



DOCUMENT NO. 88.

BOARD OF ALDERMEN,

APRIL 23, 1838.

The Committee on Roads and Canals, to whom was referred so much of the report of the Water Commissioners, as relates to the construction of the Aqueduct across the Harlaem River, presented the following report thereon, which was laid on the table and directed to be printed.

THOMAS BOLTON, Clerk.

The Committee on Roads and Canals, to whom was referred so much of the Water Commissioners' report as relates to the carrying the aqueduct across the Harlaem River, for the purpose of bringing water to this city, and also the remonstrance of the owners of property in that neighborhood, against injuring the navigation of the river, respectfully

REPORT:

That the plans proposed by the Commissioners contemplate

crossing the river in two modes ; one plan is by a high bridge, sufficiently high to allow vessels to pass under the same, and to preserve, uninjured, the navigation of the river. This bridge would be required to be 1,450 feet in length, and to be elevated 163 feet above the rock bottom, and 138 feet above the tide. It is contemplated by them to erect the same on piers, with arches varying from 50 to 80 feet in width. The portion of the bridge over the stream would be composed of six arches, each eighty feet in width, and the residue being on the land of a smaller size. The estimated expense of this bridge with the aqueduct, as made by the Engineer at this time, is \$935,745. If pipes should be substituted instead of the aqueduct, the cost might be reduced, as your Committee are informed by the Engineer, about \$35,000 ; so that the cost of the high bridge would be \$900,000.

The other plan, proposed by the Water Commissioners, is to carry the aqueduct across by what they term an inverted syphon.

By this plan they proposed to leave open an arch of 80 feet, resting on piers, and in height 50 feet at one side of the water. This arch is placed immediately adjoining the New York shore, where there is now about two feet of water, and where, as the Commissioners think, the current will be so strong as in a very short time to carry away the mud now deposited at the bottom of the river, and leave sufficient depth of water to pass through, with such vessels as might be used for navigating the river. The remainder of this structure they propose to form by filling up across the river, an embankment of stone, by casting them into the river until a sufficient bed shall be formed to support the foundation walls of the aqueduct. The estimated cost of this plan is \$426,027. The Water Commissioners, in their report, submitting these two plans, give a preference to the latter or the plan by an inverted syphon or pipes, as preferable to the high bridge, for seven reasons :

1. The difference in the cost.

2. That the same objects will be obtained by the low bridge as that of the high one, at one half the expense.

3. Because the experience in sinking piers in mud and building them to so great a height is very limited, and if badly built, the injury would be very serious to the aqueduct.

4. The water in the aqueduct would be more exposed to frost, while the iron pipes would be protected entirely from frost by being covered with earth.

5. The leakage of the aqueduct would be injurious to the masonry, while it would be entirely avoided by the pipes.

6. The time necessary to complete the high bridge would be more than for the low one.

And lastly, if the river should be made navigable by removing the obstructions, that the archway proposed by them would admit the passage of vessels for every useful purpose, and that more would be unnecessary.

The Commissioners, however, after expressing this opinion, admit that so far as architecture is to be considered, the high bridge has the preference, and that if the Common Council shall direct the construction of the high bridge, the aqueduct shall be so constructed.

Since this report was submitted, the Commissioners have altered the latter plan, by enlarging the arch to the width of 120 feet, and the height of 65 feet, which causes an addition to the expense of \$50,000, making the estimated cost \$476,000.

Your Committee have felt duly sensible of the importance of the subject referred to them, both on account of the expenditure of money involved, and the interests of the City, as well as of the proprietors of land in the neighborhood of the proposed bridge, as to the proper decision of this question. They have had several interviews with the Water Commissioners, as well as with the Engineer, and such other persons as they were able to procure the attendance of. They think that the public good would have been promoted, had they been authorized to obtain the opinion of some scientific gentlemen on this sub-

ject, whose views would have greatly aided the Committee in arriving at a correct decision of this matter. They were not however authorized to incur any expense, and they have been compelled to come to a decision, in regard to it, from such information as they have been able otherwise to procure.

In order to arrive at a just conclusion, it is important to inquire into the capacity of the stream which is to be crossed by this aqueduct.

Harlaem River runs between the main land, and the Island of New York on the north-easterly side. Its extent is about seven miles from the North to the East River. It varies in depth below M'Comb's Dam, from 20 to 30 feet, and above the dam, owing probably to the deposits of mud, in consequence of former interruptions to the current, by the dam, its depth is from 21 to 10 feet.

