other work at 12 doll. & if he shall Exert himself may give him 13 doll.

James Calwell, Nottingham, agrees to work at 10 doll. pr. month

#### November 1801

James Kelly of Cantabury agrees to work in Stone work at 11 doll. pr. month.

John Bowers agreed to work on Stone at 12 doll. pr. mo. — no time set — he proposed 5 or 6 mo. — I told him it would be according as the Season was

#### December 1801

John Smalley agreed to work at 8 doll. pr. mo. . . .

## APPENDIX E

### CARPENTERS' CRAFT RULES IN BOSTON, 1774-1800

*The Carpenters' rules of work in the Town of Boston*, "formed and published in the year 1774," consisted of a list of the work the members of the craft performed, a description of the manner of finishing, and a statement of the prices to be charged for the several items. These prices, or wages, were largely inoperative; they remained superseded throughout the severe monetary fluctuations during and after the Revolution. The new rules of 1800 state with reference to the rules of 1774:

. . . several have held them up as a direction at this day, not considering that they were calculated upon a scale which bears no proportion to the price of other labor *now*, and which is by no means an equivalent compensation for the service, in reference to the raised price of the necessaries of life; and that, not only the low rate at which they were cast render them a very incompetent guide at present, but that they are besides greatly defective in not specifying one quarter part of the work now in demand. Wherefore, the Carpenters of the Town have met at sundry times to consider the propriety of forming new arrangements, and Rules, more accurate and more complete, and calculated on a scale better adjusted to the means of an honest livelihood in an equitable reward to faithful industry. They chose, accordingly, a large and respectable *COMMITTEE*, out of their number, to form such *RULES*; which, being reported and unanimously approved by the whole body, they now publish for the service of the Craft, — expecting that all work will be measured by them, and executed in the best possible manner.

Items of house carpentering are specified almost exclusively. There is no reference to work on bridges, although Boston had seen numerous carpenters employed on her connecting bridges before the year 1800. The list was, therefore, not coextensive with the work of members of the craft. The prices recommended by the trade doubtless served in the town principally as norms about which actual charges fluctuated. Such craft organization was a minor excrescence on the body of a society essentially individualistic. See *The Rules of Work of the Carpenters in the Town of Boston* (Boston, 1800), pp. iii, iv., Harvard College Library.

## APPENDIX F

The following extracts from the Almanac Diaries kept by Loammi Baldwin, 1st, will indicate the nature of these manuscripts, extensively used in this study:

- 1790 — "Linco M said no man was saved because he merited it sought for it or wish.d for it. . . .
- 1793 — Aug. 7 — "Medford — begin surve[y] for Middlesex Canal. . . .  
 Oct. 8 — "Gov. Hancock died. . . .  
 Nov. 14 — "Resigned as sheriff . but consented to continue until about 2nd. week in Jan. . . .
- 1794 — Jan. 17 — "Resignation accepted. . . .  
 Mar. 10 — "Monday about 3 O'clock P.M. Set out for Southern States to ye appointment and at the request of the Directors of the Middlesex Canal to View the Canals Engage an artist in our service & make such further enquiry as shall think proper. . . .  
 Apr. 16 — "arrived home Woburn 11 P.M. [from southern trip]. . . .  
 May 12 — "Reported to Directors Middlesex Canal. . . .  
 June 4 — "at Gen.l Court about Canal acts. . . .  
 June 13 — "Elected by Gen.l Court a Senator of Middlesex. . . .  
 June 19 — "took my seat in Senate. . . .  
 July 21 — "began the survey of the Middlesex Canal by James [sic] Weston, Esq. . . .  
 July 30 — "ended the survey. . . .  
 Aug. 11 — Aug. 23 [or to 30] "Buy land for canal. . . .  
 Sept. 10 — "Brock ground in the Middlesex Canal on the western shore of the Proprietors Millpond I turned or dug the first spade full. . . .  
 Oct. 30 — "Cambridge, Boston, home — got the Instrument. . . ."

## APPENDIX G

### THE UNION CANAL LOTTERY<sup>1</sup>

The right to raise not more than \$20,000 by lottery was granted by New Hampshire to the Union Canals in 1813. The next year the company secured authority to sell the tickets in Massachusetts. In the latter state the scheme met difficulties in 1818 with the passage of a general act regulating lotteries. Meanwhile the term of the lottery had expired in New Hampshire and a new act, passed December 20, 1820, allowed an extension of six years for drawing the classes yet undrawn. There were then three lotteries authorized in New Hampshire. Each was allowed five months in every fifteen, during which it might conduct a lottery without competition. The first term of the Union lottery, under the extension, commenced in February of 1821. An appeal in 1822 or 1821 to the Massachusetts legislature for a similar increase of time failed of favorable action.<sup>2</sup>

When matters had reached this point, the directors of the Middlesex Canal, largely interested in the Union Canal, inquired into the affairs of the managers of the lottery and received the news that after six classes had been sold and drawn, the lottery stood in debt \$5,647.07. Instead of profiting, the Union Canal was further burdened. To pay off the debt at once by an assessment on shares was considered unwise for two reasons:

1. The \$60 assessment required would lead many stockholders to abandon their shares.

<sup>1</sup> Lotteries were likewise granted Blodget's or Amoskeag Canal for improvement of the Merrimack River. The original act, Dec. 30, 1799, empowered Blodget to raise \$9,000 in three years. A resolve of the legislature of June 17, 1802, called for the accounts of the managers, and an act of the next day authorized the raising of an additional \$10,000. The term of three years for this act was twice extended (*Laws of New Hampshire*, VI, 622; VII, 101, 122, 438, 749). Similar grants in favor of Blodget were passed by Massachusetts on March 9, 1804, and March 14, 1806. Two years after the last of these acts the managers were called upon to exhibit their accounts, and two years later a commission, composed of John Winslow, Jonathan Hunnewell, and Benjamin Weld, was appointed to examine the accounts over which there had been many disputes (*Massachusetts Statutes Private and Special*, III, 440; IV, 36, 145, 292). This same lottery was still running in 1814 (*ibid.*, IV, 547).

<sup>2</sup> *Laws of New Hampshire*, VIII, 232, 931. *Massachusetts Statutes Private and Special*, IV, 556. Reports, June 1820, Dec. 21, 1820; June 19, 1821: Corporate Records.

2. If notes should be given and the debt therefore remain for some time unsatisfied, "the Legislature may from motives of fellow feeling be yet inclined to relieve the unfortunate proprietors . . . whereas if the debt is cancelled the reason and necessity of granting further encouragement would not be with some so apparent."<sup>4</sup>

Obligations of the company were given in July 1822, to be paid off over five years; and the income of the Union Canal was reserved for meeting these installments. The mood of the legislature remained obdurate, and the debt was still being paid in 1828. The next year the agent of the Middlesex reported of the Union Canal:

I have now the pleasure to state that this Canal is entirely free from debts, the demands created by lottery speculation are paid to the last dollar with interest. . . .<sup>4</sup>

The managers of this lottery, which did so badly, were Patrick T. Jackson, later President of the Boston and Lowell Railroad, William A. Kent, and Andrew Sigourney, who was succeeded on his death by Joel Stone. They have left their summary accounts. The disproportionate yield of even the best class drawn was characteristic of lotteries generally in America.<sup>5</sup> Large amounts were paid in prizes, and the amount left in the hands of the beneficiaries was in most instances relatively small. Apparently, in this lottery, the chance in favor of the company was too closely calculated, and failure to sell all the tickets made matters worse. The account<sup>6</sup> is here duplicated as it appears:

<sup>4</sup> Report, July 24, 1821: Corporate Records.

<sup>4</sup> Report, Jan. 26, 1829: Corporate Records.

<sup>5</sup> A. R. Spofford, "Lotteries in American History," *American Historical Association, Annual Report* (1892), pp. 173-195.

<sup>6</sup> Corporate Records.

UNION CANAL LOTTERY\*

1st Class	13500 Tickets in all @ 10.00 each	Dolls Ct		Loss	Gain	Bad Debts
	6935 " Sold amounting to .....	71,555.00	a			
	amt. of Prizes paid & charges .....	<u>81,863.47</u>	Bal. Loss.	10308.47		2058.72
2 <sup>d</sup> Class	Suspended —					
3 Class	20,000 Tickets @ 3.00					
	16,167 Sold amt'g to .....	49,498.00				
	Prizes & Charges .....	<u>47,879.72</u>	Bal <sup>e</sup> . Gain		1618.28	1768.51
4 <sup>b</sup> Class	25000 Tickets @ 4.00					
	18609 Sold amt'g to .....	76,564.00				
	Prizes & Charges .....	<u>65,940.00</u>	Balance Gain		10,623.85	*9012.90
5 <sup>b</sup> Class	25000 Tickets @ 5.00					
	12013 Sold amt to .....	61650.00				
	Prizes & Charges .....	<u>44524.00</u>	Balance Gain		17,125.13	684.80
6 Class	25000 Tickets					
	23623 Sold amt'g to .....	159,211.00				
	Prizes &c Paid .....	<u>159,306.03</u>	Balance Loss	95.03		*10645.30
2 <sup>d</sup> Class	10000 Tickets @					
	9721 " Sold amt to .....	48850.00				
	Prizes & Charges .....	<u>45902.---</u>	Balance Gain		2948.00	
	Gain ... 32315.26					
	Loss ... 10403.50			<u>\$10403.50</u>	<u>\$32315.26</u>	<u>\$24794.94</u>
	<u>21911.76</u>					
Bad Debts ..	24794.94					
Int paid ....	<u>2763.89</u>					
	<u>27558.83</u>					
Aggregate Loss .....	\$ 5647.07					

\* The mathematical errors in this table are unexplained.

\* 6064.80 of this sum was due fr. T. Kidder  
 ° 6316.00 " " " B. Eaton

# APPENDIX H

## STATISTICS OF LOWELL MANUFACTURES.

JANUARY 1, 1835.

CORPORATIONS,	<i>Locks &amp; Canals</i>	<i>Merrimach</i>	<i>Hamilton.</i>	<i>Appleton.</i>	<i>Lowell.</i>	<i>Suffolk.</i>	<i>Tyromst.</i>	<i>Lawrence.</i>	<i>Middlesex.</i>	<i>Total.</i>
Capital Stock,	600,000	1,500,000	900,000	500,000	500,000	450,000	500,000	1,100,000	500,000	6,650,000
Number of Mills,	1	Print Works and 3	Print Works and 3	2	Cotton and Carpet Mill in one building.	1	2	4, another & Bleachery preparing	2	22 Mills, beside Print Works, &c.
Spindles,		34,432	18,944	10,240	4,500 Cotton besides Woolen.	10,240	11,136	24,192	3,120	116,804
Looms,		1,253	560	350	140 Cotton 68 Carpet.	350	404	710	98	3,933
Females employed,		1,321	780	475	325	460	450	1,000	240	5,051
Males "	200	437	200	70	150	70	80	160	145	1,512
Yards made per week,		172,000	78,000	80,000	43,270	90,000	120,000	164,000	6,000	753,270
Bales Cotton used in do.,		110	70	86	76	86	86	156	None.	670
Pounds Cotton wrought in do.,		40,000	25,500	30,000	15,600	30,000	30,000	54,600	470,000 wool per an. and 1,500,000 cotton teasls.	235,700 cotton
Yards dyed and printed do.,		150,000	70,000	None.	None.	None.	None.	None.	6,000	226,000
Kinds of Goods made,	{ Machinery. CarakEngin's for Railroads. }	Prints & Sheetings No. 22 to 40	Prints & Drillings, No. 14 to 40.	Sheetings & Shirtings, No. 14	Carpet, Rugs and Negro Cloth.	Drillings, No. 14.	Sheetings & Shirtings, No. 14.	Sheetings & Shirtings, No. 14 to 30, and Casi- mires.	Broadcloths and Casi- mires.	
Tons Anthracite Coal expended per annum,		4,696	2,000	300	180	294	329	500	240	11,239 *

\* Unexplained error in total.

