HISTORY OF

Buffalo Library

A GREAT FAILURE.

BEING A REVIEW OF THE BUFFALO CITY WATER-WORKS SINCE THEY BECAME THE PROPERTY OF THE CITY BY PURCHASE; INCLUDING A STATEMENT, TAKEN FROM THE PUBLIC RECORDS OF THE CITY, OF THE CONSTRUCTION OF THE TUNNEL AND INLET PIER, AND OF THE CHANGES MADE IN THE PLANS OF THE SAME FOR THE BENEFIT OF THE CONTRACTORS AND AGAINST THE INTERESTS OF THE TAX-PAYERS; ALSO ARTICLES PRINTED IN THE CITY NEWSPAPERS, AND LETTERS WRITTEN BY CITIZENS BEARING ON THE FAULTY METHOD OF SUPPLYING WATER TO THE PEOPLE OF THE CITY OF BUFFALO, N. Y.

COMPILED BY THOMAS DARK, SR.

BUFFALO, N. Y.
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HISTORY OF

A GREAT FAILURE.

For about twenty years I carried on business in England as a contractor of public works, which consisted of building dwelling-houses, bridges, water-works, sewers and various other public works.

In the year 1857 I had made up my mind to emigrate to Australia, but in conversation with some gentlemen friends who knew considerable about the United States of America, they persuaded me to go to America, and in the early part of January, 1857, I left Old England with two of my sons, George and Thomas, who were then boys, and after a very stormy voyage of sixty-two days on the Atlantic Ocean, we landed in New York. After stopping in the City of New York and in New Jersey for a few days, we took a train on the Erie Railroad for Buffalo, arriving in the city on April 1, 1857.

Being a stranger, having no acquaintances in Buffalo, I remained in the city but a few days, then went across to Fort Erie and took the train for Brantford. There I met Mr. Whitehed, who had the contract for extending the Brantford Railroad, and I tried to make a contract with him to build some bridges upon this road, but did not succeed, and after a few days I returned and settled down to try my luck in the City of Buffalo.

My first contract with the City of Buffalo was that of building the stone culvert across Louisiana street, from Little Buffalo creek to the Ohio basin, in the summer of 1857; and from that time I have been carrying on the business of contractor of public works in the City of Buffalo and various other cities in the United States and Canada. But I have always made Buffalo my home and felt an interest in the improvements made and in the prosperity and growth of the city.

While I carried on business in England, I had several years' experience in the construction of water-works on a large scale.

Every contractor of large works in England has to see to the engineering and setting out of the work according to the plans and specifications made by the chief engineer of such works, or he must employ a civil engineer to do so for him, and most contractors keep their own civil

engineer, but in all my contracts I always did this part of the work myself.

In the year 1859, the Buffalo City Water-works Company, by its President, Albert H. Tracey, Esq., contracted with me to cut through the embankments of the two reservoirs on Prospect hill and lay in two twenty-inch supply mains—one into each reservoir.

I also at the same time ran the levels for laying the twenty-inch main from the reservoir to Pennsylvania and North streets for the company, the company laying the main from the reservoir to Main street at the same time.

From that time on until the City of Buffalo purchased the water-works from the Buffalo City Water-works Company, in 1868, I did considerable work for the company at various times under the direction of Mr. Tracey, and after his time, under the direction of Henry W. Rogers, Esq., who succeeded Mr. Tracey as President of the Buffalo City Water-works Company.

Having had many years' experience in the construction of water-works and the mode of supplying pure water to citizens for domestic use, while carrying on business in England, I will try to describe what I know of the novelty of the construction of the Buffalo water-works and the crude way in which the water has been and still is being supplied to the citizens of Buffalo for domestic use since I became acquainted with the works in 1859.

I have transcribed the complaints made at sundry times by the press and the people of the City of Buffalo concerning the impurity of the water, and I propose to set down my own personal observations of the water supply by the Buffalo City Water-works Company from 1859 to 1868, when the city purchased the water-works; also what I know of the enlargement of the works after the city purchased the same from the company, and of the mode of supplying the water to the citizens up to the present time.

Being awarded the first premium for the plans and specifications for the enlargement and improvement of the works according to the advertisement made by the Water Commissioners, I will show how, after the contract was let to construct part of the works, according to plans and specifications made by me, the whole plans and specifications were altered and set aside and the contractors were allowed to construct the work for their own profit without any consideration of giving an abundant supply of pure water to the city and without any regard for the pockets of the taxpayers.

It is well known to many of the citizens of Buffalo that the Buffalo City Water-works Company first constructed its works on the site of the pumping-station of the present city water-works.

It would seem that the location for constructing the water-works was selected without due consideration for securing an abundant supply of pure water, or consideration as to what the future growth of the City of Buffalo and its population might be. As the population increased, new streets were opened and graded, new sewers constructed, streets were paved, and receivers were constructed to carry off the surface water from the streets into the sewers, all of the main sewers then discharging into the Erie canal; and as the population increased south and east, the sewage of these districts was discharged into the Hamburgh canal. Every year the intolerable nuisance increased. The filthy water was discharged into the Erie canal and through the Black Rock harbor. The Bird Island pier embankment, which divides the Black Rock harbor from the Niagara river for a distance of several hundred feet up the river above the Bird Island pier inlet, allowed a large amount of the filthy water from the Erie canal to leak through into the Niagara river. The filthy water followed the stream along the embankment to the Bird Island inlet and through the tunnel to the pumps, and was pumped into the Prospect reservoirs to be distributed for domestic use. Every year the water supply became worse, and many complaints were made by citizens about the impurity of the water supply. At that time there were only the two Bolton and Watt pumping engines in use at the pumping-station. They were built when the works were first constructed. The two old engines were badly out of order, and the company had a new pumping-engine erected by the Shepard Iron-works Company. The supply of water at that time amounted to from ten to twenty million gallons per day, pumped into the Prospect reservoirs.

Sometime in 1867 Henry W. Rogers, Esq., who was then president of the Buffalo City Water-works Company, informed me that the company was negotiating with the Common Council to make a contract for supplying water to the City of Buffalo for a term of years. Mr. Rogers said if the company succeeded in making a contract satisfactory to the company, it would increase its capital and improve and enlarge the works.

But at the same time there seemed to be a great desire and anxiety among some members of the Common Council that the city should purchase the works, and have full control of the water supply of the City of Buffalo. This agitation was kept up for several months, and finally a resolution was adopted by the Common Council authorizing the city to purchase the water-works from the Buffalo City Water-works Company.

At a meeting of the Common Council, August 3, 1868, a communication was submitted, as follows:

The undersigned appointed to negotiate on the part of the city with the Buffalo Water-works Company for the purchase and sale of the works and franchises of said

company, respectfully report that they have performed the duty assigned them, and have received and deposited with the City Comptroller a deed of real estate, and said company have entered into a contract to transfer the personal property on the delivery of the bonds of the city in accordance with the resolution adopted by your honorable body on the 20th ultimo.

Respectfully submitted,

WM. F. ROGERS, *Mayor.*
R. D. FORD, *Comptroller.*
DAVID F. DAY, *City Attorney.*

Received and filed.

On August 17 the following communication was submitted to the Common Council:

The undersigned appointed to negotiate with the Buffalo Water-works Company for the transfer of the property and franchises of said company to the city on the basis of a resolution heretofore adopted by your honorable body, respectfully report that they have brought the negotiations to a close, and that the works have this day become the property of the city and are now under the control of the Water Commissioners. Bonds to the amount of $641,000 have been issued and paid to H. W. Rogers, Esq., President of the company, who was duly authorized to receive them, the city assuming the payment of sixty-four mortgage bonds issued by the company having some twelve years to mature, making the whole amount paid for the works $705,000. The transfer was made as if the sale had been effected on the first day of May last, the city receiving the revenue collected by the company since that date less the expense of running the works from May 1st to August 15th inclusive. These receipts and expenditures are as follows:

Receipts from May 1, 1868	$43,367.76
Expenditures to August 15, 1868	25,676.14
Balance due the city	$17,601.62

Among the items of expenditure is included the sum of $17,227.92 paid for fuel and which embraces the supply for the entire year, the company having made a very favorable contract for the same and for which the city receives the benefit, the amount due the city having been paid into the treasury.

Respectfully submitted,

W. F. ROGERS, *Mayor.*
R. D. FORD, *Comptroller.*
DAVID F. DAY, *City Attorney.*

On March 21, 1869, Ald. Newman, from the Committee on Water, reported in favor of the adoption of the following report:

That the Water Commissioners be, and they are hereby directed, to make and submit a specification for making plans and estimates for water-works for the City of Buffalo, to advertise six days in the *Express*, *Courier* and *Commercial Advertiser* of the City of Buffalo, and in one English newspaper of each of the following named cities: New York, Boston, Philadelphia, Chicago, St. Louis and Cincinnati, for such plans and estimates, and to offer a premium of $2,000 for the best and adopted plan, $1,000 for the

second best, and $500 for the third best plan, together with the feasibility of using the current of the Niagara river by means of a water wheel or other device as a motive power for operating pumps for supplying the city with water, and the cost of the same.

Adopted.

On April 5, 1869, Ald. Newman reported in favor of the adoption of the following resolution:

That the Water Commissioners be, and they are hereby directed, to have printed in convenient form for circulation fifty (50) copies of said specifications as herewith presented, and advertise for six days in the *Buffalo Morning Express*, *Buffalo Commercial Advertiser* and *Buffalo Daily Courier*, and in one daily paper in each of the following cities, viz.: New York, Boston, Philadelphia, Chicago, St. Louis, Cincinnati and Albany, the amount of premiums the city will pay for plans for improvements, and inviting water-works' engineers to send by mail for copies of description of improvements required.