A late survey of the river made by order of the Common Council, now in the Street Commissioner's Office, shows the depth of this river throughout. Formerly this river was navigated by vessels of considerable size up to the bridge which crosses it at the manor of Fordham, and was interrupted by the erection of M'Comb's Dam. The proposed removal of these obstructions from the river, either by the Corporation, or by a chartered Company, will restore, in a great degree, the navigation; and it is now to be decided by the Common Council, whether they will not only refuse to aid in restoring this navigation, but place in the river an obstacle which hereafter would be insurmountable, and must end all hopes of ever preserving the river for such purposes.

It is not to be supposed that the owners of land lying on the river above the proposed bridge will quietly submit to a measure which must be very detrimental to their interest, and very much decrease the value of their property, and they doubtless will resort to all legal measures to preserve the navigation of this river from injury.

In the original estimate, submitted to the people, both places were spoken of by the Commissioners. In the re-

port of the Water Commissioners, submitted to the people, in 1835, and on which they voted for this project, the Commissioners say, a third plan was to substitute inverted syphons in the place of aqueducts, in crossing Harlaem River and the Manhattan Valley. The estimates are founded upon the principle, that the water is to be taken at a certain determined heighth on the Croton, and delivered at another determined heighth in the city; the quantity to be delivered being also assumed. Upon this data, with other collaterals stated by the Engineer, he estimates the cost of crossing the river by aqueducts, at \$415,650 00

That of a syphon of 4 thirty-inch pipes 364,280 90

Difference in favor of the syphon \$51,370 00

In this plan the whole estimated expense of the aqueduct, including all the bridges and aqueducts, was fixed by them at \$4,150,709 71, and the expense of distributing the same by pipes, was fixed at \$1,261,627 01; making in all the sum of \$5,412,336 72. Of this amount, \$415,650 was stated as the estimated cost of the high bridge, and the Commissioners add, that the use of the syphon at Harlaem River, will save in the expense, \$44,605 50. (See page 347 of their report.) In the report of the Committee, directing the matter to be submitted to the people, in March, 1835, it is stated as follows:

The estimated expense of bringing the Croton to
Murray Hill, is about \$4,250,000

To this is to be added the estimated expense of
laying the water pipes in the city, to distribute
the water 1,262,000

Total expense \$5,512,000

This same bridge which, when the subject was submitted to the people for approval, was estimated to cost \$415,650, is

now estimated to cost \$935,745. It is proper to remark that these estimates are made by different Engineers, and that the Water Commissioners found their opinions on the reports of those employed by them for that purpose; but it is at the same time worthy of consideration, whether, with such discrepancy in the estimates between Mr. Douglass and Mr. Jervis, the Engineers, it would not be well to make more thorough and satisfactory estimates before commencing the work.

Of the propriety of preserving the navigation of this river, and the rights of those interested in it, there can be but one opinion, and if the adoption of the low plan, or the inverted syphon, would deprive individuals of such rights without compensation, it ought to be abandoned. Your Committee are of opinion that such would be the case. The proposed arch in the low plan, would not be sufficiently high to allow the passage of sloops, and would therefore only answer for vessels without masts. If such a structure should be placed over the river, it doubtless would cause a constant deposit above the bridge, and the consequence would very naturally be, that in a few years, the whole of the bed of the river above the bridge, would be changed to a mud flat, and navigation there entirely ended. A river of the size and depth of the Harlaem River, would, in other places, be considered a stream of too much value to be wantonly destroyed, and when we consider the peculiar situation of this city, its rapid growth and population, and we look forward to the time when the shore of this river will be thickly inhabited, the importance of at least avoiding injury to the river, must be apparent to every unprejudiced mind. This question is not to be decided by a mere reference to the present situation of the city, or to its present population. If the low structure should be adopted and carried out, the injury to the river is permanent and can never be removed; and those who are to succeed us in after years, can only express their unavailing regrets at the mistaken policy which would sacrifice the interests of this part

of the island to avoid a portion of the necessary expenditure consequent on retaining this stream. It would be an act of misplaced economy on the part of the Corporation, producing an injury which could never be repaired.

Various other reasons might be adduced why the plan of filling up the river is unadvisable, but the Committee will only notice the reasons given by the Water Commissioners for preferring this plan.

The first reason as to the cost, is not one which should influence the decision of this question. In an expenditure of ten or twelve millions, for what was originally contemplated to cost four and a half millions, it is neither just nor equitable to sacrifice the rights and interests of others, and by a departure from the original plan, destroy this river to save 400,000 dollars.

The second reason advanced by the Commissioners is, that all the purposes will be attained by the low bridge, which can be by the high one.

The Committee would refer to the former part of their report as an answer to this proposition. The navigation would be obstructed for every thing except boats and vessels without masts, and the depth of the river would be continually decreasing until it finally becomes filled up, and all further navigation through it be at an end.