APPENDIX H (continued)

CORPORATIONS,	Locks & Cas'ls	Merrimack	Hamilton.	Appleton.	Lowell.	Suffolk.	Tremont.	Lawrence.	Middlesex.	Total.
Cords of Wood per annum,		1,400	1,500	100	500	70	60	120	1,000	4,750
Gallons of Oil, "		6,800	6,000	3,500	Olive 3,000 Sperm 4,500	3,840	3,692	6,217	Olive 10,500 Sperm 2,500	50,549
Diameter of Water Wheels,		30	13	13	13	13	13	17		
Length of do. for each Mill,		24	42	42	60	42	42	60		
Incorporated,		1822	1825	1828	1828	1830	1830	1830	1830	
Commenced operations,		1823	1825	1828	1828	1832	1832	1833-4	1833	
How warmed,	Hot Air Furnace.	Hot Air Furnace.	Hot Air Furnace.	Hot Air Furnace.	Hot Air Furnace.	Hot Air Furnace.	Hot Air Furnace.	Steam.	Wakefield Furnace & Steam.	

REMARKS.

Yards Cloth made per annum,	39,170,040	Average wages of Females, clear of board,	\$1.50 per week.
Pounds Cotton consumed,	12,256,400	" " of Males, clear of board,	80 cts. per day.
Assuming half to be Upland, and half N.Orleans and Alabama,		Medium produce of a Loom on No. 14, Yarn,	38 to 49 yds per day.
the consumption in beles, is	34,800	" " No. 30,	25 to 30
A pound of Cotton averaging	3 2-10th yds.	Average per Spindle 1 1-10th yard per day.	
100 pounds Cotton will produce 89 pounds Cloth.		Persons employed by the Companies are paid at the close of each month.	
As regards the health of persons employed, great numbers have been interrogated, and the result shows, that 6 of the females out of 10 enjoy better health than before being employed in the mills, — of males, one half derive the same advantage.		The average amount of wages paid per month,	\$80,000
As regards their moral condition and character, they are not inferior to any portion of the community.		A very considerable portion of the wages is deposited in the Savings Bank.	
		Consumption of Starch per annum,	310,000 lbs.
		" of Flour for do. in Mills, Print Works & Bleachery,	3,800 bbls.
		per ann.	
		" of Charcoal, per annum,	500,000 bushels.

To the above named principal establishments, may be added, the extensive Powder Mills, of O. M. Whipple, Esq; The Lowell Bleachery; Flannel Mills; Card and Whip Factory; Planing Machine; Reed Machine; Grist & Saw Mills, together employing about 300 hands, and a capital of \$300,000. Also, in the immediate vicinity, Glass Works, and a Furnace, supplying every description of Castings.

On the 1st. June next, the Middlesex Company will manufacture 300 yards of Sattinet per day, in addition to the above, and the consumption of Wool will then be 2000 lbs per day in their establishment. The Locks & Canals Machine Shop, included among the 22 Mills, can furnish machinery complete for a Mill of 3000 Spindles in 4 months, and lumber and materials are always at command, with which to build or rebuild a Mill in that time, if required.



## APPENDIX I

I

## RATE OF TOLL

ON THE

## MIDDLESEX CANAL.....UNTIL FURTHER NOTICE.

APRIL 4, 1808.

ON all articles (excepting those which follow) by weight at 6½ cents a ton, each and every mile, the whole distance being 27 miles		Dolls. Cts.
Timber { Oak—per mile, 6½ cents a ton	- - - - -	1,68½
Timber { Pine—per mile, 4 cents	- - - - -	1,08
Pine Boards	} 6½ cents	
Pine Plank, reduced to board measure		1,68½
Clapboards—4 cents a thousand	- - - - -	1,08
do. freight in the Proprietors' Boats—64 cents a thousand	- - - - -	
Shingles—1 cent a thousand	- - - - -	
Oak Plank, 2½ inch—6½ cents for 600 feet board measure	- - - - -	1,68½
Ash Plank, 2½ inch—6½ cents for 700 feet board measure	- - - - -	1,68½
Staves, Barrel—6 cents per thousand	- - - - -	1,62
do. Hoghead—12 cents	- - - - -	3,24
do. Pipe—18 cents	- - - - -	4,86
do. Butt—25 cents	- - - - -	6,75
Hoops, Hoghead—8 cents per thousand	- - - - -	2,16
do. Barrel—4 cents	- - - - -	1,08
do. Half-Barrel—3 cents	- - - - -	,81
Hoop-Poles, Hoghead—18 cents per thousand	- - - - -	4,80
do. Barrel—9 cents	- - - - -	2,40
Shucks, 40 to be rated as one ton—6½ cents	- - - - -	1,68½
do. with heads, 40 to be rated as one and an half ton, or 27 a ton—6½ cents	- - - - -	1,68½
Hogheads, empty, 20 to be rated as a ton, or at 8½ cents each	- - - - -	1,68½
Barrels, empty, 50 to a ton	- - - - -	1,68½
Half-Barrels, empty, 80 to a ton	- - - - -	1,68½
Corn { 40 bushels to a ton, or 4 cents, 2 milles a bushel	- - - - -	1,68½
Rye { 40 bushels to a ton, or 4 cents, 2 milles a bushel	- - - - -	1,68½
Oats, 80 bushels to a ton, or 2 cents, 1 mille a bushel	- - - - -	1,68½
Rock Salt, 28 bushels to a ton	- - - - -	
Coarse Salt, 30 bushels to a ton	- - - - -	
Coarse Fine Salt, 34 bushels to a ton	- - - - -	
Fine Salt, 40 bushels to a ton	- - - - -	
Oars, for 1000 feet—4 cents a mile	- - - - -	
Wood and Bark per cord, whole distance 27 miles, or from above Concord River	- - - - -	1,17
	to Medford, 22 miles	1,00
ditto	from between Hopkins's Lock and Concord River, to Medford, 19 miles	,90
	to Charlestown, 22 miles	1,00
ditto	from between Wilmington Lock and Hopkins's Lock, to Medford, 14 miles	,65
	to Charlestown, 17 miles	,75
ditto	from between Horn-Pond Lock and Wilmington Lock, to Medford, 12 miles	,60
	to Charlestown, 15 miles	,70
ditto	from between Medford-Pond Lock and Horn-Pond Lock, to Medford, 7 miles	,40
	to Charlestown, 10	,50

APPENDIX I

2

RATE OF  
Dockage, Wharfage, and Storage,  
AT THE LANDING-PLACES OF THE MIDDLESEX CANAL.....1809.

*At the Boston Landing.*

<b>WHARFAGE.</b>	
<i>On Articles brought down or going up the Canal.</i>	HALF-CHESTS of BOHEA or HYSON TEA— 3 cents each.
WOOD and BARK—per cord, 10 cents for land- ing and the first month; and then 5 cents a month from April to September inclusive, and 10 cents a month from October to March inclusive.	GRAIN—1 cent per bushel.
TIMBER—per ton or per 100 feet ranging, 10 cents for landing and the first month, and 5 cents for every month after.	HALF-BARRELS, FIRKINS, KEGS, and SMALL PACKAGES—1 cent each.
BOARDS, PLANK, JOIST, STAVES, HOOPS, and CLAPBOARDS—12 cents per thousand for landing and the first month; 6 cents per thou- sand from April to September inclusive, and 10 cents from October to March.	HOGSHEADS and PIPES—6 cents each.
SHINGLES—3 cents per thousand for landing and the first month, and 2 cents per thousand for every subsequent month.	BARRELS—3 cents each.
SHOOK HOGSHEADS—1 cent per thousand for landing and the first month.	IRON—10 cents per ton.
BALES of COTTON, BAGS of HOPS, BALES, CRATES, TRUNKS, BOXES—5 cents each.	NAILS—2 cents per cask.
BOXES of LEMONS, OIL, GLASS—1 cent each.	SALT—3 cents per hogshead.
CHESTS of BOHEA TEA—6 cents each.	
	<b>STORAGE.</b>
	BALES of COTTON, BAGS of HOPS, BALES, CASES, CRATES, and TRUNKS—12 cents a month.
	HOGSHEADS—12 cents.
	BARRELS—5 cents.
	CHESTS of BOHEA TEA—12 cents.
	GRAIN—2 cents a bushel.
	IRON—20 cents a ton.
	If put into Store for any term less than a week <i>one third</i> the above rates.

*In Charlestown, at the 1st and 2d Landings.*

<b>DOCKAGE.</b>	
TIMBER put into the Booms—5 cents a month a ton or 100 feet ranging.	<b>STORAGE.</b>
N.B. All Timber must be put into the Booms, if not going immediately out of the Pond.	<i>(The same as at the Boston Landing.)</i>
	BALES of COTTON, BAGS of HOPS, BALES, CASES, CRATES, and TRUNKS—12 cents a month.
<b>WHARFAGE.</b>	HOGSHEADS—12 cents.
WOOD and BARK—5 cents per cord a month; 20 cents a month, if left within 20 feet of the water.	BARRELS—5 cents.
BOARDS, PLANK, JOIST, STAVES, HOOPS, CLAPBOARDS—6 cents per thousand a month.	CHESTS of BOHEA TEA—12 cents.
SHINGLES—2 cents per thousand a month.	GRAIN—2 cents a bushel.
TIMBER—6 cents a ton or 100 feet ranging.	IRON—20 cents a ton.
	If put into Store for any time less than a week, <i>one third</i> the above rates.

Articles loaded on or landed from Vessels other than the Canal Boats, to pay the customary wharfage.

Boats and Rafts may proceed to the Boston Landing, and pay toll there.  
When a Boat, loaded with Wood or other articles, is to go to the Boston Landing, the Conductor must present his Passport to the Collector at Charlestown, and sign a copy of it, which the Collector will make in a book kept for that purpose. He must then take his Passport with him to the Boston Landing. And on the return of the Boat, the Conductor must bring a Certificate from the Collector at the Boston Landing, that his loading has been received there; otherwise such Boat cannot have a Passport to go up the Canal.