Adopted.

The following are the specifications referred to:

OFFICE OF THE BUFFALO CITY WATER-WORKS,
BUFFALO, March 31, 1869.

Notice to Water-works' Engineers:

The City of Buffalo desires to make certain improvements in its w ter supply, and will pay premiums for plans and specifications in detail, accompanied by estimates of cost covering the propositions made.

For the plans and specifications that shall be approved and adopted by the Common Council of said city, the sum of $2,000.

For plans and specifications that shall be second in value, the sum of $1,000.

And for that which shall be deemed third in order of merit, the sum of $500.

All others besides those to whom premiums shall be awarded as above, shall be returned to their respective owners on or before the first day of August, 1869.

The requirements to be considered and investigated, and for which plans are invited, are:

First—To obtain a supply of pure water—The present supply is from the Niagara river through a tunnel excavated through rock underneath the Erie canal and Black Rock harbor, and lined with brick cylindrical lining four feet internal diameter for a distance of about three hundred and forty (340) feet to the outside of Bird Island pier, the inlet to the said tunnel being connected by masonry with said pier.

The plans submitted for improvement at this point are to consider the question of extending the present tunnel farther into the river, locating a pier at its termination, with controlling gates, etc., and for the inlet, or for constructing a new tunnel of larger dimensions from the pumping-well of the engine-house to a pier as above indicated, in the river, at such distance—probably about six hundred and fifty (650) feet—as to avoid the flow of the Buffalo river water in time of freshet. Any other plan than the above, which an engineer may think proper to present for procuring a supply of pure water, may be submitted.

Second—Motive Power—The works have now steam power equal to supply ten million (10,000,000) gallons in twenty-four hours, with a reserve of an equal amount.

The plans in relation to power are to consider the feasibility of using the flow of the Niagara river for this purpose. Opposite the works and within four hundred (400) feet, the current of the river is at the rate of six to seven miles per hour, and plans are invited for using this power for pumping—say twenty million (20,000,000) gallons in twenty-four hours, and for carrying pumping mains across Black Rock harbor and the Erie canal securely and without obstructing navigation.

The depth of water in said harbor and canal varies from eight to twelve feet, with a rock bottom.

Provisions are likewise to be made for ice defences, as very large and heavy fields of ice from the lake pass down with the rapid current of the river to give it force; likewise large quantities of anchor or slush ice are to be provided against.

Third—Reservoirs—The present reservoir is less than half a mile from the engine house, has a capacity of about thirteen millions (13,000,000) gallons, the water line is eighty-eight (88) feet above average river level, and its elevation will supply from three-fourths (3-4) to five-sixths (5-6) of the requirements of the city.

The portion of the city to be supplied requires an additional elevation of not less than forty (40) feet, and will not probably use more than from one-sixth (1-6) to one-fourth (1-4) of the entire supply.

Land for a reservoir of sufficient capacity and elevation for the supply of the city may be procured at a distance of two and a half (2½) miles from the engine house, and in a direction of a portion of the required supply.

Land can also be obtained for a reservoir of sufficient capacity to supply the more elevated portion of the city by a separate distribution within from five hundred (500) to eight hundred (800) feet of the engine house by raising the embankment, by masonry or otherwise, to attain the additional elevation, say forty (40) feet, required.

If the plans submitted under this head recommend a separate distribution for the more elevated portion of the city, they must be accompanied by means of steam power as well as water, with estimate of cost of both.

If a new reservoir for both elevations is recommended, the estimate must include the necessary pumping mains to reach it.

Further information can be obtained by addressing the Water Commissioners.

The plans submitted on these various points must be in detail, and giving estimates of cost under each head separate.

Plans and specifications as above to be submitted to the Common Council of the City of Buffalo, through the Board of Water Commissioners, on or before the first day of July, 1869. Each set of plans and specifications shall be designated by such initial as the engineer may elect, and a corresponding initial shall be placed upon an envelope, inclosing the address of the engineer, said envelope not to be opened until the award of premiums shall have been made.

July 7, 1869—From the Board of Water Commissioners:

In answer to the advertisement you directed to be inserted in sundry newspapers on the 5th day of April last, offering certain premiums for plans, specifications, etc., for the improvement of the water-works belonging to the city, seven plans have been received, which are presumed to come within the meaning and requirements of the circular approved by your honorable body and sent by mail to all applicants.

Besides which there are two communications on the subject without plans, one model with explanations and one set of drawings without specifications or explanation.

By the Act of the Legislature passed May 7, 1868, the plans for building new works

or the improvement of the present works are to be fixed and determinated upon by the Common Council.

We therefore respectfully submit the plans received for such action as your honorable body may deem wise and proper, trusting that there may be no more delay than is necessary to reach a careful and well considered conclusion.

Respectfully submitted,

WM. F. ROGERS,
JAMES RYAN.

Ald. Newman moved that the communication be referred to the Committee on Water.

Carried.

On August 2, 1869, Ald. Newman moved that the Council proceed to consideration of the report of the special committee appointed to consider the plans and specifications for improving the water-works.

Carried.

The following report was then presented by Ald. Newman, from said special committee:

The committee appointed by your honorable body on the 21st of July, and to which additions were made on the 26th of July last, to whom was referred the plans and specifications in relation to improvements in the Buffalo City Water-works, beg leave respectfully to report as follows on the duties assigned them:

First—Upon examination of the different plans presented, they report that but six, viz.: Nos. 2, 3, 4, 5, 6 and 7, come within the requirements of the circular issued, and are, therefore, the only ones to be considered in relation to the award of premiums.

Second—The plans designated by the above numbers were fully examined and discussed, and by ballot the committee decided that Nos. 2, 4 and 7 were the three possessed of most merit.

Third—Upon further discussion in relation to the three plans last above named, the committee by ballot decided that as a whole, without endorsing the plan in all parts, No. 2 was best adapted for conformity with the present works, and was first in merit by the same arguments, and in the same way the committee decided No. 4 to be second in point of merit.

No. 7, as you are aware, proposes to abandon entirely the present works and to locate and build new works opposite the foot of Michigan street. Your committee do not undertake to make any recommendation in this direction, as there was a diversity of opinion in their minds, but agreed, as in two former cases, to commend it as third in point of merit.

Fourth—In addition to the rejected plans, Nos. 3, 5 and 6, your committee would state that No. 3, in their judgment, is impracticable in many of its recommendations, has several misstatements in relation to present works embodied in its general remarks, and discusses unsatisfactorily several particulars not pertinent to the matter embraced in the circular.

No. 5 is a plan for supplying by means of water-wheels located on Bird Island reef, and is deemed to be entirely inadequate in its provisions for power and impracticable in application.

No. 6 is likewise a plan to supply by water power, but the committee, while they were greatly pleased with the elaborateness and beauty of the plan presented, were forced to the conclusion that its author did not comprehend the difficulties to be encountered, and feel compelled to report unfavorably upon it.

In view of the fact that five of the six plans which have been considered recommend the location of a reservoir at the same point, your committee would suggest the propriety of your honorable body securing the land for this purpose, believing that if it should not be eventually occupied for reservoir purposes, no loss could result to the city being the owner.

On account of the importance of this question, your committee beg leave to recommend, in connection with the foregoing report, that your honorable body authorize an analysis of the water from the sources recommended in the plans that have been presented, viz.: in the bay opposite Michigan street, the present inlet of the works, the point opposite the works, to which it is proposed to extend the tunnel, and the point outside of Bird Island pier, opposite Connecticut street, recommended by plan No. 4.

Ald. Newman moved that the report be referred to the committee of the whole.

Carried.

On September 6, 1869, the following report was submitted:

Your Committee on Water, believing that the important question so long before you and of so much importance to the city should, if possible, be determined without further delay, beg leave to make the following report and recommend for your consideration:

The law authorizing the purchase of the present works devolves upon the Common Council the responsibility of determining the plans for their extension and improvement.

To aid them in the work, the Council have sought, by means of presenting liberal premiums for plans, to avail themselves of the best engineering talent and advice, and have had before them the several plans submitted. Of the three plans selected as the best, one recommends a change of location, and another presented plans and specifications in detail, locating the works at the same point, viz: opposite the foot of Michigan street.

While your committee are inclined to favor the change, there are several reasons causing them to hesitate before recommending it.

First—They believe an extension of the tunnel further into the river in connection with the change now being made by the State at the head of Bird Island pier, whereby that part of the pier now extending inward toward the beach and in part across the mouth of the harbor is to be removed and the pier straightened and extended in the direction of its main line, thereby permitting a much larger volume of the creek water to flow inside the pier when the water is high in the creek instead of being forced outside, as heretofore, by the present form of the pier, will give the city as pure water as can be obtained in the bay opposite Michigan street, and less objectionable on account of sand roil, as it is believed a tunnel at this point will have to be extended a much greater distance than has been proposed to obtain water that shall be generally clear from roil.

Your committee, therefore, are of the opinion that change in the Bird Island pier now making or that may be made for this purpose, together with the extension of the tunnel,

will carry the inlet of the works at the present location entirely beyond the influence of the creek waters and the sewage of the city.

Second—The delay that must ensue in supplying the higher portion of the city.

If the location is changed, it will consume from two to three years' time before the tunnel can be completed, the reservoir built, new buildings, pumping machinery, etc., erected and the works in operation so as to supply the city from the new works.