The third reason is, the want of experience in constructing the high bridge. Your Committee do not think this a satisfactory reason against undertaking the work; if there is a want of experience in those employed by the Commissioners in working on the Croton Aqueduct, it certainly is not to be supposed that men of competent abilities and experience can be found to undertake and complete this work. The London Bridge, the bridge over the Potomac, as well as several other works in our own country of a similar character, all required as much experience and skill as this work, and your Committee do not think that this can form any reasonable objection

to the high bridge, if it should be adopted by the Common Council.

At a late interview with the Engineer, Mr. Jervis, he stated to your Committee, that "he did not consider that there was any serious difficulty in the erection of the high bridge, nor did he believe that the danger from the climate, in injuring the work, was as great as had been represented. That he believed the work might be completed, and that it might be so constructed as to withstand the ordinary changes of climate in this country. That from its height it would of course be more exposed than the other proposed structure, and might in the course of time, require extensive repairs." The mere possibility of having to repair this bridge at the expiration of 80 or 100 years, is not, in the opinion of the Committee, any argument at all that should weigh against the propriety of preserving the navigation of the river. The one, if it needs repairs, can be repaired at pleasure, the river, if destroyed by building the low bridge, can never be restored.

The fourth and fifth reasons are, that the aqueduct would be more exposed to the frost, than the pipes on the low plan, and would leak, and thereby injure the masonry. This difficulty is easily obviated by substituting pipes in the place of the aqueduct over the bridge, if it should be thought best, and would be a saving of nearly \$40,000 in the expense, according to the estimate of the Engineer. Or if an aqueduct should be thought best, it can, by the mode proposed by the Water Commissioners, be lined with iron plates, so as to make it perfectly tight. All the benefits anticipated by the Commissioners from the pipes, can be obtained by substituting them over the aqueduct, and thereby the objection as to frost and leakage will both be obviated. If, however, there is any force in the argument as to frost and leakage, and the consequent interruption of the aqueduct, the same reasons should apply, with equal force, to the Sing Sing Bridge, which is constructed in the same manner, and which, if interrupted for repairs, would

produce the same inconvenience to the city from interruption of the water. See p. 94, Doc. 55, Commissioners' Report.

The 6th reason offered in favor of the low bridge, is the time necessary to complete the high bridge. The Commissioners have not stated the additional time required to complete the high bridge beyond that for building the low bridge.

It may be true that the high bridge might require another year for its completion, beyond that required for the low bridge; but it must be remembered that a very considerable time is to be occupied in building the necessary works on this island, both reservoirs and aqueducts; and your Committee think that the bridge, whichever plan should be adopted, can be finished as soon as it will be required to supply the other parts of the work. But even if it should produce a delay of a year, your Committee will only use the language of the Commissioners themselves, on page 365 of their last report. "A work of this magnitude and importance, which is intended to last for ages, must not have its permanence and safety jeopardized by a too rapid execution of its parts;" and the same reason should apply to the inconsiderate adoption of any measure which would produce an irreparable injury.

It is also doubtful whether if time would not be lost by adopting the low plan. The Commissioners would at once be involved in law suits, and probably be restrained by injunction from proceeding with the work, until the rights of the parties and the legality of the proceedings of the Water Commissioners could be tested by a decision of the Supreme Court of the United States. The time thus lost would more than equal the additional time required for the construction of the high bridge, and would be much better spent in work to preserve the navigation of the river, than in a legal controversy to take away the rights of others.

The seventh and last reason of the Commissioners has been referred to, and is included under the second. In the opinion of the Committee, if the river should be made navigable to the North River, the proposed arch would not, in any way,

afford sufficient facility for the navigation that would pass through the same; and the rapidity of the current through the archway, for at least half of the time, would be such as to make it dangerous to pass through, even if the height was sufficient.

These are all the reasons which the Commissioners have given, why the low bridge should be adopted; and your Committee do not think that any of them afford any arguments against the high bridge, with the exception of the difference in expense, which has heretofore been noticed.

It is proper, also, here to notice other parts of the plan of the Water Commissioners, as connected with the upper part of the island. The first reservoir, which is called the receiving reservoir, is placed south of 86th street; and until the water reaches this place, it is not proposed, in the plan as reported, to draw off any water for the use of that portion of the city.

This would then afford no benefit to the upper section of the island, until an alteration should be made in the plan, and a new reservoir erected, at some other spot, above 86th street; a measure not contemplated, or even suggested, by their report.