When a Raft is to go to the Boston Landing, the same rule is to be observed.  
JOHN L. SULLIVAN,  
*Agent of the Middlesex Canal Corporation.*

# RATES OF TOLL ON THE MIDDLESEX AND RIVER CANALS.....1821.

Articles.	Bow.		Hooksset.		Amoskeig.		Union and Cromwell's.							Total at U. & C.		Wicassee.		Middlesex.		Remarks.
	Dollars.	Cents.	Dollars.	Cents.	Dollars.	Cents.	M.	G.	B.	O.	C.	M.	C.	Dollars.	Cents.	Dollars.	Cents.	Dollars.	Cents.	
Timber, Oak, per ton,	15	10	13	8	37	1/2	4	4	4	6	4	10	8	40	17	1	68	1	68	
"    Pine,	16	10	14	8	30		4	4	4	6	4	10	8	40	17	1	68	1	68	
Masts and Bowsprits, three tons each and over,	25	12	12	12	30		4	4	4	6	4	10	8	40	17	1	68	1	68	
"    under three tons each,	12	12	12	12	30		4	4	4	6	4	10	8	40	17	1	68	1	68	
Lumber, Pine, per m. board measurement,	14	18	18	18	50		4	4	4	6	4	10	8	40	17	1	68	1	68	
Oak Plank and Boards, per m. inch,	14	18	18	18	50		4	4	4	6	4	10	8	40	17	1	68	1	68	
Ash and other hard stuff not enumerated,	16	18	18	18	50		4	4	4	6	4	10	8	40	17	1	68	1	68	
"    per m. board measurement,	16	18	18	18	50		4	4	4	6	4	10	8	40	17	1	68	1	68	
Staves, Pipe, per m.	50	28	1	00	1	00	8	7	8	12	7	18	15	75	21	1	10	1	10	
"    Hogshead, W. O. and R. O. per m.	80	42	1	25	1	25	7	7	7	8	7	11	7	54	22	1	83	1	83	
"    Barrel,	60	32	1	00	1	00	5	5	5	6	5	9	5	40	18	1	80	1	80	
"    Hogshead,	40	18	1	00	1	00	3	3	3	4	3	6	3	25	13	1	55	1	55	
"    Barrel,	16	12	1	00	1	00	3	3	3	4	3	6	3	25	13	1	55	1	55	
"    Hogshead,	8	6	1	00	1	00	2	2	2	3	2	3	2	12	5	1	27	1	27	
"    Barrel,	8	6	1	00	1	00	2	2	2	3	2	3	2	12	5	1	27	1	27	
Hoop Poles, Hogshead,	32	24	1	00	1	00	10	10	10	14	10	20	16	90	34	3	50	3	50	
"    Barrel,	16	12	1	00	1	00	5	5	5	7	5	10	8	45	17	1	75	1	75	
Shooks, with Heads, 25 to a ton,																				
"    without Heads, 40 to a ton,																				
Hogsheads, empty, 20 to a ton,																				
Barrels, Beef and Rum, 50 to a ton,																				
"    Fish, 60 to a ton,	48	23	1	31	1	31	8	8	9	9	8	14	16	72	20	1	50	1	50	
"    Half, 80 to a ton,																				
Shingles, per m.	3	2		6			1	1	1	1	1	2	1	8	2		27		27	
Clapboards, "	15	10		10			5	5	5	5	5	10	8	40	10		55		55	
Stone, Hammered, per ton, (of 14 cubic feet.)	25	12		30			4	4	4	4	4	7	8	35	5		75		75	
"    Rough,	13	6		6			2	2	2	2	2	4	4	18	3		40		40	
Merchandise, per ton,	48	25		25			8	8	8	9	8	14	16	72	20		50		50	
Salt, Lime and Plaster, per ton,	20	13		13			6	6	6	7	7	10	13	56	9		35		35	
Iron Ore, same as Plaster, per ton,	20	13		13			6	6	6	7	7	10	13	56	9		35		35	
Oats, 75 bushels to a ton,																				
Corn and Rye, 40 bushels to a ton,																				
Potatoes,	40																			
Wood, Hard, per cord,	10	6		25			2	2	2	3	2	5	5	21	8		83		83	
"    Pine,	6	4		20			1	1	1	2	1	4	4	15	6		63		63	
Posts and Rails, split and sawed, per 100,	10	6		20		13	2	2	2	3	2	5	5	21	8		83		83	
Charcoal, per 100 bushels,	15	9		9			2	2	2	3	2	5	5	21	8		83		83	
Treenails, per ton,	48	25		25			8	8	8	9	8	14	16	72	20		50		50	
Bricks, per 100, same as Plaster,	20	13		13			6	6	6	7	7	10	13	56	9		35		35	
Manure, per boat load,																				
Hay, per ton, Screwed,	36	16		16			6	6	6	6	5	10	10	48	10		100		100	
Bark, per cord,	10	6		6			2	2	2	3	2	5	5	21	8		83		83	
Hop Poles, per 100,	5	3		3			1	1	1	1	1	2	1	8	2		20		20	

\* Each Boat passing Amoskeig Canal pays \$2. or 24 cents per ton on its capacity, whether loaded or empty; and the articles it contains pay no other Toll

{ delivered in Charles-  
town or Medford.  
1-6 of value.

APPENDIX I

4

RATES OF TOLL ON THE MIDDLESEX AND RIVER CANALS.....1825.

Articles.	Bow.		Hooksett.		Amoskeig.		Union and Cromwell's.						Total at U & C.		Wicwassec.		Middlesex.		Remarks.	
	Dollars.	Cents.	Dollars.	Cents.	Dollars.	Cents.	M.	C.	S.	G.	C.	M.	C.	Dollars.	Cents.	Dollars.	Cents.	Dollars.		Cents.
	Timber White Oak, per ton, . . . . .	25	12	13	7	37	17	4	4	4	6	4	10	8	40	17	1	68		
"  Red Oak, rough hewn, per ton, . . . . .	17	8	8	8	20	17	2	2	2	3	3	5	4	20	9		85			
"  Pine, . . . . .	16	8	8	8	20	17	2	2	2	3	3	5	4	20	9		90			
"  Rough Spruce & Hemlock, per ton, . . . . .	8	4	4	4	10	8	2	2	2	4	2	6	5	26	9		45			
Masts and Bowsprits, three tons each & over, under three tons each, . . . . .	25	12	13	7	37	17	4	4	4	6	4	10	8	40	17	1	68			
Lumber, Pine, per m. board measurement, . . . . .	25	12	13	7	37	17	4	4	4	6	4	10	8	40	17	1	68			
Oak Plank, and Boards, per m. inch, . . . . .	25	12	13	7	37	17	4	4	4	6	4	10	8	40	17	1	68			
Ash and other hard stuff not enumerated, per m. board measurement, . . . . .	34	68	36	1	1	00	10	10	10	10	10	24	20	1	00	17	81			
Staves, Pipe, per m. . . . .	50	28	28	1	1	00	8	7	8	12	7	18	15	75	21	2	10			
"  Hogshead, W. O. per m. . . . .	80	42	42	1	25	90	7	7	7	8	7	11	7	54	22	2	25			
"  R. O. . . . .	60	32	32	1	60	40	5	5	5	6	5	9	5	40	18	2	20			
"  Barrel, W. O. . . . .	40	21	21	1	60	40	3	3	3	4	3	6	3	27	12	2	10			
"  R. O. . . . .	40	18	18	1	50	30	3	3	3	4	3	6	3	25	13	2	00			
Hoops, Hogshead, . . . . .	27	12	12	1	35	20	2	2	2	3	2	4	2	17	9		67			
"  Barrel, . . . . .	16	12	12	1	50	30	5	5	5	7	5	10	8	45	17	1	75			
Hoop Poles, Hogshead, . . . . .	8	6	6	1	33	20	2	2	2	3	2	5	4	22	8		87			
"  Barrel, . . . . .	32	24	24	1	50	30	10	10	10	14	10	20	16	90	34	3	50			
Shooks, with Heads, 25 to a ton, . . . . .	16	12	12	1	50	30	5	5	5	7	5	10	8	45	17	1	75			
"  without Heads, 40 to a ton, . . . . .																				
Hogsheads, empty, 20 to a ton, . . . . .																				
Barrels, Beef and Rum, 50 to a ton, . . . . .	48	25	25		3	2	8	8	9	9	8	14	16	72	20	1	50			
"  Fish, 60 to a ton, . . . . .																				
"  Hull, 80 to a ton, . . . . .																				
Shingles, per m. . . . .	3	2	2		6	4	1	1	1	1	1	2	1	8	2		27			
Clapboards, . . . . .	18	12	12		50	30	5	5	5	8	5	12	10	50	17	1	62			
Stone, Hammered, per ton, (of 14 cubic feet), . . . . .	25	12	12		50	30	4	4	4	4	4	7	8	35	5		75			
"  Rough, . . . . .	13	6	6		12	7	2	2	2	2	2	4	4	20	3		10			
Merchandise, per ton, . . . . .	20	10	10		12	7	6	6	6	6	6	9	9	48	10	1	10			
Salt, Lime, Plaster, Bar Iron, and Iron Castings, per ton, . . . . .	15	7	7		11	6	3	3	4	4	4	6	7	31	6		80			



# RATES OF TOLL ON THE MIDDLESEX AND RIVER CANALS.

Eighteen Hundred and Thirty.

Articles.	Bow Canal.	Hooksett.	Amoskeig.	Union Locks and Canals.							Total Union	Wicassec.	Middlesex Canal.	Total.	Remarks.	
				Merrill's.	Griffin's.	Short	God's.	Cook's.	Moore's.	Cronwell's.						
Merchandise, per ton, . . . . .	13	10	18	1	1	1	1	1	1	1						
Corn and Rye, 40 bushels to a ton, . . . . .	13	10	18	1	1	1	1	1	1	1						
Oats, 75 bushels to a ton, . . . . .																
Potatoes, 40 bushels to a ton, . . . . .	14	10	18	6	6	6	6	6	6	9	9	48	10	1	00	
Shooks, with heads, 25 to a ton, . . . . .																
"    without heads, 40 to a ton, . . . . .	14	10	18	6	6	6	6	6	6	9	9	48	10	1	00	
Hogsheads, empty, 20 to a ton, . . . . .																
Barrels, beef and rum, 50 to a ton, . . . . .	10	7	15	3	3	4	4	4	6	7	31	6	80			
"    fish, 60 to a ton, . . . . .																
"    "    120 to a ton, . . . . .	10	7	15	3	3	4	4	4	6	7	31	6	80			
Charcoal, 100 bushels to a ton, . . . . .																
Salt, Lime, Plaster, Bar Iron, Pig Iron, . . . . .	11	7	15	3	3	4	4	4	6	7	31	6	80			
and Iron Castings, per ton, . . . . .																
Factory Cotton Cloths, downward, . . . . .	12	10	20	1	1	1	1	1	1	1	45	1	50			
Sea Coal, (bituminous) per chaldron, . . . . .	10	6	12	1	1	1	1	1	1	1	45	1	50			Upward, same as Merchandize.
Lehigh and Schuylkill Coal, per ton, . . . . .	4	3	7								17	5	80			
Copperass, (downward,) . . . . .	5	4	9								18	4	50			
Iron Ore, per ton, . . . . .	7	4	11								18	5	37			Upward, same as Merchandize.
Stone, hammered, 14 cubic feet per ton, . . . . .	8	5	13	3	3	3	3	3	4	5	24	5	50			
"    rough, . . . . .	8	5	13	3	3	3	3	3	4	5	24	5	50			
Bricks, common, per M, . . . . .	2	1	3								7	2	14			
"    furnace . . . . .	13	13	25	6	6	7	7	7	10	13	50	9	50			
Sand and Clay, for glass houses, per ton, . . . . .	20	13	25								33	9	100			
Manure, per boat load, per mile, . . . . .	7	5	12								24	5	50			
Hay, screwed, per ton, . . . . .													13			
Cotton . . . . .	13	10	18	2	2	2	2	2	6	6	26	10	100			
												4	67			

TIMBER LUMBER, &c.