If the works are retained as at present, the mains can be laid next season and the higher districts of the city be supplied directly through the mains while the reservoir is being built, and thus a saving of nearly or quite two years' time in furnishing the supply can be made.

Third—If the present reservoir is retained, a much smaller and less expensive one than is contemplated for the supply of the entire city from the foot of Michigan street would answer all the purposes for the more elevated supply.

Very large reservoirs are not a positive requirement in connection with steam-pumping supply, as you are depending upon the capacity of your pumps and not of your reservoir, and they can always be readily increased and at much less expense than building reservoirs.

The question of time in supplying the entire city and of economy in furnishing and maintaining the supply, your committee believe to be largely in favor of the present location. They think the estimates, as far as given in the plans you have before you for consideration in relation to removing the works, will be much below the actual cost of the work when completed in a satisfactory manner, and that the change will exceed a million of dollars exclusive of new reservoirs, mains, etc.

The Common Council, however, are only agents of the taxpayers at large in deciding this great question of water supply, and as the impression prevails to so great an extent among the citizens, erroneous though it may be, that pure water can not be obtained below the city (and if this be so, the future growth of the city will make the present location more and more unfavorable), we are therefore constrained to favor the change, and recommend the adoption of the following resolution:

Resolved, That the Water Commissioners be and they are hereby authorized and directed to present plans to the Council locating new works for the supply of the city with water near the foot of Michigan street, with a tunnel underneath the creek, the Blackwell canal, etc., to such a point in the bay as shall secure at all times a supply of pure, clear and wholesome water.

Referred back to the Committee on Water and ordered printed.

On January 24, 1870, the following communication was sent to the Board of Water Commissioners:

GENTLEMEN—On the 8th of March last I made a communication to the commissioners recommending certain improvements in the works under their care. The communication was endorsed by the board and transmitted to the Council. Some of the recommendations therein contained were authorized by the Council and have been carried out.

I desire to call your attention again to a recommendation made at that time, upon which no action has been taken, although its importance should have given it precedence over all others.

I refer to the extension of the tunnel into the river to a distance sufficient to avoid the water from Buffalo creek when it is forced outside the Bird Island pier. In the communication referred to above, I alluded to the possibility of an arrangement being made for

filtering the water before it reached the pumps. I am still of the opinion that it might be accomplished, but the fact that the inlet of the present tunnel has upon several occasions under influence of heavy easterly winds been left above water so that the pumps could not be operated for several hours, and the possibility that in time it may have to be enlarged to meet the requirements of the city, leads me to recommend the construction of a new tunnel of larger size, and the inlet so constructed as to insure a supply of water to the pumps at any probable stage of the water in the river.

It may prove difficult and expensive work, and may possibly fail of accomplishment if undertaken, but unquestionably the necessities of the case warrant the effort being made. The condition of the water supplied the city for a few weeks past under the influence of the unusual violence and continuation of the storms that have prevailed, furnishes a much stronger argument for the necessity of immediate action than any I can possibly present, and the citizens have a right to ask that no unnecessary delay occurs before some steps are taken to improve the quality of the water.

I therefore recommend that the Board ask the Common Council to adopt the accompanying resolution, conferring power upon the commissioners to proceed at once with the construction of a tunnel and inlet pier, leaving the question of filtering to be decided in the future.

Very respectfully,

A. R. KETCHUM, *Superintendent.*

Received and filed.

Whereupon Ald. Evans offered the following resolution:

That the Water Commissioners be, and they are hereby authorized, to advertise for proposals for constructing a tunnel from the pumping-house of the Buffalo City Water-works, under the Erie canal, Black Rock harbor, and Niagara river, together with an inlet pier for the supply of the city with pure water in accordance with plans and specifications presented by Thomas Dark, Esq., in his plans for improving the water-works of the city.

Ald. Miller moved that the whole subject be referred to the Committee on Water for one week.

Carried.

By Ald. Newman:

That the superintendent of the water-works be, and he is hereby, directed to report to this Council the probable expense of extending the old tunnel, and also of a new tunnel into the river, about three hundred feet from its present termination.

Adopted.

By Ald. Newman:

That the superintendent of the water-works be, and he is hereby directed to report to this Council the most feasible plan for furnishing water to the district north of North street.

Adopted.

By Ald. Newman:

That the superintendent of the water-works be, and he is hereby directed to report to the Council the probable expense in detail of constructing a tunnel under the Buffalo

river, Blackwell canal and into the lake 2,000 feet, or far enough to reach pure water; the construction of a reservoir on High street and removal of the pumping apparatus to some point near the foot of Michigan street.

Carried.

Ald. Newman moved that the superintendent of the water-works be requested to furnish the information asked for in the foregoing resolution to the Committee on Water, next Thursday night.

Carried.

January 31, 1870.

Ald. Booth, from the majority of the Committee on Water, submitted the following report:

The Committee on Water to whom was referred the communication from the Water Commissioners at the last meeting of the Council, in relation to the construction of a new tunnel under the Niagara river, with inlet pier, etc., having considered the same report in favor of adoption of the resolution accompanying said communication as moved by Ald. Evans,

Resolved, That the Water Commissioners be, and they are hereby authorized to advertise for proposals for constructing a tunnel from the pumping-house of the Buffalo City Water-works under the Erie canal, Black Rock harbor and Niagara river, together with an inlet pier for the supply of the city with pure water, in accordance with the plans and specifications presented by Thomas Dark, Esq., in his plans for improving the water-works of the city, and

That the City Attorney be, and he is hereby directed to take the necessary steps for obtaining permission from the government to erect and maintain an inlet pier in the Niagara river not less than 300 feet outside of Bird Island pier, and also to ascertain if it will be necessary to obtain permission from the British or Canadian governments to erect said pier.

Ald. Newman, from the minority of the Committee on Water, offered the following as a substitute for the majority report:

The Committee on Water, to whom was referred the communication from the Water Commissioners, have considered the same, and offer the following report:

The water in the Niagara river is more or less impregnated with sewage of the city, and no system of filtration has been discovered that will purify the water of these solutions, and the city will still suffer from this great evil. The water has been, during the past year, oftener unfit for use than ever before, and the city will materially suffer from it, as an effort will be made next Wednesday, before the Legislature, by the citizens of Lockport, to defeat the project of locating the insane asylum in Buffalo. Their principal argument will be that the water which will be furnished by the city to the asylum will be unfit for use. The present tunnel can not be extended farther into the river, and a new one of sufficient capacity to furnish at least 20,000,000 gallons must be constructed. The rock in the Niagara river has, like most other rock, several seams, and if in the construction of the tunnel one of the seams should be met, it would be very difficult and almost impossible to finish the work. The inlet to the tunnel must be protected by very strong masonary. That not only would suffer a great deal from the ice, but also be a very serious obstruction

to the navigation. Besides that, the construction of said inlet would be very expensive and difficult on account of the swift current of the river.

The committee would therefore recommend to take the water from the bay at a point 2,000 feet south-westerly from the sea-wall opposite the foot of Michigan street. At that point is clay bottom, a depth of 28 feet of water, no sewage coming in contact with it, and well arranged filters will cleanse these waters. The committee would further recommend to bed a five-foot diameter iron pipe made of galvanized iron, into the bottom of the lake, and under the Blackwell canal and Buffalo river, from said point to the foot of Michigan street, and from an inlet to said pipe by a crib, similar to the one in Chicago, and that an engineer, with a consulting engineer from abroad, be engaged to furnish plans and specifications for the above work, and that the Water Commissioners advertise for proposals for construction of the above works, according to the plans and specifications.

Ald. Evans moved that both reports be printed and referred to the committee of the whole, and that the Council will resolve itself into committee of the whole for the purpose of considering said report on Monday, February 7, 1870, immediately after the order of reports from officers of the corporation.

Carried.

Ald. Newman, from the Committee on Water, also submitted the following communication, received by the committee from the superintendent of the Water-works in answer to a resolution adopted at the last session of the Council:

In reply to the second resolution offered by Ald. Newman at the last meeting of the Council and adopted, asking for the most feasible plan for supplying the territory north of North street, the committee have received the following reply, and, having considered the same, recommend its adoption, subject to such modifications as may be found necessary in carrying out the plan in detail:

I report that I deem the most economical and feasible plan for supplying this district to be that of making an independent arrangement by a set of pumping machinery adapted to this purpose.

On February 7, 1870, Ald. Chambers moved that the Council do now resolve itself into committee of the whole for the purpose of considering the several reports from the Committee on Water relative to enlarging and improving the water-works submitted to the Council at its last meeting.

Carried.

Ald. Evans was called to the chair.

The committee of the whole rose, and by their chairman reported that they had had under consideration the subject referred to them, and had made some progress thereon, but not being able to complete the same, asked leave to sit again.

Ald. Newman moved that the report be received, and that leave be granted the committee of the whole to sit again at the next session of the Council, immediately after the order of reports from officers of the corporation.

February 14, 1870.

On motion of Ald. Newman, the Council then resolved itself into committee of the whole for the purpose of considering the several reports from Committee on Water relative to improving the water-works, with Ald. Evans in the chair. The committee of the whole rose and by their chairman, Ald. Evans, reported that they had had under consideration the subject referred to them, and had directed him to report in favor of the adoption of the following resolutions:

That the Water Commissioners be and they are hereby authorized to advertise for proposals for constructing a tunnel from the pumping-house of the Buffalo City Water-works under the Erie canal, Black Rock harbor and Niagara river, together with an inlet pier, for the supply of the city with pure water, in accordance with plans and specifications presented by Thomas Dark, Esq., in his plans for improving the water-works of the city.

