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THE

WATER POWER

AT THE

GREAT FALLS OF THE POTOMAC,

BY

M. C. EWING,

CIVIL ENGINEER.

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The Proprietors of the water power afforded by the Potomac river at the Great Falls, in Fairfax county, Virginia, are so fully impressed with the extraordinary capacities and advantages this property presents for extensive manufacturing and milling operations, that they deem it unnecessary to add any thing to the report of the civil engineer, Mr. Ewing, which is hereto appended. They offer the entire property for sale, but would rather dispose of a controlling interest in it, upon very moderate terms, to men of capital and enterprize, than part with the whole of it.

Since Mr. Ewing's survey was made, the surrounding country has been greatly improved by the settlement within it of a great number of respectable farmers from the State of New York; and the Proprietors have purchased a fertile island situated immediately above the Falls, to serve as an extension of the wing dam mentioned in his report. This island contains about fifty acres, and is represented on the annexed map.

The canal proposed by Mr. Ewing for the purpose of embracing nearly the whole water power of the river, is represented on the map by the strong black line; that constructed and used for navigation by the old Potomac Company, by the dotted line. This canal is a mile and a quarter in length, its embankments have become consolidated by time, and the work is in such preservation that it can, at a very trifling expense, be made to supply a number of large mills.

Liberal charters are readily obtained from the Legislature of Virginia, by companies wishing to engage in manufacturing business, and the laws of the State are good and the taxes light.

Persons wishing to purchase will please apply to Commodore Jones, residing near the Falls property, or to William A. Bradley, or John Marron in Washington, D. C.

June 5th, 1845.

REPORT.

CITY OF WASHINGTON, *October 8th*, 1839.

GENTLEMEN: I have the honor herewith to submit the results of my examination of the Great Falls tract on the Potomac river, accompanied by a map shewing its position, size, and topography, with a plan of the town of South Lowell, and profile for the proposed improvement there by canal; also a general map on a smaller scale to exhibit the connection of the tract with tide water.

This tract, formerly in possession of Albert Fairfax, covers the western shore of the Potomac from above the rapids of the Great Falls to $1\frac{1}{2}$ miles below the fall, contains 963 acres, includes the entire canal of the old "Potomac Company," constructed for the passage of boats around the falls, and embraces a fall in the river of $77\frac{1}{2}$ feet.

With a view to the use of this water for milling and manufacturing purposes, I have levelled and surveyed by several routes through the tract. The strong blue line shewn on the map I would recommend for the location of a canal deriving its supply of water from the river above the falls, the water concentrated upon the entrance of the canal by a wing dam formed by throwing stone upon the rapids.

The length of this canal will be $1\frac{7}{8}$ miles, depth 4 feet, water surface 40 feet, slopes $1\frac{1}{2}$ to 1; the cutting to canal bottom on this route at no place exceeds 13 feet depth, and is generally six to nine feet.

From the levels taken on the axis and cross sections, it appears that 95,000 yards of earth excavation will be required; 35,000 yards of rock excavation, and 18,000 yards of embankment. The prices for earth excavation there, with the required hauling, will be about 25 cents per yard; for the rock $1 10. These prices are the result of careful observation in this vicinity, and above the average of contractors' bids. A total cost, including 10 per cent. contingencies, is thus obtained of $68,475. An estimate that I should think entirely ample for the proposed construction.

Should a flight of locks be required at Glade Hill for the passage of boats the expense will be doubled, but locks seem unnecessary; boats can lay along the shore; lifting them for trade above the falls is not re-

quired; an inclined plane may be constructed, and the water of the canal carried off by a simple waste.

In the surveys made for the Potomac Company, and for the Chesapeake and Ohio Canal Company, I have seen no accurate guage of the quantity of water passing over these falls. The immense volume of water flowing in the Potomac valley furnished these canals with feeders more than ample for every purpose of navigation. As it is desirable, previous to any extensive improvement, to know the quantity that may at all times be commanded, I have made a series of experiments on the river, and especially at the *Little Falls*.