Timber, Oak, per ton, . . . . .	25	13	37	4	4	4	6	4	10	8	40	17	1 68
Red Oak, rough hewn, for . . . . .	12	7	17	2	2	2	3	2	5	4	20	9	85
posts and piles, per ton, . . . . .	16	8	20	2	3	3	4	3	6	5	26	9	90
" Pine, per ton, . . . . .	8	4	10	1	2	2	2	2	3	2	14	5	45
Rough Spruce and Hemlock, per ton, . . . . .	25	12	30	4	4	4	6	4	10	8	40	14	1 40
Masts and Bowsprits, 3 t'ns, each, & over, . . . . .	25	12	30	4	4	4	6	4	10	8	40	12	1 35
Under 3 tons, each . . . . .	34	18	50	5	5	5	8	5	12	10	50	17	1 63
Lumber, Pine per M, board measurement, . . . . .	68	36	100	10	10	10	16	10	24	20	100	28	2 81
Oak Plank and Boards, per M, do do . . . . .	50	28	100	8	7	8	12	7	18	15	75	21	2 10
Ash, and other hard stuff, not enumerated per M, board measurement, . . . . .	3	2	6	1	1	1	1	1	2	1	8	2	10
Shingles, per M, . . . . .	17	9	25	3	2	2	4	3	7	4	25	4	80
Clapboards, per M, . . . . .	—	—	—	—	—	—	—	—	—	—	—	—	—
Posts & Rails, split & sawed, 100 pr. ton, . . . . .	—	—	—	—	—	—	—	—	—	—	—	—	—
Treenails, per M, . . . . .	5	3	5	1	1	1	1	1	1	1	4	2 1/2	20
Hop Poles, per 100, . . . . .	2	1	3	1	1	1	1	1	1	1	4	1	10
Laths, per M, . . . . .	10	6	15	1	1	1	3	1	5	3	15	5	83
Wood, hard, per cord, . . . . .	6	4	10	1	1	1	1	1	3	1	10	7	65
pine, . . . . .	10	6	14	1	1	1	3	1	5	3	15	8	1 00
Bark, per cord, . . . . .	75	37	100	2	2	3	4	2	10	7	30	11	1 50
Staves, Pipe, per M, White Oak, . . . . .	40	25	75	—	—	—	—	—	—	—	20	7	1 33
Hhd. " Red Oak, . . . . .	30	20	50	—	—	—	—	—	—	—	14	6	1 00
" Barrel, " White Oak, . . . . .	30	15	45	—	—	—	—	—	—	—	15	10	85
" Barrel, " Red Oak, . . . . .	20	12	30	—	—	—	—	—	—	—	14	7	50
Hoops, Hogshead, per M, . . . . .	16	12	50	—	—	—	—	—	—	—	45	17	1 75
Barrel, per M, . . . . .	10	6	17	—	—	—	—	—	—	—	22	8	87
Hoop Poles, Hogshead, per M, . . . . .	35	20	60	—	—	—	—	—	—	—	65	20	3 50
" Barrel, per M, . . . . .	16	12	35	—	—	—	—	—	—	—	45	17	1 75
Empty Boats, . . . . .	50	25	75	—	—	—	—	—	—	—	25	25	25

Same as Merchandise.  
Same as W. O. Bbl. Staves.

## RATES OF TOLL ON THE MIDDLESEX AND RIVER CANALS.

Eighteen Hundred and Thirty-Five.

ARTICLES.	BOW CANAL.	HOOKSETT.	AMOSKEG.	UNION LOCKS AND CANALS.						TOTAL UNION.	MIDDLESEX CANAL.	BILLERICA LOCK.	REMARKS.	
				MERRILL'S.	GRIFFIN'S.	SHORT.	GOTT'S.	COOS.	MOOR'S.					CROWELL'S.
Merchandise, per ton, .....														
Corn and Rye, 40 bushels to a ton, .....														
Oats, 75 bushels to a ton, .....														
Potatoes, 40 bushels to a ton, .....														
Shooks, with heads, 25 to a ton, .....														
"    without heads, 40 to a ton, .....														
Hogsheads, empty, 20 to a ton, .....	14	10	18	6	6	6	6	6	9	9	48	1	0.10	
Barrels, beef and rum, 50 to a ton, .....														
"    "    80 to a ton, .....														
"    fish, 60 to a ton, .....														
"    "    120 to a ton, .....														
Charcoal, 100 bushels to a ton, .....														
Salt, Lime, Plaster, Bar Iron, Pig Iron, .....														
Iron Castings, and Slate, per ton, .....	10	7	15	2	2	3	3	3	6	6	25	75	0.10	
Factory Cotton Cloths, (downward), .....	10	8	12								20	50	0.10	Upward, same as Merchandise.
Sea Coal, (bituminous) per chaldron, .....	10	8	12	1	1	1	1	1	7	8	20	50	5	
Lehigh and Schuylkill Coal, per ton, .....	5	3	8	1	1	1	1	1	3	3	9	35	4	
Copperas, (downward), .....	4	3	6	1	1	1	1	1	1	1	12	25	10	Upward, same as Merchandise.
Iron Ore, per ton, .....	7	5	9	3	3	3	3	3	4	5	24	50	5	
Stone, hammered, 14 cubic feet per ton, .....	6	4	10	1	1	1	1	1	1	1	10	40	5	
"    rough, .....	2	1	2								7	14	5	
Bricks, common, per M, .....	14	10	20	6	6	7	7	7	10	13	50	50	10	
"    furnace, .....	20	13	25								32	1	18	
Sand and Clay, for glass houses, per ton, .....	7	5	9								24	50	5	
Manure, per boat load, per mile, .....												13	1.00	
Hay, screwed, per ton, .....												1		
Oyster Shells, .....												1		



TIMBER, LUMBER, &c.

Timber, Oak, per ton, .....	85	13	37	4	4	4	6	4	10	8	40	1	68	0.10
" Red Oak, rough hewn, for posts and piles, per ton, .....	12	7	17	2	2	2	3	2	2	4	20	1	85	0.8
" Pine, per ton, .....	16	8	20	2	3	3	4	3	6	3	26	1	90	0.6
Rough Spruce and Hemlock, per ton, .....	8	4	10	1	2	2	2	2	3	2	14	1	45	0.3
Masts and Bowsprits, 3 t'ns, each, & over, .....	25	12	30	4	4	4	6	4	10	8	40	1	40	0.14
Under 3 tons, each .....	25	12	30	4	4	4	6	4	10	8	40	1	25	0.12
Lumber, Pine, per M, board measurement, .....	34	18	50	5	5	5	8	5	12	10	30	1	63	0.12
Oak Plank and Boards, per M, do do .....	68	36	100	10	10	10	16	10	24	20	100	1	81	0.20
Ash, and other hard stuff, not enumerated, per M, board measurement, .....	50	28	100	8	7	8	12	7	18	15	75	1	10	0.16
Shingles, per M, .....	3	2	6	1	1	1	1	1	1	1	8	1	10	0.4
Clapboards, per M, .....	17	9	25	3	2	2	4	3	7	4	25	1	80	0.10
Posts & rails, split & sawed, 100 per ton, .....														
Treenails, per M, .....														
Hop Poles, per 100, .....	8	3	5						1	1	4		20	
Laths, per M, .....	2	1	3										10	0.2
Wood, hard, per cord, and Bark, .....	6	4	10	1	1	1	3	1	7	8	22		83	0.8
" pine, .....	4	3	8	1	1	1	1	1	4	5	15		60	0.6
Staves, Pipe, per M, White Oak, .....	75	37	100	2	2	3	4	2	10	7	30	1	50	
" Hhd. .....	40	25	75								20	1	33	
" Red Oak, .....	30	20	50								14	1	14	
" Barrell, White Oak, .....	30	15	45								15	1	85	
" Red Oak, .....	20	12	30								14	1	50	
Hoops, Hogshead, per M, .....	16	12	50								45	1	75	
" Barrel, per M, .....	10	6	17								12	1	87	
Hoop Poles, Hogshead, per M, .....	35	20	60								65	3	50	
" Barrel, per M, .....	16	12	35								45	1	75	
Empty Boats, .....	50	25	75							25	25	1	75	0.25

Upward, one dollar per M.

Same as Merchandise.  
Same as W. O. Bbl. Staves

M

# RATES OF TOLL

## ON THE

# MIDDLESEX AND RIVER CANALS.

Eighteen Hundred and Forty-Three.

ARTICLES.	BOW CANAL.		ROOSESET.	UNION LOCKS AND CANALS.						TOTAL UNION.		MIDDLESEX CANAL.	TOTAL.	REMARKS.	
				MERRILL'S.	CRIFPIN'S.	SHORT.	COFF'S.	COOS.	MOOR'S.						CHOMWELL'S.
Merchandise, per ton,															
Corn and Rye, 40 bushels to a ton,															
Oats, 75 bushels to a ton,															
Potatoes, 40 bushels to a ton,															
Shooks, with heads, 25 to a ton,															
" without heads, 40 to a ton,															
Hogsheads, empty, 20 to a ton,															
Barrels, beef and rum, 30 to a ton,															
" fish, 60 to a ton,															
" 120 to a ton,															
Charcoal, 100 bushels to a ton,															
Salt, Plaster, Bar Iron, Pig Iron, Iron Castings, and Slate, per ton,	7	..	5	..	1	1	1	2	2	3	3	13	..	40	65
Lime, 8 casks to a ton,	7	..	5	..	1	1	1	2	2	3	3	13	..	25	50
Sea Coal (bituminous) per chaldron,	6	..	4	..	1	1	1	1	1	5	5	15	..	25	50
Lehigh and Schuylkill Coal, per ton,	5	..	3	..	1	1	2	2	2	2	2	12	..	20	40
Copperas, (downward,)	3	..	2	..	1	1	1	1	1	2	3	10	..	25	40
Iron Ore, per ton,	7	..	5	..	1	1	2	2	2	2	3	13	..	25	50
Stone, hammered, 14 cubic feet per ton,	3	..	2	..	1	1	1	1	1	2	3	10	..	25	40
" rough,	2	..	1	..	1	1	1	1	1	1	1	7	..	14	20
Bricks, common, per M,	12	..	8	..	4	4	6	6	7	10	10	50	..	25	70
Sand and Clay, for glass houses, per ton,	5	..	3	..	1	1	1	1	1	3	4	12	..	25	45
Manure, per boat load, per mile,	..	..	..	..	..	..	..	..	..	..	..	..	..	13	30
Hay, screwed, per ton,	7	..	5	..	1	1	1	1	1	3	3	12	..	50	75
Oyster Shells, per ton,	2	..	1	..	1	1	1	1	1	2	2	8	..	20	40

TIMBER, LUMBER, &c.