That the City Attorney be and he is hereby directed to take the necessary steps for obtaining permission from the Government to erect and maintain an inlet pier in the Niagara river, not less than three hundred feet outside of Bird Island pier, and also to ascertain if it will be necessary to obtain permission from the British or Canadian Government to erect said pier.

Ald. Evans moved that the report from the Committee of the Whole be adopted.

Ald. Chambers moved as an amendment that the report of the minority of the Committee on Water, which was submitted to the Common Council on the 31st day of January and referred to the Committee of the Whole, be adopted.

Lost.

Ayes—Ald. Chambers, Keenan, Newman and Storck—4.

Noes—Ald. Booth, Carmichael, Dietzer, Dilcher, Evans, Groben, Hawley, Lang, Orr, Patchin, Peters, Pierce, Safford, Scheu, Sears, Sheehan, Smith, Van Buren, Van Allen and Werrick—20.

The motion of Ald. Evans was then carried.

February 28, 1870.—From the Board of Water Commissioners:

On account of the uncertainty of the depth of water in the Niagara river at the point of location of the inlet pier to the tunnel, for which you have directed the board to advertise for proposals to build, we respectfully ask authority to procure correct soundings, to

be made with as little delay as possible, that contractors bidding for the work may have correct information on this point upon which to base their calculations.

Respectfully submitted,

ALEXANDER BRUSH,
C. J. WELLS,
JAMES RYAN.

Filed and authority granted.

June 16, 1870.—Further from the Water Commissioners:

The contract with Messrs. Douglas, Clark & Co. for construction of the new tunnel and inlet pier, etc., provides for an engineer for inspection, etc., of the work as it progresses, to secure conformity to the plans and specifications.

We are informed that under the provisions of the charter this Board can not appoint an engineer for this purpose, but that the duties of inspection and oversight of the work will devolve upon the City Engineer.

We therefore report to your honorable body that work on the shore shaft and culvert to pumping-well has been commenced, and ask that the engineer be requested to give the work such attention as its importance demands.

Respectfully submitted,

C. J. WELLS,
GEORGE YAW,
JAMES RYAN,
Commissioners.

July 18, 1870—From the Engineer:

Wm. H. Douglas & Co. ask for a payment to apply on their contract for constructing a new tunnel, etc., for the water-works.

Amount of contract	$170,000.00
Amount of work done	2,000.00
Amount paid on same	
Amount asked	1,800.00

I would recommend that an order for $1,800 be drawn in their favor.

JOHN A. DITTO, *Engineer.*

Filed and order directed to be drawn.

July 25, 1870—From the City Clerk:

I herewith lay before your honorable body the annexed communications from His Honor, the Mayor.

Respectfully submitted,

GEORGE WARDWELL, *City Clerk.*

Received and filed.

Following are the communications referred to:

MAYOR'S OFFICE, BUFFALO, July 22, 1870.

The following resolution, passed at the session of your honorable body held on the 11th inst., is received without any approval, viz:

That the engineer be and he is directed to take charge of the construction of the new water-works.

Section 5, Title 15, of the Charter provides that the Water Commissioners shall have the supervision and management of the water-works and their appurtenances and of the extensions, alterations and repairs ordered by the city to be made upon them.

The resolution is therefore in plain conflict with the Charter, which, as is seen, places these water-works under the charge of the Water Commissioners. I hereby concur, however, in the recommendation of the Water Commissioners made to your honorable body on the 16th inst., that the engineer or other competent person be directed to oversee and inspect the work in the new tunnel, inlet pier, etc., during their construction, in order to insure compliance with the plans and specifications of the contract.

Respectfully submitted,

ALEXANDER BRUSH, *Mayor.*

Ald. Newman moved to refer to the Committee on Water.

Carried. Ayes, 11; noes, 6.

MAYOR'S OFFICE, BUFFALO, July 22, 1870.

I have withheld my signature to the order for $1,800 directed by your honorable body on the 18th inst. to be drawn in favor of Wm. H. Douglas & Co., to apply on their contract for constructing a new tunnel, etc., for the water-works.

Section 9, Title 15, of the Charter directs that all claims against the city growing out of the Water Department shall be presented to the Water Board for examination before they shall be presented to the Common Council for audit.

Presenting this claim to the Council by the engineer instead of the Board of Water Commissioners is clearly a violation of the Charter.

Respectfully submitted,

ALEXANDER BRUSH, *Mayor.*

Referred to Committee on Water.

August 8, 1870—Ald. Newman also reported:

That the engineer be and he is hereby directed and authorized to take charge of the construction of the tunnel and inlet pier now in process of construction for the water-works, in compliance with title 2, section 37, revised City Charter, which sets forth that the engineer shall superintend all surveys and the construction and repairs of bridges, canals, wharves, docks, piers, basins, slips, aqueducts, tunnels, sewers, receivers, and grading and paving of streets, alleys and sidewalks.

Referred to the Committee on Water.

I stated in the beginning of these memoranda that the location of the water-works pumping-station was selected without due consideration for securing pure water or for ensuring an abundant and steady supply.

I would here state that when the city purchased the water-works, both of these important matters were lost sight of, and the majority of the statesmen who governed and controlled the purchasing and the construction of the works dropped into the ruts from which the city had lifted the Water-works Company, and followed on without due consideration of getting pure water or of giving at all times a sure and abundant supply,

which is very evident from the first sad day when the city purchased the works. All this I will endeavor to show from the reports of committees, from letters to the press, from citizens of Buffalo, and also letters from myself in the different newspapers of the city from time to time for the past twenty-six years.

After the Water Commissioners had received several plans and specifications according to their advertisement, and had submitted the same to the Common Council, and plans and specifications No. 2 had been well considered in committees and had been adopted, and the premium of two thousand dollars paid for the same, the committee did not seem to agree as to the best location for procuring pure water.

On September 6, 1869, in the committee report relating to taking the water from the bay opposite Michigan street, as proposed by one of the three plans selected as the best, the following sentence appeared:

While your committee are inclined to favor the change, they believe an extension of the tunnel further into the river will give the city as pure water as can be obtained in the bay opposite Michigan street.

Here the committee is not certain of procuring pure water, and not a word is said about the great risk of the water supply being cut off by slush ice and the city being deprived of water for domestic purposes, and the fire department rendered of little or no service in case of fire.

Again in the same report they say:

Third—If the present reservoir is retained, a much smaller one and less expensive one than is contemplated for the supply of the entire city would answer all the purposes for the more elevated supply. Very large reservoirs are not a positive requirement in connection with steam pumping supply, as you are depending upon the capacity of your pumps and not of your reservoir.

This theory shows how little these gentlemen knew about the practical part of the important question they had under consideration.

It will be observed that all engineers of water-works in the largest cities contend for large reservoirs that will contain large supplies of water in case of accident to the pumping machinery or to the pumping mains, which might cut off the water supply from the city.

Again the committee say:

As the impression prevails to so great an extent among the citizens, erroneous though it may be, that pure water can not be obtained below the city, and if this be so, the future growth of the city will make the present location more and more unfavorable, we are constrained, therefore, to favor the change.

The above shows that the committee understood but very little about the great problem they had under discussion; still they were unwilling to be instructed by men who did know.

On the same date a communication from Mr. Ketchum, the superintendent of the water-works, was received, calling the attention of the

Common Council to the impurity of the water in the Niagara river, and stated that the water on several occasions, under influence of heavy easterly winds, had been kept below the inlet in the Bird Island pier so that the pumps could not be operated for several hours.

Now add to this the possibility of this occurring at the present inlet pier in the Niagara river when the slush ice covers the river from shore to shore for three days, as I saw it in May, 1857, which would cut off the water supply entirely from the pumps.

Mr. Ketchum adds:

The condition of the water supplied the city for a few weeks past under the influence of the unusual violence and continuation of the storms that have prevailed furnished a much stronger argument for the necessity of immediate action than any that I can possibly present, and the citizens have a right to ask that no unnecessary delay occur before some steps are taken to improve the quality of the water.

January 31, 1870.

Ald. Newman, from the minority report of the Committee on Water, offered the following:

That the water in the Niagara river is more or less impregnated with sewage of the city, and the city will still suffer from this great evil. The water has been during the past year more often unfit for use than ever before, and the city will materially suffer from it.

The committee would therefore recommend to take the water from the bay at a point 2,000 feet southwesterly from the sea wall.

Here was another recommendation without a due consideration for obtaining a supply of pure water.

In a very short time the whole of the shore from the old light-house to the Hamburgh turnpike road will be built up with docks, warehouses, elevators, etc., and the water in the bay inside the breakwater will be more or less impregnated with filth and be impure.

Copied from the *Commercial* of Thursday, March 2, 1870.

Mayor Brush, Thomas Dark, Esq., the members of the Water Committee and a few other gentlemen proceeded to Black Rock and took the "W. A. Thompson," which had been chartered for the occasion, and proceeded to make such an examination as was practicable of the bottom of the river, for the extension of the tunnel for the water supply of the water-works. City Surveyor Ditto had placed posts in range at which would allow of an accurate survey. The whole business was simple. The apparatus consisted merely of regular lead lines and a long bar of round iron to feel the bottom. The water at the point where the tunnel will open into the river, 300 feet from the pier, is about 19 feet, and shoaling to 14 feet at the pier. The bottom was remarkably smooth. It is a flint rock with trivial indentions, and here and there seamed. Boulders could not remain upon its surface with such a current—probably eight miles per hour. This survey settles the matter of the practicability of continuing the tunnel. The only remaining

question is as to the purity of the water. The quality of the water would of necessity be greatly benefited if taken from far out in the channel, and we believe that the proposed improvement will give us as good water as could be desired.