The area of the water way at the Little Falls is 2,040 square feet, the superficial velocity 68 feet per minute. In calculating the mean velocity it is necessary to consider a strong undertow below the fall at the chain bridge. The mean velocity is 48 feet per minute, and by reason of the undertow *the true mean velocity* is 56 feet per minute. The quantity running is therefore 114,240 cubic feet per minute. This is the result without the effect of tide, and at a very dry season in September, when there had been no rains for many weeks.

By the survey made 3 miles below a greater quantity seems to pass, and when we consider that there are no streams to materially feed the river between the Little and Great Falls, but on the contrary water is exhausted by the Chesapeake and Ohio Canal feeder, and by evaporation, the above amount, 114,240 cubic feet per minute, is a moderate estimate of the water passing the Great Falls.

The application of water to mills is made in such various ways, the wheels and their diameters, the overshot, undershot or breast-wheels, exhaust water under such different circumstances, that I will simply notice one mill in this neighborhood. There are 3 14-feet diameter overshot wheels, driving 8 sets of burrs of 5 feet diameter; the exhaustion of water is from 6 to 800 cubic feet per minute; suppose an increased power requisite, say 1,000 cubic feet per minute?

The wing dam at the entrance of the canal may be built to turn the entire river, if necessary, into a canal of proper construction, but by using 50,000 cubic feet of the water in such a canal as the one proposed, there will be a supply for 50 mills on the first level, and by using the water three times on the same race, (it may be used four times,) there is a full power for 150 mills.

The above guaging and contrast with the exhaustion is merely to shew how ample is the supply at all seasons.

The route traced by the red dotted line may be constructed and form a branch of the main canal; mill races may run thence to many points on the shore where there are eligible sites for building.

At the terminus of the main canal, where it follows the side cutting round Glade Hill, the bottom of the canal is 22 feet above the table of land immediately east, and here are some of the finest building sites. The same races may be applied to mills near the Bluff, and a third use of the same water on or under the Bluff.

Difficult creek, which runs along the southern boundary of the tract, is a never failing stream of 1,000 to 2,500 cubic feet per minute; the profile shews its extraordinary fall or rapids below Walker's mill; this fall may be used for mills.

On Difficult creek, west of the point where the Leesburg turnpike passes, there is some fine bottom land, as also at the upper corner of the tract on the Potomac, the country back from the river bounding on the tract is richly cultivated and wooded, the eminence between the canal and river is clear and cultivated, and furnishes throughout good sites for residences. There is an abundance of fine timber about the middle of the tract, the position of a saw mill now in operation is shewn on the map, using the water of the old Potomac Company's canal. This company, however, never contemplated the extensive use of the falls for mills, having intended its use to suit the transportation along the river, and the canal has been abandoned, owing to the more perfect transportation furnished by the Chesapeake and Ohio Canal.

In 1840 the dam at the Little Falls feeder will be raised 1½ feet, to give the required depth of 6 feet in the Chesapeake and Ohio Canal, and for the Alexandria canal; the latter is in active construction, and will be finished during 1841, when there will be a slack water navigation from the Great Falls into the Little Falls feeder, and thence by canal to Alexandria without lockage. From Alexandria there is a free navigation to sea for ships of the first class.