Timber, Oak, per ton, . . . . .	20	..	13	..	4	4	4	6	4	10	8	40	..	1 25	1 85
" Red Oak, rough hewn, for posts and piles, per ton, . . . . .	15	..	10	..	2	2	2	3	2	5	4	20	..	80	1 25
" Pine and Chestnut, per ton, . . . . .	12	..	8	..	2	2	2	3	2	3	4	20	..	70	1 10
Rough Spruce and Hemlock, per ton, . . . . .	7	..	4	..	1	2	2	2	2	3	2	14	..	45	70
Masts and Bowsprits, 3 tons, each, and over, Under 3 tons each, . . . . .	25	..	15	..	4	4	4	6	4	10	8	40	..	1 40	..
Norway Pine Masts, . . . . .	15	..	10	..	2	2	2	3	2	5	4	20	..	1 00	1 50
Lumber, Pine, per M, board measurement, . . . . .	25	..	20	..	3	3	3	5	3	10	8	35	..	1 00	1 80
Oak Plank and Boards per M, do. do., . . . . .	30	..	20	..	5	3	5	8	5	12	10	50	..	1 50	2 50
Ash, and other hard stuff, not enumerated, per M, board measurement, . . . . .	25	..	15	..	4	4	4	7	4	10	7	40	..	1 20	2 00
Shingles, per M, . . . . .	4	..	3	..	1	1	1	1	1	2	1	8	..	10	25
Clapboards, per M, . . . . .	12	..	8	..	1	1	1	2	1	2	2	10	..	50	80
Posts and Rails, split and sawed, 100 per ton, . . . . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Treenails, per M, . . . . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Hop Poles, per 100, . . . . .	5	..	3	..	1	1	1	1	1	1	1	4	..	20	..
Laths, per M, . . . . .	2	..	1	..	1	1	1	1	1	1	1	3	..	10	..
Wood, hard, per cord, and bark, pane, . . . . .	4	..	3	..	1	1	1	1	1	1	1	13	..	60	0 80
Staves, Pipe, per M, White Oak, . . . . .	40	..	20	..	2	2	2	2	2	6	4	20	..	1 00	1 80
" Hhd. " Red Oak, . . . . .	20	..	12	..	1	1	1	2	2	3	3	13	..	75	1 20
" Barrel, " White Oak, . . . . .	15	..	10	..	1	1	1	1	1	1	1	8	..	60	03
" Barrel, " Red Oak, . . . . .	11	..	6	..	1	1	1	1	1	2	2	9	..	50	80
Hoops, Hogshead, per M, . . . . .	10	..	5	..	1	1	1	1	1	2	2	9	..	25	50
" Barrel, per M, . . . . .	5	..	3	..	1	1	1	1	1	3	2	12	..	50	70
Hoop Poles, Hogshead, per M, . . . . .	15	..	10	..	4	4	4	7	4	10	7	40	..	1 00	1 40
" Barrel, per M, . . . . .	10	..	5	..	2	2	2	6	5	5	3	25	..	1 25	1 65
Empty Boats, . . . . .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Railroad Sleepers, per hundred, . . . . .	12	..	8	..	2	2	2	4	4	6	10	30	..	1 00	1 50

.. Upwards 50 c., Midd'x.

Same as Merchandise.  
Same as W. O. Bbl. Staves.

## APPENDIX J

### PERSONNEL

#### MIDDLESEX CANAL COMPANY

##### PRESIDENTS

James Sullivan .....	1793-1808
Aaron Dexter .....	1809- ?
Benjamin Guild .....	? -1830
Peter O. Thatcher .....	1831-1840
Abbot Lawrence .....	1841-1849
Ebenezer Chadwick .....	1850-1853
Abbot Lawrence .....	1854- ?

##### STANDING COMMITTEE 1830-1839

William Appleton, succeeded by George Hallett in 1835  
Ebenezer Chadwick  
William Sullivan

##### STANDING COMMITTEE 1840-1846

Charles Francis Adams, succeeded by Amos A. Lawrence  
in 1843  
Ebenezer Chadwick  
George Hallett  
(The Standing Committee was abolished in 1846)

##### SUPERINTENDENTS OR AGENTS

Loammi Baldwin .....	1794-1805
Samuel Jaques .....	1806-1807
John Langdon Sullivan .....	1808-1820
James F. Baldwin .....	1821-1824
Caleb Eddy .....	1825-1845
Richard Frothingham .....	1846-1854

##### DIRECTORS

1805

Joseph Coolidge  
Aaron Dexter  
Christopher Gore  
Benjamin Hall  
John Coffin Jones  
Benjamin Joy

Mungo Mackay  
 Ebenezer Oliver  
 William Payne  
 James Sullivan  
 James Winthrop

1814

Ebenezer T. Andrews  
 Jonathan Amory  
 James F. Baldwin  
 Joseph Coolidge  
 Edward Cruft  
 Aaron Dexter  
 Benjamin Guild  
 Dudley Hall  
 Benjamin Joy  
 William Payne  
 William Sullivan  
 Abraham Touro

1830-1837

Charles Francis Adams  
 Ebenezer T. Andrews  
 William Appleton, succeeded by George H. Kuhn  
 in 1837  
 James F. Baldwin  
 Ebenezer Chadwick  
 Joseph Coolidge  
 Benjamin Guild  
 Dudley Hall  
 George Hallett  
 Joseph B. Joy, succeeded by Abbot Lawrence in 1834  
 Thomas W. Phillips  
 William Sullivan  
 Peter O. Thatcher  
 (The Board was reduced to seven in 1838)

1838-1839

Charles Francis Adams  
 Ebenezer Chadwick  
 George Hallett  
 Abbot Lawrence  
 Luther Lawrence  
 William Sullivan  
 Peter O. Thatcher  
 (The Board was reduced to five in 1840)

1840-1850

Charles Francis Adams

Ebenezer Chadwick

George Hallett, succeeded by William Sturgis in 1846

Abbot Lawrence, succeeded by William Appleton in 1850

Peter O. Thatcher, succeeded by Amos A. Lawrence  
in 1841

1851-1854

\*Charles Francis Adams

William Appleton

Ebenezer Chadwick

William R. Lawrence, succeeded by Amos A. Lawrence  
in 1854

William Sturgis

\* Succeeded by George H. Kuhn in 1852, who was in turn succeeded by Abbot Lawrence in 1853.

## APPENDIX K

### PROPRIETORS OF THE LOCKS AND CANALS, LOWELL, OCTOBER 8TH 1834

Appleton, Nathan .....	60	Jackson, P. T. ....	80
"    Samuel .....	12	"    Charles .....	30
Amory, Hannah R. ....	20	"    James .....	30
Andrews, Henry .....	2	"    P. T. & Lee (Trustees) ...	10
Ames, Francis .....	4	Kuhn, Geo. H. ....	10
Appleton, William .....	5	Lowell, J. A., & Trustee .....	53
Bigelow, Tyler .....	1	"    John Jr. ....	20
Boott, Kirk .....	5	Lee, Jeremiah .....	4
Borden, Isaac .....	4	"    Thomas Trustee .....	3
Bigelow, I. ....	4	"    Thomas .....	12
Budlong, Thomas .....	6	Lawrence, Amos .....	20
Blake, Joshua .....	17	"    Abbot .....	20
Brooks, Peter C. ....	28	Lyman, Geo. W. ....	51
Boott, J. W., Trustee & Guar <sup>o</sup> . ....	8	"    Theodore Jr. ....	40
Bryant & Sturgis .....	23	Lee, George .....	12
Boott, Moody & William (Trustees) 3		"    John C. ....	2
Belknap, John .....	10	Lawrence, Luther .....	1
Cabot, Frederick, 5; E. Clark, 9 ..	14	Lee, Henry Jr. ....	1
Cabot, Lucy .....	12	"    Elizabeth C. ....	1
"    Samuel, 10; R. A. Crafts, 5 ..	15	"    Francis L. ....	1
"    Henry .....	40	"    Harriet J. ....	1
"    Henry & Lee (Trustees) ..	4	"    Joseph .....	4
Channing, Susan .....	4	"    Thomas & Henry (Trustees) ...	1
Carey, Thomas G. ....	10	Motley, Thomas .....	15
Cushing, John P. ....	15	Mason, William P. ....	11
Chadwick, Eben <sup>r</sup> . ....	5	Manufac <sup>r</sup> . Insurance Office .....	8
Dutton, Warren .....	10	Moody, Susan M. ....	3
Deveraux, Humphrey .....	6	"    David Guar <sup>o</sup> .....	6
Draper, W. B. ....	12	Mason, W. P. (Trustee) .....	12
Emmons, Nathl H. ....	3	Moody, W. H. ....	3
Foster, Chas. W. ....	10	Nichols, B. R. Guar. ....	12
Fiske, Isaac .....	2	Ocean Bank at N. Port. ....	1
"    Augustus H. ....	1	Prescott, William .....	10
Gray, John C. ....	22	Perkins, Thomas H. ....	20
Green, Simon E. ....	6	Pickman, D. L. ....	10
Gardiner, Wm. H., & Trustee .....	6	Perkins, T. H., S. G. & Gardiner (Trustees) ..	13
Hobbs, Ebenezer Jr. ....	2	Parkers, Jno. ....	20
"    Sarah .....	2	Perkins, Thos H. Jr. ....	18
Higginson, Susan C. ....	1	Paine, Chas. C. ....	4
"    J. P. (Trustee) .....	1	Pratt, Geo. W. ....	2
"    Stephen & Cross (Trustees) .....	2	Quincy, Josiah, Jr., Guar <sup>n</sup> . ....	12
"    Louisa .....	6	Rogers, Wm. S. ....	8
Hallett, George .....	2	Rollins, Eben <sup>r</sup> . ....	10

## THE MIDDLESEX CANAL

Rand, Benjamin .....	1	Warren, John C. ....	14
Stanton, Francis .....	6	Whitwell Bond & Co. ....	3
Thorndike, Israel .....	50	Wales, Thomas B. ....	15
"    Augustus .....	35	Williams, Timothy .....	17
Tilden, Joseph .....	28	"    John .....	1
Thorndike, Mary M. ....	12		
"    Charles & Loring		98 Subscribers	•
(Trustees) 5		1200 Shares	



## APPENDIX L

### STOCKHOLDERS OF MIDDLESEX CANAL COMPANY,

NOVEMBER 17, 1846

Adams, Charles Francis	2	Lawrence, Lucy	5
Adams, John Quincy	43	Lering [?], Elizabeth	6
Andrews, Ebenezer T.	4	Lodge, Giles	1
Appleton, William	21	Lyman, Mrs. S. B.	8
"    "    (Trustee)	5	Middlesex Canal	1
Atkinson, George	3	Miller, Charles E.	1
"    J. and F. [?]	23	Miller, Hannah	1
Baldwin, George R.	2	Packard, Asa	1
"    James F.	6	Parker, Peter	5
Bassett, Francis	2	Parsons, Lydia E.	3
Blake, Sarah	12	Phillips, Sally	6
Boston Episcopal Charity Society	1	Porter, G. W.	1
Brooks, Peter C.	6	Prince, Harriet	2
Chadwick, Ebenezer	29	Oliver, Ebenezer	2
Coles, Isaac U. [?]	20	Quincy, Josiah	7
Davis, John W.	5	Seaver, Anna M. [?]	5
Dexter, George M.	3	Shattuck, Amelia H.	1
"    John C.	3	Shattuck, George C.	1
Farley, Robert	8	Sohier [?], E. A.	3
Gorham, B. (and wife)	11	Schier [?], William D.	5
Greenough, Maria	5	Standish, Hannah	1
Guild, Benjamin	1	Storer, Ann W.	1
Guild, Elizabeth	14	"    Susan	2
Hall, Dudley	2	Sturgis, William	7
Hall, Joseph	15	Sullivan, William (heirs of)	40
Hallett, Elizabeth	10	Sweet, Elizabeth B.	7
Harvard College	60	Thatcher, Peter O. (Estate of)	5
Hazard, Ebenezer	3	Thayer, Charles L. (Children of)	2
Howard, Catharine H.	1	Touro, Judah	22
Howard, Elizabeth	16	Warren, Edward	4
Howard, John C.	1	Watson, Almira	1
Hayward, James	5	"    B. M.	2
Johnson, Mary	5	"    Laura A.	1
Jones, Anna P.	20	Wendell, Oliver	2
Joy, Joseph G.	20	Whetmore, Thomas	7
Joy, Nabby [?]	15		
Kuhn, George H.	2		
Lawrence, Abbot	137		
"    Amos A.	90		
		74 Stockholders	
		800 Shares	

## BIBLIOGRAPHY

### A

#### MANUSCRIPT SOURCES

#### I. Records of the Proprietors of the Middlesex Canal. Office of the County Commissioners; Middlesex County, Massachusetts.