Very soon after we had taken the soundings and made what examination was needed, I was waited upon at my house by one of the aldermen, who told me that he had been appointed a committee to enquire of me if I would accept the appointment to superintend the construction of the tunnel and inlet pier for the city.

I said I would on certain conditions. I reviewed the various proceedings, namely, the advertisement by the Water Commissioners inviting engineers to submit plans and specifications for enlarging and improving the water-works, upon which several plans and specifications had been submitted to the Water Commissioners, and from the Water Commissioners to the Common Council, and by the Council referred to the Committee on Water, and to the Common Council as a Committee of the Whole; and by them, the Water Commissioners and civil engineers had been well examined, and plans and specifications No. 2 had been by them selected as the best, and by the Common Council accepted and adopted. I said that if I was appointed by the Common Council and directed to carry out these plans and specifications for the interest of the city, I would accept the appointment to superintend the work—but I would not be a tool in the hands of any man or party to do otherwise—if the city would agree to pay me $5,000 per year for filling the office.

After this I never heard any more about appointing me to superintend the work.

I was never an office seeker, never asked for an office in the city, and never held but one, which I was very much urged to accept against my own inclination. I knew that some of the powers that be were very much opposed to my being appointed to superintend the work, which will be shown as we pass along. I was glad that I did not get the office.

Now we will return to complaints made by the several newspapers of the city, and by letters from citizens in the several newspapers at various times about the water supply of the city, showing the changes made in the plans, the deals made to defraud the taxpayers, and the defective method of securing the water supply.

From the *Commercial*, January 2, 1870:

THE EAST WIND—LOW WATER.

The wind got around to the north some time during the night and has blown steadily from that quarter during the day. In consequence the water in the river is again very low and anxious inquiries will naturally be made as to the possibility of another failure in the water supply.

On visiting the office of the water-works this morning we learned that the pumps were at work and that there was an adequate depth in the reservoir; that the commis-

sioners had visited the Bird Island pier, and so far ahead with the cutting through the stone work that they would be enabled to let the water through to the opening of the tunnel in a very short space of time should the necessity arise.

Under all the circumstances we do not think our citizens need be under any serious apprehensions that they will be left without water.

In the *Commercial:*

THE PRESENT WORKS AND IMPROVEMENTS—THE QUESTION OF TAKING WATER FROM THE LAKE, ETC., ETC.

THE VIEWS OF PURE WATER.

Editor Buffalo Commercial Advertiser:

Reading the *Buffalo Daily Courier* of a recent issue, I noticed an article headed, "Water Question," in which the writer seemed to feel most earnestly interested in the present and future welfare of the City of Buffalo and its inhabitants, and asked some very important and practical questions which concern every citizen of Buffalo, and which should engage the most earnest attention of every sound-minded person in the city.

The solution of the question of a good supply of pure water and good drainage for large cities and towns requires the best engineering skill and talent that can be procured, as it is well-known that the health of the people and the prosperity of the city depend materially upon these two important matters.

What is wealth without health? In order to secure health to a community there must be cleanliness, and in order to have cleanliness in any city there must be a good supply of pure water and good drainage, both of which the City of Buffalo is badly in need of at the present time.

Let us now examine some of the questions asked by the writer on the water question.

One of the questions asked is: "If the tunnel can be finished will it furnish pure water?" It is also asked: "Will not the deposits dumped in the middle of the river that are taken out in mud scows, the result of dredging from Buffalo creek, or the deposits of the Hamburgh canal, such as were forced out last year at the expense of the general tax, both reach or flow more or less to the inlet of the new tunnel pier, and thence into the tunnel and pumping-well, to be pumped back, drank and used again by the citizens?"

It seems to me these questions may be answered in the affirmative by any one who understands where the mud from the dredging scows is dumped into the river, and know the current of the stream and the intended location of the pier, and who is not interested in miserable construction and ceaseless repairs and the present extent of the old water-works. I am satisfied that there will always be more or less of the sewage-deposit and street-washing finding its way into the new tunnel pier.

In spring and fall the freshets will carry the filth out into the stream and to the inlet tunnel pier, and in summer when the Hamburgh canal, the Buffalo river and all the slips are dredged and the deposits carried in mud scows and dumped into the river there must be considerable of the filth carried down stream to the inlet tunnel pier.

I would answer "Water Question" that I think it was a great mistake to tap the source of water supply down the river, thereby catching the deposits of our sewage and pumping it back again, when above the city there lies a sea of the purest fresh water in the world which might have been procured and pumped into large reservoirs constructed with filters built at an elevation, where, as the writer of "Water Question" observed,

all might draw a bountiful supply of pure water, and would not have cost the city as much as the old works have and will cost.

If the City of Buffalo had constructed new works, pumping the supply from the lake and depositing it in good large reservoirs at the highest possible elevation, with filters on a large scale, the citizens of Buffalo might boast of substantial works with an abundant supply of pure water.

The water being filtered would give the citizens clear water and pure, as the sand roil from the water in the lake in stormy seasons would not enter into the supply mains.

After accomplishing this our citizens would feel better warranted in helping forward to completion what has already been commenced in the beautifying of our city by laying out parks, etc.

PURE WATER.

April, 10, 1871.—From the City Engineer:

I herewith submit plans for the construction of the inlet pier for the new water-works tunnel, so that the Council can, as I believe, determine more closely than they have heretofore done the best and most substantial for the construction of this pier.

The present plan provides for the construction of a pier of which the general dimensions are a length of 45 feet and a width of 28 feet on bottom, with batter of half-inch per foot rise. The plan now adopted proposes to erect this pier with a vertical face rectangular against a current of 6½ miles per hour, as indicated by the U. S. survey. The speed of this current is, according to my measurement, 8 miles per hour, and with a southwest wind it is increased to 10 miles per hour.

When the ice breaks up in the spring it frequently happens that large fields of ice, with an unbroken surface from shore to shore, run down the river with all the force and speed of this current. I leave for your consideration to determine how long a mass of masonry of 600 tons can withstand the crushing power of a field of ice reaching from shore to shore. The total width of the river at this point is 1,500 feet. A single field of ice 1,500 feet long and 1,500 feet wide and one foot thick will weigh 65,000 tons. It will strike this pier with a speed of 11 feet per second, and will give a constant force on the pier for 2¾ minutes. I leave for your consideration the question of the effect that must result from the expenditure of such force on this pier, and recommend that you take immediate action to secure the erection of this pier in such a manner that it shall be able to withstand the action of the destructive force of the large field of ice.

JOHN A. DITTO, *Engineer.*

Referred to committee.

It will be seen later on that the contractors had great influence with some of the Council, and had succeeded in getting the whole superintendence of the construction of these works put into the hands of the City Engineer. They now begin to use their influence over the engineer to make various changes in the plans for their benefit.

It might appear strange to some why the City Engineer did not see what he now represented as defects in the plans before the contract was let. As he had these plans before him it was his duty as City Engineer to have pointed out whatever defect he might have seen in any of the plans.

But before the contract was let he had not been initiated into the secrets of the contractors, and now he commenced to recommend changes to be made. We will call this change No. 1.

June 12, 1871.

Ald. Kelly, from the Committee on Water:

That the Engineer be, and he is hereby directed, to prepare plans and specifications and quantities for the construction of the proposed change to the inlet pier for the new water-works tunnel and report the same at the next meeting.

Adopted.

June 19, 1871.—From the Engineer:

I submit a plan, specifications and quantities for the proposed change to the inlet pier for the new water-works tunnel. The following are the quantities: Masonry, total amount cubic yards, 1,111; wrought iron, 52,751 pounds.

JOHN A. DITTO, *Engineer.*

Referred to Committee on Water.

July 10, 1871.—From the Engineer:

The following is a statement of the increase of quantities for the proposed change of plan of the inlet pier over the amount as required as per the present plan: Masonry, cubic yards, 600; wrought iron, pounds, 65,500. JOHN A. DITTO, *Engineer.*

Referred to Committee on Water.

Observe that no weight was given by the Engineer of the wrought iron which was intended to be used for holding down bolts or the three inlet gates with bell metal facings and gearings for raising and closing the gates, which were intended to be used in plan No. 2 made by me.

The three-inch round wrought-iron anchors or bolts which were intended to be dove-tailed into the bed rock and run up through the masonry in the pier with a large cast-iron washer on top, with a thread and nut on top of each anchor, would hold more than double the weight of all the extra masonry recommended by the Engineer in his plan. The present pier is built on a timber foundation, as I am informed by one of the best civil engineers in the city. The bed of rock on which the timber foundation lays being uneven, the weight of masonry broke the timbers, which caused a settlement in the masonry in the pier, and from what I was told by the civil engineer, the wrought-iron jacket which now covers the southwesterly end of the pier as a pretext to protect the masonry from the flow of ice, was in reality more to cover the break in the masonry at a cost of several thousand dollars.

The weight of the wrought-iron anchors above referred to in my plans would have been 8,536 pounds, the cast-iron washers 480 pounds, and in my plan there were three inlet gates, all fitted with bell-metal facings, and gearing for raising and closing the gates, while there are only two inlets in the present pier.

As the contractors seemed to have now got full control of the planning and construction of the work, the Engineer had to keep all the iron and

machinery in my plans in the dark so as to make it appear that my plan was defective and to strengthen the plan submitted by the Engineer.

But at any rate it was determined by the contractors that changes must be made which would best suit them and break the present contract.