I have the honor to be, gentlemen,

Your obedient servant,

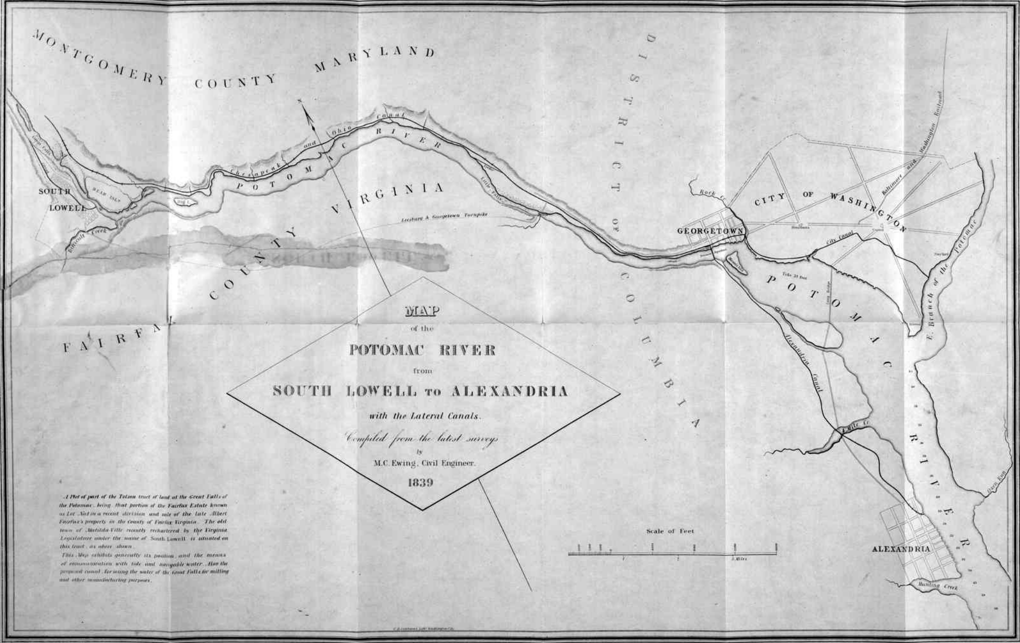
M. C. EWING,

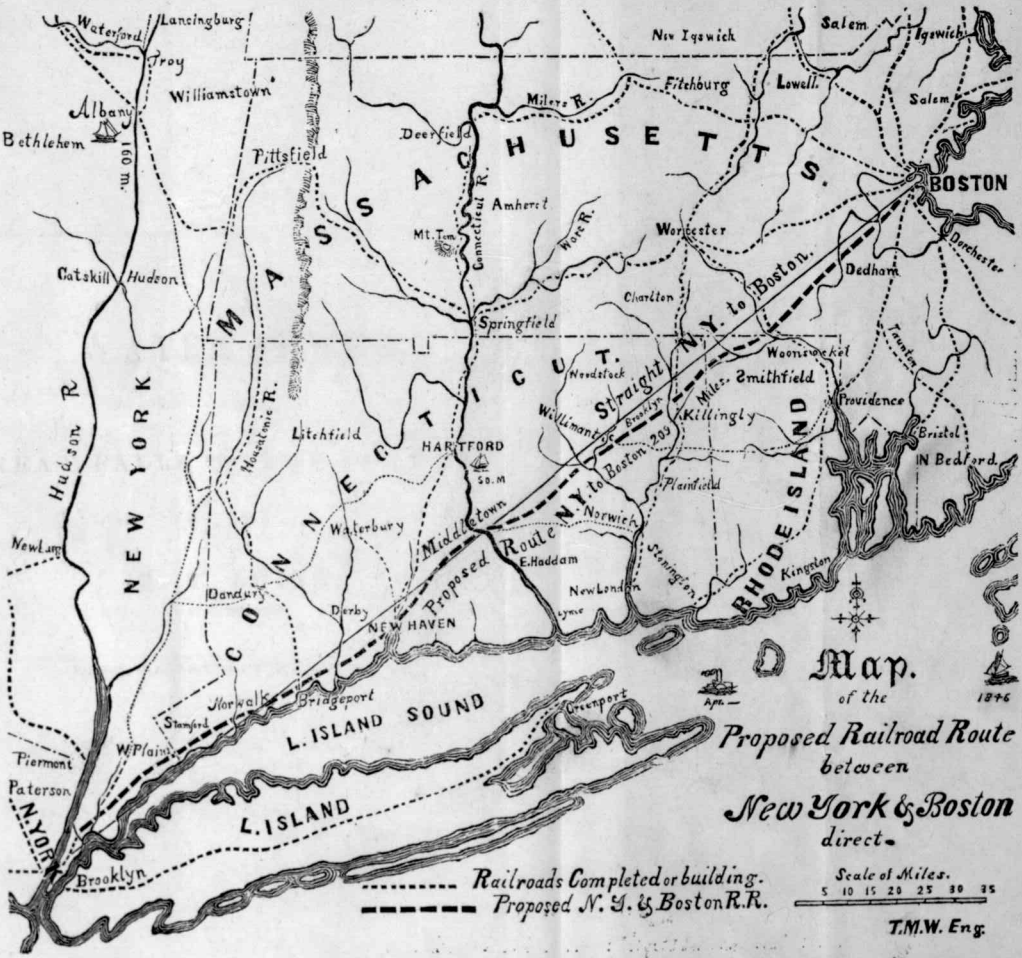
Civil engineer.