At the same time, the debt for the construction of the Croton Aqueduct, is a debt charged upon the whole city. The interest which will annually become due on the stock issued must, as soon as the premiums received on the sale of the stock are exhausted, be raised by tax, as no prudent Common Council would determine to continue annually adding to the principal of the debt the sum of \$500,000 for interest, until the aqueduct should produce revenue sufficient to defray it. If such tax should become necessary, it must be very apparent that the upper part of the island would be taxed proportionably for the annual interest of this project, while it could not derive any corresponding benefit from it. It is not for the Committee to pass at this time on the propriety of this mode of taxation, they only refer to it here as showing that this expenditure will press more heavily on the upper part of the island than the

lower part, because they will be compelled to pay for that which is productive of no benefit to them, while the lower part of the city will receive its supply of water, both for use and for the extinguishment of fires from it. It is true that whatever benefits one part of the island is conducive to the general advantage of the whole ; but this is an individual benefit, not at all equal to the amount of taxation.

While such is to be the operation of the debt incurred in constructing the Croton Aqueduct, in reference to the distribution of the expenditure for the same, it appears to the Committee that it would be improper and unjust towards the northern part of this island in addition thereto, to add injury by interfering with or destroying the navigation of the Harlaem River.

Though this stream may not be considered at the present time of much value, on account of the small number of vessels which navigate it, yet it must be remembered that one and the principal reason is the obstruction already existing to the navigation thereof.

As the Committee have heretofore remarked, this question must not only be decided with reference to the interest of the present generation, but as to that of posterity—the time will come when that portion of the island will become thickly inhabited, and then, if not before, the value of preserving a river of the depth of the Harlaem River, will be known and admitted.

It has been proposed to build a pier in the North River, for the purpose among others of providing a basin for the smaller craft coming to the city, at an estimated expense of four or five millions of dollars. At some future day this river, without any other expense than that of removing the obstructions now existing, would form one far superior in extent, while the cost would not exceed 100,000 dollars.

From these and other reasons which might be offered, the Committee have come to the conclusion that it would not be expedient to adopt the plan recommended by the Commissioners, of the low bridge with one arch over the river.

Though the immediate expense would be less, yet the measure would be one far more injurious to the city, and particularly to the upper portion of the island, than the additional expense, which might be incurred in preserving the navigation of the river unimpaired. The Committee have found more difficulty in adopting a plan to recommend, than in deciding on the inexpediency of the first plan proposed.

With a view of reducing the expense of this bridge, they have requested from the Engineer, Mr. Jervis, a plan somewhat partaking of both plans referred to by the Water Commissioners, a draft of which is herewith submitted. By this plan it will be seen that about 200 feet in width of the river would be preserved, but the height of the arches is not sufficient for ordinary sloops to pass through. The additional expense attending it would be about 100,000 dollars, and it does not receive the approbation of Mr. Jervis. In his opinion as expressed to the Committee, "if the navigation of the river is to be preserved, no modification of the low bridge would answer. The low bridge was submitted without reference to the navigation, and the high bridge only would allow masted vessels to pass through." He also objects to the plan last referred to as being very objectionable in its architecture, while there is not enough saved to warrant the adoption of it.

It appears to the Committee, that it is necessary that openings, of at least 200 or 300 feet in the whole, should be left, whatever plan may be adopted; and that the arches should be sufficiently high to allow of the passage of sloops under them; and if no other plan can be devised, by which the expense can be reduced and the navigation of the river preserved, they are of opinion that the high bridge should be adopted.

They have not referred to the proposition contained in the remonstrance, to construct the aqueduct so as to allow of ordinary travel over the same; the additional expense which it would cause being nearly one-third of the whole expense of the construction; and the additional weight that it would add

to the aqueduct, far exceed any considerations in favor of it. If a bridge should hereafter be required for travel in that neighborhood, it can be constructed for a very small portion of what would be required for the enlargement of the aqueduct, so as to admit of its being used for a viaduct.

The Committee, in conclusion, offer the following resolutions:

Resolved, That it is inexpedient to adopt the plan proposed by the Water Commissioners for crossing the Harlaem River by means of a low bridge, or syphon.

Resolved, That the Common Council hereby request the Water Commissioners, in constructing the aqueduct across Harlaem River, to leave at least three hundred feet of the channel of the river open, excepting where piers may be necessary to support the aqueduct, and that they build the bridge over the river in such a manner as to allow the free passage of sloops; and unless the Commissioners shall propose to the Common Council some other plan less expensive in the construction, and embracing the foregoing propositions, that they be requested to adopt the plan proposed by them for the high bridge across the Harlaem River.

D. P. INGRAHAM,
JOHN V. GREENFIELD,
A. V. WILLIAMS,
JOSEPH N. BARNES,
J. WESTERVELT.