On August 7, 1871, Ald. Kelly offered the following report:

That the Water Commissioners be, and they are hereby authorized and directed, to contract with William H. Douglas & Co. for constructing the inlet pier for the new water-works tunnel in accordance with the plan and specification now on file in the Engineer's office, showing the proposed changes of form, dimensions, etc., of said inlet pier at an additional cost of seventy thousand ($70,000) dollars to the present contract price for completion of said pier and tunnel.

Adopted.

October 16, 1871.—From the Engineer:

William H. Douglas & Co. ask for payment to apply on their contract for new water-works tunnel.

Amount of contract,	$240,000.00
Amount of work done,	60,000.00
Deduct 10 per cent.,	6,916.00
Total amount due,	$ 62,244.00
Deduct from payments,	49,994.00
Amount due,	12,250.00

I would recommend that an order be drawn. JOHN A. DITTO, *Engineer.*

October 16, 1871.—From the Engineer:

William H. Douglas & Co. ask for payment to apply on their contract for new water-works tunnel.

Amount of contract,	$240,000.00
Amount of work done,	60,000.00
Deduct 10 per cent.,	6,916.00
Total amount due,	62,244.00
Deduct from payments,	49,994.00
Amount due,	12,250.00

I would recommend that an order for $12,250.00 be drawn in their favor.

JOHN A. DITTO, *Engineer.*

We concur in the recommendation of the Engineer that an order for $12,250.00 be drawn on the water-works' extention fund in favor of W. A. Douglas & Co.

Very respectfully submitted,

C. J. WELLS,
JAMES RYAN,
GEORGE YAW.

Filed and order directed to be drawn.

It will be noticed from the above that the engineer, commissioners and the Common Council were more anxious to make the change in the plan for the inlet pier and to secure $70,000 extra pay for Messrs. W. H. Douglas & Co. than they were about the interest of the taxpayers, or of securing an abundant supply of pure water, as they were all so anxious to secure a payment for Messrs. Douglas & Co ($12,250) before the contract was executed and signed and approved by His Honor, the Mayor, as will be shown.

On October 27, 1871—From the Water Commsssioners:

This Board has delayed executing the contract with William H. Douglas & Co. for the change of the form and construction of the inlet pier to the new tunnel, as directed by your honorable body on the 7th day of August last, for the reason that it seemed to them that the difference in the cost of the two structures had been overestimated, and the sum of $70,000, directed to be added to the contract of Messrs. Douglas & Co., was more than the difference in the cost of the two piers.

We do not question the propriety of the change or hesitate to say that the proposed pier is better in form, and the plan of its construction more likely to secure its permanency than was the original or Dark plan of the pier, but think your honorable body might direct a reconsideration of the cost.

We have made some estimates of the difference in the cost, and while we do not claim entire accuracy—on the contrary, only an approximation—we are confirmed thereby in our judgment that some errors may have occurred in the estimates upon which your honorable body based your action in directing $70,000 to be added to the contract.

Very respectfully submitted,

C. J. WELLS,
JAMES RYAN,
GEORGE YAW.

Whereupon Ald. Kelly offered the following preamble and resolution, and moved its adoption:

WHEREAS, This Council did, on the 7th day of August, 1871, order and direct, in accordance with a report of the Committee on Water, the Water Commissioners to contract with Wm. H. Douglas & Co. for constructing the inlet pier in accordance with plans and specifications then on file in the engineer's office at an additional cost of $70,000; and,

WHEREAS, Said Water Committee carefully examined the estimated cost of said change of form referred to in the report of said Commissioners mentioned, and were fully satisfied that the increased cost thereof was just and reasonable and was less than was at first estimated and was satisfactory to the City Engineer; therefore,

Resolved, That the Water Commissioners be and they are hereby directed to carry out and sign a contract, which has been presented as aforesaid by this Council August 7, 1871.

Ald. Pierce moved to refer the communication, together with the resolution, to the Committee on Water.

Lost.

Ayes—Booth, Carmichael, Groben, Lang, Peters, Pierce, Sears, Storck—8.

Noes—Bork, Cruice, Evans, Fisher, Kelly, Patchin, Scheu, Sheehan, Smith, Van Allen, Werrick, Zink—12.

The resolution offered by Ald. Kelly was then adopted:

WHEREAS, The engineer has sent to the Water Commissioners a communication on the 13th of November, 1871, certifying that there was due said Douglas & Co. the sum of $5,508 on account of work done on said pier and tunnel in accordance with the aforesaid resolution:

Resolved, That an order be drawn on the proper fund in favor of said Douglas & Co. for said amount.

Adopted.

December 4, 1871.—Communication from His Honor, the Mayor:

The following resolution, viz.: That the said Water Commissioners be, and they are hereby directed, to carry out and sign a contract, which has been presented to them, if in accordance with the resolution passed as aforesaid by this Council, August 7, 1871, which was adopted by your honorable body on the 27th ult., is herewith returned without approval.

From the report of the Water Commissioners made to your honorable body last Monday, it appears that they had not consummated the contract with William H. Douglas & Co. in conformity with the instructions given them August 7, 1871, for the reason as stated in their communication, that it has seemed to them that the difference in the cost of the two structures had been over-estimated, and the sum of $70,000.00 directed to be added to the contract of Messrs. Douglas & Co. was more than the difference between the cost of the two piers, etc.

If the cost of the proposed change of pier has been over-estimated, it is certainly for the interest of the city and of the taxpayers that the question should be carefully and thoroughly examined and authoritatively settled before entering into a new contract. If such examination should prove that the estimates are fair and reasonable and that the proposed sum, $70,000.00, is not unnecessarily large, the fact when reported would set at rest the anxiety which now agitates the public mind.

The original contract with Messrs. Douglas & Co. was drawn with a view to the possible contingency of a change in the original plan and a provision inserted that should any change be found advisable or necessary whereby the cost of the work should be increased, such additional cost should be estimated at a fair and reasonable rate.

When the resolution of Aug. 7th, directing the Water Commissioners to contract with Messrs. Douglas & Co. for an additional $70,000.00, was presented for my consideration, I was induced by the data before me to approve the action of your honorable body therein. Subsequent investigation has led me to doubt the correctness of the opinion then founded, and as there appears to exist a very general conviction among those who have examined the subject that the proposed change of pier can be accomplished with handsome profit to the contractors, at a saving of several thousand dollars to the city less than contemplated in the resolution referred to, I consider it my duty to return the foregoing resolution to your honorable body, and respectfully but earnestly recommend that the whole subject be referred back to the Committee on Water, together with the City Engineer and the Water Commissioners; that the latter be authorized to employ a com-

petent engineer, and that this committee be instructed to examine the estimates for the proposed change of pier and report their conclusions at the next session of the Council. Already there has been too much delay in the matter. The sooner, therefore, a satisfactory settlement can be reached, the better for both city and contractors.

ALEXANDER BRUSH, *Mayor.*

Ald. Kelly moved that the communication be received and filed and the subject matter thereof be referred to the Committee on Water, the Water Commissioners, City Engineer, the City Attorney and F. J. Behn, Canal Engineer, who shall serve without pay, and that they report to this Council at its next meeting.

Ald. Stork moved as an amendment that the communication be received and filed and the recommendation of the Mayor be adopted.

Lost.

Ayes—Ald. Booth, Carmichael, Patchin, Peters, Sears, Sheehan, Storck, Van Buren, Walsh—10.

Noes—Ald. Bork, Cruice, Dayton, Evans, Fisher, Groben, Kelly, Scheu, Smith, Van Allen, Werrick, Zink—12.

The motion of Ald. Kelly was then carried.

December 4, 1871.—Further from the Mayor:

I have the honor herewith to return the following resolution, viz.:

That an order be drawn on the proper fund in favor of Douglas & Co. for $5,508.00, which was adopted by your honorable body on the 27th ult., without approval.

I have no disposition to interpose any unnecessary obstacles to Messrs. Douglas & Co. obtaining their just demands against the city, but a due regard to the interest of the municipality, which has been confided to our care, requires the definite settlement of the proposed contract before further payments are made, based on the increased cost of the works.

Also their claims against the city growing out of their work for the Water Department should be presented to the Water Board for examination and approval before being acted upon by the Council. ALEXANDER BRUSH, *Mayor.*

Referred to the Committee on Water together with the City Attorney.

December 11, 1871.

Ald. Kelly moved that the rules of the Council be suspended for the purpose of permitting him to offer a report from the special committee appointed to consider matters pertaining to the water-works.

Carried—Ayes 21, noes 0.

Ald. Kelly then submitted the following report and moved its adoption:

The undersigned special committee to whom was referred the subject matter of a communication from His Honor, the Mayor, returning without his approval a resolution

passed by the Council on the 27th day of November, directing the Water Commissioners to execute the contract with Messrs. W. H. Douglas & Co. for the change in the construction of the inlet pier, report that they have had several meetings for the purpose of considering the subject referred to them. The essential question presented to your committee's consideration was whether the price proposed to be paid Messrs. W. H. Douglas & Co. for the proposed change in the form of the inlet pier is reasonable and just, and to the examination of this question your committee have directed their attention, fully concurring with His Honor, the Mayor, that if the cost of the proposed change has been over-estimated, it is certainly for the interest of the city and of the taxpayers that the question should be carefully and thoroughly examined.

The Water Commissioners, in their communication of the 27th ult., admit that the proposed pier is better in form and its plan of construction more likely to secure permanency than the original or Dark plan of pier, but state that they believe that some errors have been made in the estimates, upon which the Council based its action in directing $70,000.00 to be added to the original contract price. At the several meetings of your committee, which were attended by a part or all of the members of the Board of Water Commissioners, said board submitted the estimates which had been prepared for them of the cost of said pier, and upon which they based the opinion that the price proposed to be paid for the change was exorbitant.