To Com. THOS. AP C. JONES,

HALL NEILSON, Esq.

WILLIAM A. BRADLEY, Esq.


MAP
of the
POTOMAC RIVER
from
SOUTH LOWELL to ALEXANDRIA
with the Lateral Canals.
Compiled from the latest surveys
by
M.C. Ewing, Civil Engineer.
1839
MONTGOMERY COUNTY MARYLAND
FAIRFAX COUNTY VIRGINIA
DISTRICT OF COLUMBIA
CITY OF WASHINGTON
GEORGETOWN
ALEXANDRIA
SOUTH LOWELL
POTOMAC RIVER
Chesapeake and Ohio Canal
Leesburg & Georgetown Turnpike
Rock Cr.
City Canal
Baltimore and Washington Railroad
E. Branch of the Potomac
Alexandria Canal
Long Bridge
4 Mile Cr.
Hunting Creek
Difficult Creek
Bear Isl.
Little Falls
Scale of Feet
A Plot of part of the Tolson tract of land at the Great Falls of the Potomac, being that portion of the Fairfax Estate known as Lot No.1 in a recent division and sale of the late Albert Fairfax's property in the County of Fairfax Virginia. The old town of Matilda-Ville recently rechartered by the Virginia Legislature under the name of South Lowell is situated on this tract, as above shown.
This Map exhibits generally its position, and the means of communication with tide and navigable water. Now the proposed canal, for using the water of the Great Falls for milling and other manufacturing purposes.


Waterford
Lansingburg
Troy
Williamstown
Albany
Bethlehem
160 m.
Pittsfield
Deerfield
Connecticut R.
Amherst
Mt. Tom
Ware R.
Worcester
Catskill
Hudson
Springfield
Charlton
Straight N.Y. to Boston.
Dedham
Dorchester
BOSTON
Salem
Ipswich
New Ipswich
Fitchburg
Lowell
Salem
Milers R.
MASSACHUSETTS.
Hudson R.
NEW YORK
Housatonic R.
Litchfield
HARTFORD
CONNECTICUT.
Newstock
Straight N.Y. to Boston.
Williamantic
Brooklyn
Killingly
Smithfield
Providence
Woonsocket
Taunton
Bristol
N. Bedford
Plainfield
Norwich
Middletown
Waterbury
Proposed Route N.Y. to Boston 209
E. Haddam
Stonington
Kingston
RHODE ISLAND
Newlon
Danbury
Derby
NEW HAVEN
Lyme
Newlondon
Norwalk
Bridgeport
Stamford
Greenport
L. ISLAND SOUND
W. Plains
Piermont
Paterson
NY
L. ISLAND
Brooklyn
Map. of the 1846
Proposed Railroad Route between New York & Boston direct.
Railroads Completed or building.
Proposed N. Y. & Boston R.R.
Scale of Miles.
5 10 15 20 25 30 35
T.M.W. Eng.