##### *Books, Lettered:*

- A. Transfer of Shares  
Entries 1794-1807
- B. List of Stockholders and Transfers of Shares  
1811-1825
- C. Alphabetical Index of Shareholders  
Not dated; apparently from 1800 to about 1821
- D. Alphabetical Index of Stockholders  
Not dated; earlier than B or C
- E. Book of Stock Certificates of the Blodget Canal Co. at Amoskeag Falls, N. H.  
1808-1811
- F. Alphabetical List of Stockholders in the Middlesex Canal  
Not dated
- G. Records of Deeds, Middlesex Canal, and Alphabetical List of Grantors of Land to the Proprietors of the Middlesex Canal, with dates of Deeds, Acknowledgments, and Registry  
1794-1823
- H. Early Records of Deeds of Lands owned by Middlesex Canal Co.  
1655; 1677; etc.
- I. Middlesex Canal Lands; Summary made by Caleb Eddy, Agent Middlesex and Merrimack River Canals, Record of Sales of Lands, 1850, 1851
- J. Treasurers Accounts 1793-1796; Record of Assessments Paid
- K. Treasurers Accounts 1797-1804; Disbursements and Receipts from Assessments  
See Q below
- L. Annual Reports of Stockholders Meetings  
1830-1851
- M. Directors Meetings; Records  
1829-1854

- N. Report of Investigating Committee, 1825  
Reports of Agent of the Canal to the Directors  
1826-1844 and 1846
- O. Eagle Bank Check Book; Stubs of Dividend Payments  
Not dated
- P. Ledger 1811-1824
- Q. Treasurers Accounts; Disbursements and Receipts from  
Assessments, 1805-1808  
Also contains Ledger 1793-1808
- R. Books of Stock Certificates  
1810-1824, incomplete, containing fragmentary records  
of receipts
- S. Rough Pencil Sketches of the Merrimack River  
Not dated

*Bundles, Numbered:*

- I. Vouchers, 1812-1817
- II. Memoranda Accounts; Bills; Vouchers  
1803-1823
- III. Memoranda Accounts; Bills; Vouchers  
1824-1832
- IV. Memoranda Accounts; Bills; Vouchers  
1833-1842
- V. Regulations; Toll Rates; Legislative Acts; Bylaws, etc.  
Collection of printed matter on these and kindred subjects
- VI. }  
VII. } Miscellaneous — Copies of orders and regulations, toll rates,  
hiring of lock keepers, letters of recommendation for lock  
keepers, etc.
- VIII. Deeds and Contracts
- IX. Stock Certificates
- X. Letters and Reports  
Reports of subcommittees on tolls, on lands, on the state  
of the locks; miscellaneous and routine letters
- XI. Receipted Bills: Memoranda of Payments
- XII. Receipted Bills: Memoranda of Payments
- XIII. Receipted Bills: Memoranda of Payments
- XIV. Caleb Eddy, *Historical Sketch of the Middlesex Canal* (one  
copy)  
Boston, 1843
- XV. Plan of Concord River  
1811

## II. Baldwin Manuscripts

Baker Library, Harvard University

These comprise a large collection of family papers dating, in any quantity, from about the year 1750. They are contained in 250 boxes. Of particular interest for the history of American civil engineering are the papers, drawings, field books, letters and diaries of:

Loammi Baldwin, 1744-1807.

Loammi Baldwin, 1780-1838.

James Fowle Baldwin, 1782-1862.

George Rumford Baldwin, 1798-1888.

Much material for the history of the Middlesex Canal during the period 1793-1807 is found in the papers of Loammi Baldwin, 1st. There is a collection of early plans and surveys.

A number of early surveying instruments is in the Baldwin Mansion, North Woburn, Massachusetts.

## III. Loammi Baldwin, "Revolutionary War Papers" (MSS)

Harvard College Library

## IV. Frothingham Manuscripts

Massachusetts Historical Society

Documents dated from 1650-1864 relating mostly to Charlestown, Massachusetts

Documents dated from 1794-1855, relating to the Hooksett, Bow, Union, and Middlesex canals. In particular:

Bundle H — Stock Certificates, Middlesex Canal, 1794-1824

Bundle I — Middlesex Canal, Miscellaneous, 1795-1855

With the last are the annual reports of the agent from 1847-1852

## V. Sullivan Manuscripts

Massachusetts Historical Society

Partial collection of letters of Governor James Sullivan and his family; mostly personal

## VI. Knox Manuscripts

Massachusetts Historical Society

Documents, and letters to and from General Henry Knox

## VII. Craigie Papers

American Antiquarian Society

Account books, and letters to and from Andrew Craigie

## VIII. Massachusetts Archives

State House, Boston, Mass.

Plans of early canal projects; early maps; and legislative documents

## B

## MAPS AND PLANS

- Machin's Map of a Canal from Barnstable Bay to Buzzard's Bay, copy, about 1776 (Mass. Archives).
- A Plan and Section of Scusset and Manument Rivers . . . , John Hills, 1791 (Mass. Archives).
- Plan of a Lock, about 1795 (Baldwin MSS).
- A Plan of the Canal at Amoskeag Falls; The Property of S. Blodget, Esq., about 1800 (Knox MSS).
- Plan of a Traveling Bridge over Middlesex Canal, 1801 (Baldwin MSS).
- "Plan of a Fraim and Gateway for the brick culvert . . .," 1801 (Baldwin MSS).
- Rough Surveys and Plans of the Middlesex Canal, 1793-1803 (Baldwin MSS).
- "Original Survey Course of Canal Medford to Charlestown," 1803 (Baldwin MSS).
- Course of Canal to Charlestown Mill Pond, about 1803 (Baldwin MSS).
- Plans of the Medford Branch Canal, 1804, 1805 (Baldwin MSS).
- Plans drawn from Survey of Middlesex Canal 1805, by Benj. F. Baldwin (Baldwin MSS).
- Middlesex Canal, from Boston to Medford in 1805, attached to a Map of Boston by Osgood Carleton (Mass. Archives).
- "Plan relating to Bridge over Middlesex Canal in Medford," 1804 (Baldwin MSS).
- Plan of West Boston Bridge, showing canal passage, 1807 (Mass. Archives).
- Survey for a Water Communication from Weymouth Landing Place in Boston Harbour to the Tide Water at Taunton Great River, February 1808, protracted by Benj. F. Baldwin (Mass. Archives).
- Plan concerning Middlesex Canal, 1808: Bills, 1808 (Mass. Archives).
- Plan of a Proposed Canal in Boston, 1810, by Osgood Carleton: Senate Document 4207 (Mass. Archives).
- "Plan and Profile of a Survey and Level between Sunapee Lake and the Connecticut River, by Sugar River made . . . pursuant to a resolve of the General Court of Mass. Jan. 25, 1816 and . . . of New Hampshire, June 21, 1816," Loammi Baldwin and John Farrar, for Mass., Henry B. Chace, for N. H. (Mass. Archives).
1. "Plan of Township #1 . . . in Kennebec Purchase . . . surveyed . . . September 1816 for Proprietors of Middlesex Canal."

2. "Plan of Township . . . East of Moosehead Lake . . ." (Mass. Archives).
- Map of Boston and its Vicinity, 1820, John G. Hales (County Commissioners, Middlesex County).
- Plan of the Middlesex Canal, 1829, G. R. Baldwin (Rough Draft, in Baldwin MSS; Original, County Commissioners, Middlesex County).
- Section Maps, Middlesex Canal, 1829, G. R. Baldwin (Baldwin MSS).
- Sections of the Middlesex Canal, July 1830, by G. R. Baldwin for Loammi Baldwin, 2nd (Original, Baldwin MSS).
- Profile of Middlesex Canal, 1830, G. R. Baldwin (Original, County Commissioners, Middlesex County).
- Map of the Route of the Boston and Lowell Railroad, November 1832, projected by B. F. Perham (County Commissioners, Middlesex County).
- Plan and Profile of the Boston and Lowell Railroad, showing the Middlesex Canal, 1836, James F. Baldwin, Engineer; drawn by Henry C. Waters. (Copies: County Commissioners, Middlesex County; Boston and Maine Railroad; Mass. Historical Society; New Hampshire Historical Society; Woburn Public Library; Mass. Archives, etc.)
- Profile of Middlesex Canal from Merrimack River at Lowell to Boston Harbor, 1924, E. B. Carney (Lowell, Mass.).

## C

## NEWSPAPERS AND PERIODICALS

- Billerica*, Billerica, Massachusetts
- Boston Daily Advertiser*
- Boston Transcript*
- Columbian Centinel*, Boston
- Courier-Citizen*, Lowell
- Farmer's Monthly Visitor*, Manchester, New Hampshire
- Horticulturist and Journal of Rural Art and Rural Taste*, Albany
- Independent Chronicle*, Boston
- Literary Miscellany*, Cambridge, Massachusetts
- Massachusetts Centinel*, Boston
- Massachusetts Magazine*, Boston
- Massachusetts Mercury*, Boston
- New England Farmer*, Boston
- Winchester Press*, Winchester, Massachusetts

## D

## COURT DECISIONS AND COURT DOCKETS

- Russell v. Temple* (1798) 3 Mass. 108.  
*Stevens v. Proprietors of Middlesex Canal* (1815) 12 Mass. 466.  
*Proprietors of Sudbury Meadows v. Proprietors of Middlesex Canal* (1839)  
 40 Mass. (23 Pick.) 36.  
*Heard v. Proprietors of Middlesex Canal* (1842) 46 Mass. (5 Metc.) 81.  
*Derby v. Hall* (1854) 68 Mass. (2 Gray) 236.  
 Supreme Judicial Court of Massachusetts, Dockets, 1852, 1853, 1859, 1860;  
 Middlesex and Suffolk Counties.