The first item in these estimates, upon careful examination, revealed a very serious mistake. Stone for the masonry in the pier was estimated at $15.00 per cubic yard laid in the wall. Your committee found upon inquiry, and the fact was subsequently admitted by the Water Commissioners, that the cost of the undressed stone delivered upon the bank of the canal, near the pier, is more than the Water Commissioners' estimate for the stone laid in the pier. The cost of dressing the stone is necessarily very large, owing to the kind of stone used and the peculiar manner in which it must be dressed.

After a careful consideration of this item the Water Commissioners were forced to admit that the estimate made by the City Engineer and the engineer associated with him was probably not far from correct. The only point after this admission upon which the estimates of the Water Commissioners differed materially from those upon which the contract price of the new pier was based, was the item of contingencies. The Water Commissioners believe that the item of contingencies in the estimates for the original pier is sufficient and that nothing additional should be allowed therefor. In the present estimates the original contract contemplated the construction of a pier which could be built in about one-half of the time which it will take to build the present one. It will be readily admitted that the danger from passing rafts and vessels, as well as from the flow of ice, would be far greater to a work which would require six months for its construction than to one which could be built in two months, thereby enabling the contractors to select for its construction the most favorable season of the year. The Water Commissioners declined to inform your committee who made the estimates upon which their opinion was based, but that he was competent to make such estimates. Without desiring to question the judgment of the commissioners in this particular, your committee are forced to the conclusion that an admitted mistake of $15,000.00 or more in a single item of his estimates will not tend to inspire the public with great confidence in the value of the opinions or estimates of the unknown who furnished figures for the Board of Water Commissioners. As the only question at issue between the Water Commissioners and the engineers in the matter of the cost of the work is in the item of contingencies, very great importance attaches to the question, Who made these estimates? If he was not acquainted with the place where the pier is being built, or with the strength of the current in the river, he could form no correct estimate of the amount necessary to be esti-

mated to meet the contingencies in the construction of this work. Your committee deem it proper to remind your honorable body that at the time this question was being considered and before the contract for the additional work was awarded, the City Engineer, together with a former City Engineer, in whose ability our citizens repose great confidence, and another engineer, whose long employment upon the western division of the Erie canal has demonstrated his ability to make such estimates, prepared estimates of the cost of this work. The estimates prepared by these engineers were made by them without consultation with each other, and they agreed that the price asked for by the contractors for the change was reasonable and just. It was upon these estimates that the Council, upon the report of the Water Commissioners, did, on the 7th day of August last, adopt the resolution fixing the additional cost of the proposed change in the form of the inlet pier at $70,000.00.

The action of the Council was approved by the Mayor and upon this action the contractors procured the material and commenced the construction of the pier upon the new plan. Subsequently the City Engineer submitted to the Board of Water Commissioners an estimate for a payment to said Wm. H. Douglas & Co. to apply on said contract, based on the additional price which the Common Council had agreed to pay. Such estimate was approved by said Water Commissioners and sent to the Council with recommendation that the amount therein named be paid, and upon such recommendation the Council ordered the amount paid. This action was approved by the Mayor and the amount was paid as recommended. Your committee do not propose to discuss the question which has been raised, that the action of the Water Commissioners and Common Council binds the city to pay the addition of the sum of $70,000.00 made to the original contract price. This is not deemed essential at the present time.

From the facts as herein set forth your committee are forced to the conclusion that the price of $70,000.00 which it was proposed by the resolution of August 7, 1871, to pay Messrs. Wm. H. Douglas & Co. for the change in the form of the proposed inlet pier, was reasonable and just, and that the city ought in good faith to carry out the terms of the contract at that time awarded to said Wm. H. Douglas & Co.

Your committee, therefore, recommend that the following resolution adopted by this Council on the 27th day of November last and returned by the Mayor the 4th inst. without his approval, be adopted, notwithstanding his objection, viz.:

That the said Water Commissioners be, and they are hereby directed, to carry out and sign a contract which has been presented to them, if in accordance with the resolution passed as aforesaid by this Council August 7, 1871.

JOHN KELLY,
JOSEPH BORK,
JAMES VAN BUREN,
D. CRUICE,
JACOB SCHEU,
GEORGE ROCHEVOT,
CHARLES GROBEN,
Committee on Water.

T. FRED BEHN, *Civil Engineer.*
BENJAMIN H. WILLIAMS, *City Attorney.*

The motion of Ald. Kelly on the foregoing report was then adopted by the following vote:

Ayes—Ald. Booth, Bork, Carmichael, Cruice, Dayton, Evans, Fisher,

Groben, Kelly, Lang, Patchin, Peters, Rochevot, Scheu, Sears, Sheehan, Smith, Storck, Van Allen, Van Buren, Walsh, Werrick, Zink—23.

Noes—Ald. Pierce.

Ald. Evans, by unanimous consent, offered the following resolution, and moved its adoption:

That the City Engineer report to this Council at the next meeting the amount that is now due Messrs. Wm. H. Douglas & Co. for work done on the inlet pier and tunnel, said estimate to be based upon the contract price of $70,000.00 for said work.

Adopted.

The performance of the first act is now over.

We will call this Change No. 1.

Now let us review the proceedings back to July 7th, when all the plans received by the Water Commissioners, according to their advertisement, were submitted by the Water Commissioners to the Common Council, and by the Common Council referred to the Committee on Water, which was appointed by the Council on July 21, 1869. The Committee on Water with the Water Commissioners, and the Common Council as a committee of the whole, also civil engineers, met at various times until August 2, 1869, when Ald. Newman offered a resolution that the Council proceed to consideration of the report of the special committee appointed to consider the plans and specifications for improving the water-works.

From the above date, July 21, 1869, to January 24, 1870, plans and specifications No. 2, which were made by Thomas Dark and adopted by the Common Council, and the first premium paid for the same, were in possession of the Common Council, where access was free to the Water Commissioners, the Common Council and the City Engineer, but none of these learned gentlemen ever pointed out any defects in these plans until after the contract had been let to Messrs. Wm. H. Douglas & Co.

The Common Council, on January 31, 1870, by a resolution offered by Ald. Booth and adopted, directed the Water Commissioners to advertise for proposals for constructing a tunnel from the pumping-house of the Buffalo City Water-works under the Erie canal, Black Rock harbor and Niagara river, together with an inlet pier, for the supply of the city with pure water in accordance with the plans and specifications presented by Thomas Dark in his plans for improving the water-works of the City of Buffalo, and all proposals were made from the plans and specifications No. 2 made by Thomas Dark.

On June 16, 1870.—From the Water Commissioners:

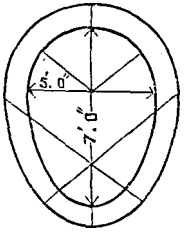
The contract with Messrs. Douglas, Clark & Co. for the construction of the new tunnel and inlet pier, etc., provides for an engineer for inspection, etc., of the work as it progresses to secure conformity to the *plans and specifications*.

It will be observed that during all this time no defects had been pointed out by any of these learned gentlemen until the whole superintendence had been placed under the charge of the City Engineer, whereupon the contractors took the reins of the city government into their own hands, as far as the city government was concerned in the construction of the inlet pier, and new tunnel, and whipped the City Engineer into line to try to find defects in the plan for the construction of the inlet pier, and after securing the engineer, the contractors soon drew a majority of the Council and others to follow, as will be seen from articles of the press and from letters in the press from citizens, and also from me from time to time, which show the change of the plan for constructing the inlet pier of the new tunnel, which I will call Change No. 1.

Next in order came Change No. 2.

The change of the cross-section of the brick-work in the tunnel was shown by diagrams and fully explained by me in the *Buffalo Courier*, April, 1871.

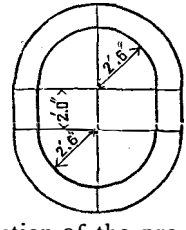
The cross-section of the tunnel on Plan No. 2, or the Dark plan, was egg-shaped, 7'0"x5'0" in the clear, with 12-inch brick wall.



The contractors had now commenced to lay brick in the culvert, which ran from the tunnel-shaft proper to the pumping-well in the pump house. The trench being open-cut, I was asked by several citizens, who, out of curiosity, had visited the work, how it was progressing, as they supposed that I was in charge of the work. I told them I had nothing to do with the work, and had not seen it since the contractors commenced.

Some of those who had visited the work said the brick-work that was being laid in the culvert was very poor, in their judgment.

I then visited the work and was surprised to see that inferior work was being done, and the shape of the culvert had been changed. According to my plan the section of the brick-work in the culvert was to be the same as the tunnel proper, but the change made the section of the culvert thus—with a half-circle invert of 2′ 6″ radius, and half-circle arch of 2′ 6″ radius and of 2′ 0″ upright wall on each side.



I went to the Water Commissioners' office to inform the commissioners of the change in the shape of the cross section of the brick-work in the culvert, and of the inferior quality of the brick-work, and to my surprise I saw on the table in the commissioners' office a cross-section of the proposed change of the cross-section of the tunnel.

I informed the Hon. C. J. Wells, who was president of the board, of the inferiority of the brick-work now being laid in the culvert.

I also took the plan of the cross-section from the table and asked the commissioner if the commissioners intended to make a change in the section of the tunnel, and if so, who was the author of the change. The honorable commissioner said I might consider him to be the author of the change.