## E

## BROADSIDES, LEAFLETS, REPORTS, ETC.

A number of libraries and historical societies possess contemporary material of a miscellaneous nature concerning the Middlesex Canal. Material in the following institutions has been used in preparation of this study:

- American Antiquarian Society (Worcester)
- Boston Athenaeum
- Boston Public Library
- Harvard College Library
- Library of Congress
- Lowell Public Library
- Massachusetts Historical Society
- Rumford Historical Association (North Woburn)
- State House Library (Boston)
- Woburn Public Library

## F

## SECONDARY ACCOUNTS OF THE MIDDLESEX CANAL

The principal secondary accounts are the following:

- Dame, L. L., "The Middlesex Canal," *Old Residents Historical Association*, Lowell (1886), vol. III.  
 Eddy, Caleb, *Historical Sketch of the Middlesex Canal* (pamphlet, Boston, 1843).

Harper, Walter R., "The Middlesex Canal," Distinction Thesis, Harvard University (1916).

(MS in Mr. Harper's possession)

Hopkins, A. T., "Old Middlesex Canal," *New England Magazine*, January 1898.

Mann, M. W., "The Middlesex Canal; An Eighteenth Century Enterprise," *Medford Historical Register*, vol. VII, and *Boston Society Publications*, vol. VI.

Sherbourne, R. B., *What Has Been; A Sketch of the Old Middlesex Canal* (pamphlet, Woburn Public Library, 1888).

Yeaton, H. P., "Historical Sketch of the Old Middlesex Canal," *Historic Leaves*, Somerville Historical Society (1903), vol. III.

The *Medford Historical Register* contains articles relating directly or indirectly to the canal in Volumes I, VII, VIII, XII, XIV, XV, XVIII, XX.

The following should likewise be mentioned:

Chamberlain, E. G., "An Attempt to Locate the Mystic Section of the Middlesex Canal," July 1924 (MS), Harvard College Library.

Hill, Mabel, "The Old Middlesex Canal," Lowell Book.

Silver, Ruth, "The Middlesex Canal," (MS), Woburn Public Library.

## G

### GENERAL REFERENCES

Adams, C. F., *The Canal and Railroad Enterprise of Boston*, in *Memorial History of Boston*, 4 vols. (Boston, 1881), IV, chap. v.

— *Memoir of Theodore Lyman* (Boston, 1906).

Allen, Wilkes, *History of Chelmsford* (Haverhill, 1820).

Amory, T. C., *Life of James Sullivan: with Selections from his Writings*, 2 vols. (Boston, 1859).

— *Memoir of Richard Sullivan* (Cambridge, 1885).

*Appleton's Cyclopaedia of American Biography* (New York, 1889).

*Bager and Porter's Stage Register* (Boston, 1830).

Baldwin, C. C., *The Baldwin Genealogy from 1500 to 1881* (Cleveland, 1881).

Baldwin, G. R., *Report on Supplying the City of Charlestown with Pure Water: Made for the City Council by Order of Hon. James Dana, Mayor of Charlestown, by George R. Baldwin and Charles L. Stevenson, Civil Engineers* (Boston, 1860).

Baldwin, Loammi [1744-1807], "An Account of a Very Curious Appearance of the Electrical Fluid Produced by Raising an Electrical Kite in the Time of a Thunder Shower," *Memoirs of the American Academy of Arts and Sciences*, I (1785), 257-259 (1783).



- Baldwin, Loammi [1780-1838], "A Diary kept at the Dry Dock Office" (MS), Baldwin Library, Massachusetts Institute of Technology.
- *Letter to the Hon. John Pickering, President of the Salem Mill Dam Corporation, upon the Estimates, etc. of that Work* (Salem, 1826).
- "Pay Roll of Workmen employed on Dry Dock, U. S. Navy Yard" (MS), Baldwin Library, Massachusetts Institute of Technology.
- *Report of the Commissioner of the State of Massachusetts on the Routes of Canals from Boston Harbor to Connecticut and Hudson Rivers* (Boston, 1846).
- *Report on the Brunswick Canal and Railroad, Glynn County, Georgia, with an Appendix Containing the Charter and Commissioner's Report* (Boston, 1836).
- *Report on the Subject of Introducing Pure Water into the City of Boston* (Boston, 1834).
- "The Original Memoirs of Benjamin, Count of Rumford," *Literary Miscellany* (1805-1806), vols. I, II.
- *Thoughts on the Study of Political Economy, As Connected with the Population, Industry, and Paper Currency of the United States* (Cambridge, 1809).
- Barry, J. S., *The History of Massachusetts*, 3 vols. (Boston, 1855-1857).
- Batchelder, Samuel, *Introduction and Early Progress of the Cotton Manufacture in the United States* (Boston, 1863).
- Beamish, Richard, *Memoirs of the Life of Sir Marc Isambard Brunel* (London, 1862).
- Bishop, A. L., *The State Works of Pennsylvania* (New Haven, 1907).
- Bishop, J. L., *History of American Manufactures from 1608 to 1860*, 3 vols. (Philadelphia, 1861-1868).
- Blodget, Samuel, *Economica; a Statistical Manual for the United States of America, with Additions to the Beginning of the Year 1810* (Washington, 1810).
- Blodget, William, *Facts and Arguments Respecting the Great Utility of an Extensive Plan of Inland Navigation in America, by a Friend to National Industry* (Philadelphia, 1805).
- Bowers, C. G., *Jefferson and Hamilton; the Struggle for Democracy in America* (Boston and New York: Houghton Mifflin Co., 1925).
- Breck, Samuel, *Sketch of the Internal Improvements Already Made by Pennsylvania; with Observations upon her Physical and Fiscal Means for their Extension; Particularly as They Have Reference to the Future Growth and Prosperity of Philadelphia* (Philadelphia, 1818).
- Brooks, Charles, *History of the Town of Medford, Middlesex County, Massachusetts, from Its First Settlement, in 1630, to the Present Time, 1855* (Boston, 1855).

- Brooks, Noah, *Henry Knox* (New York and London, 1900).
- Brown, A. E., *Beside Old Hearth-Stones* (Boston, 1897).
- Browne, G. W., *The Amoskeag Manufacturing Co. of Manchester, New Hampshire; a History* (Manchester, 1915).
- "Boating on the Merrimack," *Manchester Historic Association Collections*, I (1897-1900), 35-43.
- "Hon. Samuel Blodget; the Pioneer of Progress in New England," *Manchester Historic Association Collections*, I (1897-1900), 121-176.
- Bücher, Karl, *Industrial Evolution*, translated from the 3rd German edition by S. Morley Wickett (New York [c. 1901], 1912).
- Burbank, H. H., "James Sullivan," *Collections of the Maine Historical Society*, 3rd series, I (1904), 322-338.
- Carey, H. C., and Lea, I., editors, *A Connected View of the Whole Inland Navigation of the United States; Natural and Artificial; Present and Prospective* (Philadelphia, 1826).
- Carter, J. G., and Brooks, W. H., *A Geography of Middlesex County for Young Children* (Cambridge, 1830).
- Chapman, William, *Observations on the Various Systems of Canal Navigation* (London, 1797).
- Clark, V. S., *History of Manufactures in the United States, 1607-1860*, 3 vols. (Washington, 1916).
- Coburn, F. W., *History of Lowell and Its People*, 3 vols. (New York: Lewis Historical Publishing Co., 1920).
- Colden, C. D., *A Vindication by Cadwallader D. Colden, of the Steam Boat Right Granted by the State of New-York in the form of an Answer to the Letter by Mr. Duer, Addressed to Mr. Colden* (Albany, 1818).
- Colonial Society of Massachusetts, *Publications*, VII.
- Commons, J. R., et al., editors, *A Documentary History of American Industrial Society*, 10 vols. (Cleveland, 1910-1911).
- Converse, P. L., *1642-1892: Legends of Woburn*, 2 vols. (1892-1896).
- Copeland, M. T., *The Cotton Manufacturing Industry of the United States* (Cambridge, 1912).
- Courier-Citizen Co., *Illustrated History of Lowell and Vicinity* (Lowell, 1897).
- Cowley, Charles, *Illustrated History of Lowell* (Boston and Lowell, 1868).
- Crocker, G. G., *From the Stage Coach to the Railroad Train and the Street Car* (Boston, 1900).
- Cutter, W. R., editor, *Genealogical and Personal Memoirs Relating to the Families of Boston and Eastern Massachusetts*, 4 vols. (New York, 1908).

- Davis, J. S., *Essays in the Earlier History of American Corporations*, 2 vols. (Cambridge: Harvard University Press, 1917).
- Dickinson, H. W., *Robert Fulton, Engineer and Artist; His Life and Works* (London and New York, 1913).
- Dictionary of American Biography*
- Dictionary of National Biography*
- Drake, F. S., *Life and Correspondence of Henry Knox* (Boston, 1873).
- Drake, S. A., *Historic Mansions and Highways around Boston* (Boston, 1899).
- *History of Middlesex County, Massachusetts*, 2 vols. (Boston, 1880).
- Duer, W. A., *A Letter, Addressed to Cadwallader D. Colden, Esquire. In Answer to the Strictures, Contained in his "Life of Robert Fulton," upon the Report of the Select Committee, to Whom was Referred a Memorial Relative to Steam Navigation, Presented to the Legislature of New York, at the Session of 1814* (Albany, 1817).
- Ellis, G. E., *Memoir of Sir Benjamin Thompson, Count Rumford, with Notices to His Daughter* (Boston, 1871).
- Encyclopaedia Britannica* (11th ed.).
- Fairbairn, Sir William, Bart., *Iron, Its History, Properties, and Processes of Manufacture* (Edinburgh, 1865).
- Forbes, H. M., compiler, *New England Diaries, 1602-1800* (Topsfield: The Perkins Press, 1923).
- Freeman, Frederick, *The History of Cape Cod: the Annals of Barnstable County, Including the District of Mashpee*, 2 vols. (Boston, 1860-1862).
- Fulton, Robert, *Treatise on the Improvement of Canal Navigation* (London, 1796).
- Gallatin, Albert, *Report of the Secretary of the Treasury, on the Subject of Public Roads and Canals* (Washington, 1807).
- Gibbs, George, *Memoirs of the Administrations of Washington and John Adams, Edited from the Papers of Oliver Wolcott, Secretary of the Treasury*, 2 vols. (New York, 1846).
- Gibson, Robert, *A Treatise of Practical Surveying Which Is Demonstrated from Its First Principles* (New York, 1798).
- Gould, L. S., *Ancient Middlesex, with Brief Biographical Sketches of the Men Who Have Served the County Officially since Its Settlement* (Somerville, 1905).
- Gunther, R. T., *Early Science in Oxford*, 2 vols. (Oxford: Oxford Historical Society, 1923).
- Harlow, A. F., *Old Towpaths; The Story of the American Canal Era* (New York and London: D. Appleton and Co., 1926).

- Hazard, B. E., *The Organization of the Boot and Shoe Industry in Massachusetts before 1875* (Cambridge: Harvard University Press, 1921).
- Heads of Families at the First Census of the United States, 1790* (Washington, 1908).
- Hervey, J. A., "Ship-Building in Medford," *Medford Historical Register*, I (July 1898), 65-81.
- Hooper, J. H., "Bridges in Medford," *Medford Historical Register*, II (January 1899), 1-25.
- Hulbert, A. B., "Andrew Craigie and the Scioto Associates," *American Antiquarian Society Proceedings*, XXIII (1913), 222-236.
- Hurd, D. H., editor, *History of Middlesex County, Massachusetts, with Biographical Sketches of Many of Its Pioneers and Prominent Men*, 3 vols. (Philadelphia, 1890).
- Ingersoll, J. R., *Memoir of the Late Samuel Breck, Vice-President of the Historical Society of Pennsylvania* (Philadelphia, 1863).
- Jackman, W. T., *The Development of Transportation in Modern England*, 2 vols. (Cambridge, Eng., 1916).
- Jefferson, Thomas, *The Works of Thomas Jefferson, Collected and Edited by Paul Leicester Ford*, 12 vols. (New York and London, 1904-1905).
- Jennings, W. W., *A History of Economic Progress in the United States* (New York: Thomas Y. Crowell Co., 1926).
- Laws of New Hampshire* (Concord, 1917).
- Lossing, B. J., editor, *Diary of Washington: from the First Day of October, 1789 to the Tenth Day of March, 1790* (New York, 1858).
- Love, John, *Geodaesia, or The Art of Surveying and Measuring Made Easy; Shewing . . . How to Lay Out New Lands in America* (London, 1720).
- Manchester Historic Association Collections*, vols. X, XI, XII [Early town records].
- Mann, M. W., "A Pioneer Railroad and How It Was Built," *Medford Historical Register*, XII (July 1909), 49-67.
- "Wood's Dam and the Mill beyond the Mystic," *Medford Historical Register*, XII (January 1909), 13-20.
- Massachusetts House Journal*
- Massachusetts Register and United States Calendar*, 47 vols. (Boston, 1801-1847).
- Massachusetts Statutes Private and Special*, 14 vols. (Boston, 1805-1882).
- Meade, R. K., *Portland Cement; Its Composition, Raw Materials, Manufacture, Testing and Analysis* (Easton, 1911).
- Mesick, J. L., *The English Traveller in America, 1785-1835* (New York: Columbia University Press, 1922).

- Meyer, B. H., editor, *History of Transportation in the United States before 1860* (Washington: Carnegie Institution of Washington, 1917).
- Meyer, Eduard, *Kleine Schriften zur Geschichtstheorie und zur Wirtschaftlichen und Politischen Geschichte des Altertums*, 2 vols. (Halle: M. Niemeyer, 1924).
- Mitchell, S. A., *Compendium of the Internal Improvements of the United States* (Philadelphia, 1835).
- Morison, S. E., *The Maritime History of Massachusetts, 1783-1860* (Boston and New York: Houghton Mifflin Co., 1921).
- Morse, Jedidiah, *The American Gazetteer* (Charlestown and Boston, 1804).
- *The American Geography* (Elizabethtown, N. J., 1789).
- *The American Universal Geography*, 2 vols. (Boston, 1793, 1796).
- National Cyclopaedia of American Biography* (New York: J. T. White and Co., 1933).
- Official Reports of the Canal Commissioners of the State of New York* (New York, 1817).
- Palfrey, J. G., *History of New England*, 5 vols. (Boston, 1858-1890).
- Parton, James, *Triumphs of Enterprise, Ingenuity and Public Spirit* (Hartford, 1871).
- Pasley, Major-General Sir C. W., *Observations on Limes, Calcareous Cements, Mortars, Stuccos, and Concrete; and on Puzzolanas Natural and Artificial; together with Rules Deduced from Numerous Experiments for Making an Artificial Water Cement Equal in Efficiency to the Best Natural Cements of England . . .* (London, 1847).
- Pearse, J. B., *A Concise History of the Iron Manufacture of the American Colonies up to the Revolution; and of Pennsylvania until the Present Time* (Philadelphia, 1876).
- Philips, F., *A General History of Inland Navigation; Foreign and Domestic . . .* (London, 1792).
- Plummer, Israel, *History of the Blackstone Canal* (Worcester, 1878).
- Poor, H. V., *Sketch of the Rise and Progress of the Internal Improvements, and of the Internal Commerce, of the United States, with a Review of the Charges of Monopoly and Oppression Made against Railroad Corporations* (New York, 1881).
- Potter, John, *A System of Practical Mathematics* (London, 1757).
- Poussin, Guillaume, *Travaux d'Améliorations Intérieures Projetés ou Exécutés par le Gouvernement Général des États-Unis d'Amérique, de 1824 à 1831* (Paris, 1834).
- Preble, G. H., *A Chronological History of the Origin and Development of Steam Navigation* (Philadelphia, 1883).

- Quincy, Josiah, *The History of Harvard University*, 2 vols. (Cambridge, 1840).
- Reid, Henry, *A Practical Treatise on Concrete, and How to Make it; with Observations on the Uses of Cements, Limes, and Mortars* (London, 1869).
- *The Science and Art of the Manufacture of Portland Cement* (London and New York, 1877).
- Ringwalt, J. L., *Development of Transportation Systems in the United States* (Philadelphia, 1888).
- Ripley, W. Z., *Main Street and Wall Street* (Boston: Little, Brown, and Co., 1927).
- Rules of Work of the Carpenters in the Town of Boston, The* (Boston, 1800).
- Saposs, D. J. [joint author], *History of Labour in the United States*, 2 vols. (New York: The Macmillan Co., 1921).
- Scudder, H. E., editor, *Recollections of Samuel Breck, with Passages from His Note-Books, 1771-1862* (Philadelphia, 1877).
- Secor, Joshua, editor, *A Treatise on Internal Navigation* (New York, 1817).
- Sewall, Samuel, *The History of Woburn, Middlesex County, Mass., from the Grant of Its Territory to Charlestown, in 1640, to the Year 1860* (Boston, 1868).
- Smeaton, John, *A Narrative of the Building and a Description of the Construction of the Edystone Lighthouse with Stone* (London, 1813).
- *Reports, Made on Various Occasions, in the Course of His Employment as a Civil Engineer*, 2 vols. (London, 1837).
- Smiles, Samuel, *James Brindley and the Early Engineers* (London, 1864).
- *Lives of the Engineers*, 4 vols. (London, 1862-1868).
- Smith, Adam, *The Wealth of Nations* (Everyman's Library edition, 1910).
- Smith, J. R., *Industrial and Commercial Geography* (New York: H. Holt and Co., 1922).
- *The Story of Iron and Steel* (New York, 1913).
- Spofford, A. R., "Lotteries in American History," *American Historical Association Annual Report* (1892), 171-195.
- Stark, George, "Frederick Stark and the Merrimack River Canals," *Granite Monthly*, IX (1886), 5-16.
- "Navigation of the Merrimack River," *Old Residents Historical Association*, III (1886), 291-308.
- Stuart, C. B., *Lives and Works of Civil and Military Engineers of America* (New York, 1871).
- Sullivan, James, *The History of the District of Maine* (Boston, 1795).
- *The History of Land Titles in Massachusetts* (Boston, 1801).

- *The Paths to Riches* (Boston, 1792).
- "Sullivan on Canals," *Massachusetts Mercury*, vol. XV (March 1800).
- Sullivan, J. L., and Disbrow, Levi, *Advertisement of a Proposition for Companies, to Supply the City of New-York with Rock Water, &c.* (New York, 1832).
- Sullivan, J. L., *The Answer of Mr. Sullivan, to the Letter, and Misstatements of the Hon. Cadwallader D. Colden, in His "Brief Exposition" of Himself as the Advocate of Monopoly* (Troy, 1823).
- *Demonstration of the Right to Navigation of the Waters of New York without the License of the Owners of the Monopoly of Steam and Fire . . .* (Cambridge, 1821).
- *Explanation by John L. Sullivan, of the Nature of Certain Grants to Him for the Use of Steam Boats on Connecticut River, and of the Nature of His Claims to Admission into the State of New-York with His Patented Improvements in Steam Boats* [New York?] 1818.
- *Letters First Published in the Boston Daily Advertiser* (Boston, 1818).
- *Remarks on the Importance of Inland Navigation from Boston by the Middlesex Canal and Merrimack River* (Boston, 1813).
- *A Report Descriptive of a Route for a Railroad from the Hudson through Paterson to the Delaware River and Thence to the Susquehanna . . .* (New York, 1831).
- Sullivan, T. R., *Sketches of the Lives of John L. Sullivan and Thomas Russell* (Boston, 1861).
- Swank, J. M., *History of the Manufacture of Iron in All Ages, and Particularly in the United States from Colonial Times to 1891* (Philadelphia, 1892).
- Taft, H. C., *Early Days of Railroadng* (Lowell, 1913).
- Tanner, H. S., *A Description of the Canals and Rail Roads of the United States, Comprehending Notices of All the Works of Internal Improvement throughout the Several States* (New York, 1840).
- Taussig, F. W., "The Iron Industry in the United States," *Quarterly Journal of Economics*, XIV (1900), 143-170, 475-508.
- Thoreau, H. D., *A Week on the Concord and Merrimack Rivers* (Boston and New York, 1906). [First published, 1849.]
- Thurston, R. H., *A History of the Growth of the Steam Engine* (New York, 1878).
- Tracts on Canals*, Harvard College Library; Baldwin Library, Massachusetts Institute of Technology; Massachusetts State House Library.
- Transcript of Epitaphs in Woburn First and Second Burial Grounds* (Woburn, 1890).
- Usher, A. P., *An Introduction to the Industrial History of England* (Boston and New York: Houghton Mifflin Co., 1920).

- Van Metre, T. W., *An Outline of the Development of the Internal Commerce of the United States* (Baltimore, 1913).
- Vicat, L. J., *Practical and Scientific Treatise on Calcareous Mortars and Cements, Artificial and Natural* (London, 1837).
- Vose, G. L., *Notes on Early Transportation in Massachusetts* (New York, 1885).
- *A Sketch of the Life and Works of Loammi Baldwin, Civil Engineer* (Boston, 1885).
- Warden, D. B., *A Statistical, Political, and Historical Account of the United States of North America; from the Period of Their First Colonization to the Present Day*, 3 vols. (Edinburgh, 1819).
- Weeden, W. B., *Economic and Social History of New England, 1620-1789*, 2 vols. (Boston and New York, 1890).
- Whitford, N. E., *History of the Barge Canal of New York State* (Albany: J. B. Lyon Co., 1922).
- *History of the Canal System of the State of New York together with Brief Histories of the Canals of the United States and Canada*, 2 vols. (Albany, 1906).
- Winsor, Justin, editor, *The Memorial History of Boston, Including Suffolk County, Massachusetts, 1630-1880*, 4 vols. (Boston, 1881-1883).
- Winthrop, James, "Biographical Memoir of the Honourable James Sullivan, Esq.," *Collections of the Massachusetts Historical Society*, Second Series, I (1838), 252-254 (1814).
- Wood, F. J., *The Turnpikes of New England and Evolution of the Same through England, Virginia, and Maryland* (Boston: Marshall Jones Co., 1919).
- Wright, C. D., *History of Wages and Prices in Massachusetts, 1752-1883; Including Comparative Wages and Prices in Massachusetts and Great Britain: 1860-1883* (Boston, 1885).



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