I asked him why the change was made in the shape of the tunnel. He said that he and the engineer thought that was a better shape than the section in my plans.

I pointed out to him that the cross-section made by them was of an impracticable shape, and if it was built in heavy earth or quick-sand the side pressure would cause it to collapse.

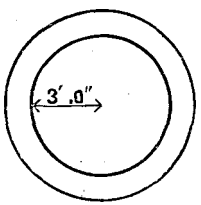
I neither saw nor heard anything further about this plan. But a change of the section seemed determined upon by the Water Commissioners and the City Engineer.

On the Thursday night following I went before the Committee on Water and stated that I had visited the work on the construction of the culvert between the tunnel shaft proper and the pumping-well in the engine-house, and found that a very inferior class of work was being done in the masonry. The joints in the brick-work were three-quarters inch thick, and the concrete used for filling the spaces between the brick-work and the rock was of very inferior quality, and upon measuring the cross section of the brick-work, I found it only four feet eight inches wide, where the plans made by me showed five feet.

Having been paid $2,000 for my plans by the city, I thought it my duty to acquaint the Water Commissioners and the Council, as well as the citizens, what kind of water-works the city would be likely to get if they should ever be completed.

After I had laid this before the committee, the commissioners were still determined, with the City Engineer and the help of the contractors, to get a change made from the section of the brick-work in the tunnel in my plans into some other shape.

The City Engineer and, I suppose, the Hon. C. J. Wells, (as he claimed a part of the credit for changing the shape of the section of the brick-work of the tunnel made in my plans), prepared the following section and submitted it to the Committee on Water, and the Water-works' Commissioners were authorized to make this change, which was to be six feet diameter in the clear of the brick-work.



Thus ends Change No. 2.

But still another change was required by the contractors, and recommended by the engineer and Water Commissioners, and adopted by the Common Council, which was Change No. 3. This was to dispense altogether with the brick lining of the tunnel and the well in the inlet pier.

Commercial Advertiser, Buffalo, Thursday evening, May 15, 1873:

THE WATER-WORKS.

THE NEW INLET PIER—THE PROPOSITION TO GRATE THE OPENING OF THE TUNNEL—MEETING LAST EVENING—DIVERSITY OF OPINIONS, ETC.

A special meeting of the Common Council, the Water Commissioners, civil engineers and others was held last evening. in accordance with the resolution of Ald. Carmichael, passed at the regular meeting of the Council, on Monday evening last.

The meeting was for the purpose of considering the proposition of Messrs. Clark and Douglas, the contractors, contained in their communication to the Council, in which they proposed to abandon building the inlet pier, to place an iron grating over the opening of the tunnel into the river, of sufficient size and strength to resist all pressure which should be brought upon it, and to admit a full supply of water into the tunnel, and so guarded as to prevent the tunnel from filling up with the sand and gravel likely to be strewn on the bottom of the river.

The proposal was accompanied by an offer to rebate $10,000 of the contract, if the construction of the grating should be agreed to. The whole matter was referred to the Water Committee, with instructions to report to the Council. Hence the committee had a very important question to decide, and it was not surprising that they should seek the advice of the engineers and those well posted in the matter.

The meeting assembled in the City Clerk's office. There were present Ald. Carmichael, Van Buren, Fisher and Dickey, of the Water Committee; also Ald. Churchyard and Baynes, President Sears, Water Commissioners Potter and Ryan, Messrs. Peter Emslie, F. J. Behn, Geo. Vomberge, the engineers, and Messrs. E. C. Sprague, Geo. R. Babcock, Geo. S. Wardwell, A. S. Bemis and others.

Ald. Carmichael called the meeting to order and stated its object. Mr. Behn, the canal engineer, was first called upon to give his views. In reply to questions, he said that he doubted whether the pier could be constructed at the estimated cost, and was not sure the city had the right to construct it. It was very important to consider that, if the pier was an obstruction in the river channel, the law would require it to be taken up. Mr. Behn thought the grating was a good idea, and that the water would be as good taken from it as higher up, as the current was there eight miles an hour.

Mr. Vomberge, the assistant city engineer, was called on, and stated that he appeared to give Mr. Ditto's opinion, as that gentleman was unable to be present.

Mr. Ditto agreed that the proposed grating would answer the purpose, with some slight modifications.

Mr. Vomberge was then asked to give his own opinion, and said that he was always opposed to taking the water supply from Niagara river, but thought it safer to have an inlet pier than the grating. The new tunnel would fill up sooner than the old one.

Water Commissioner Potter explained that the protection to the inlet of the present tunnel was of wood-work, the tunnel was filled up and was to be pumped out next Sunday.

Mr. Peter Emslie was next requested to give his views. He thought the grating would answer, but the tunnel was located in the wrong place, and it was a difficult job to build an inlet pier as it stands. He was of the opinion that the pier would interfere with navigation.

Water Commissioner Ryan said the question was, if the pier was constructed, could it be maintained? The spring ice and the fact charged, that it would be an obstruction to navigation, must be considered.

Ald. Dickey thought that the city sewage never reached the mouth of the new tunnel.

Commissioner Ryan said there was no bad water when the canal was clear. The dams in the canal had sent the filth down the river and made the water impure.

Mr. Vomberge said that the inlet pier could be built to resist any current or any accumulation of ice.

The meeting here adjourned to the Common Council Chamber.

On reassembling Commissioner Potter was called upon, and said that he was decidedly opposed to constructing a tunnel with the grating, as it would be out of command and beyond control.

Ald. Carmichael stated that the proposed change was on account of the remonstrance of citizens of Tonawanda, Wheatfield and Grand Island, who claimed that navigation of the river would be obstructed if the pier was built 550 feet from Bird Island pier.

Mr. Clark, of the firm of Clark & Douglas, said that rafts could not pass inside the pier without tugs. He explained that the pier would be 540 feet from Bird Island pier.

The plans for the tunnel were shown and explained by Mr. Vomberge. The wall was of solid masonry and there were three openings for the water to pass in. It could be shut off entirely.

Ald. Dickey inquired of Mr. Emslie if he thought the pier would stay in its position. That gentleman replied that he thought the pier a good, substantial one, which would resist the ice and current and remain in position.

Mr. Vomberge further explained that it was proposed to place a grating one foot above the bed of the river.

Mr. A. S. Bemis thought there would be no great obstruction to navigation by the pier. He had navigated the river at one time himself and was well posted in regard to the current. He said that no navigator would attempt to go down the river without sufficient steerage-way to keep in the channel and avoid the pier.

Ald. Dickey remarked that he thought the question should be settled as to whether the pier could be constructed or not; if not, then the next best thing must be done. He called for the opinion of the legal gentlemen present.

Mr. George S. Wardwell addressed the meeting, saying that objections to the pier might be made by individuals; even Congress could not obstruct the free channel of a river for the benefit of a private individual, and there was no difference in this case between a municipal corporation and an individual; therefore the city had no better chance. The question whether the pier if built in its present position would be in accordance with the Act of Congress must be considered. The bill provided that the pier should be built not to exceed 700 feet from Bird Island pier, and if built only 540 feet therefrom, as at present proposed, and found to be an obstruction to navigation, would not the government order it to be removed? All these matters should be carefully considered before the pier is put there.

Mr. A. S. Bemis thought the question of right had long been settled; if not, the fix was a sad one. We should have the same quality of water in either case, and the Erie canal should be shut off from all contact with the harbor till below the water-works.

The city had expended large sums of money and the water kept growing beautifully worse. The speaker was not a believer in lame contracts, and had always raised his voice when a member of the Council. He suggested that the city should not subordinate itself to Tonawanda, Grand Island, Wheatfield, or any inferior town along the river.

Ald. Van Buren said he acted with the citizens of Buffalo and not with the contractors. The meeting was for the purpose of considering this proposition. There was no doubt

the location of the tunnel was wrong. It was also wrong for the city to buy the water-works, but now the simple question was what was best to be done.

Ald. Carmichael said they were trying to act for the best interest of the city. Men navigating the river say it would be unsafe to have the pier there. Legal questions were involved and parties remonstrating would get an injunction. If it appeared that the pier will be dangerous, then it was a serious question whether it should be built.

Mr. E. C. Sprague then addressed the meeting. He said the question to be decided was a choice of difficulties. If the grating is built, the trouble will be to repair it when out of order. Perhaps this was the only substantial objection to the grating. On the other hand, build the pier, and in the first place, the legal risk has to be encountered. Congress has a most undoubted right to order the pier up, if shown to be an obstruction to navigation, and the speaker thought it would not be difficult to obtain such an Act. The War Department had recommended that the pier be built 700 feet from Bird Island pier, but by some operation the Act provides for any distance within 700 feet. He thought Congress could easily be induced to rescind such an Act. Then there is risk from spring ice. This nobody can give an opinion on, because the experiment is an untried one. Mr. Sprague said he appeared as representative of the International bridge. A few years ago the city was ready to subscribe for building the bridge; but it had been done without, and the draws were placed on this side. It was here proposed to construct a pier in the middle of the channel to these draws. It would be impossible to pass the pier, then get into the channel again to go through the draws. Then the citizens of Tonawanda have an immense lumber interest, and their claims must be considered. The speaker had been informed that they fully intended to try the legality of the question. The bridge company did not propose to do this. Mr. Sprague thought the tunnel might be continued 200 feet further, placed where intended by the War Department, and all the difficulties thus overcome.

Mr. George Babcock was the next speaker. He said the legal difficulties had been well stated, and nobody could tell whether the pier could stand law or not. Let it be made manifest that the pier is an obstruction to commerce, and all the great power of the West would be brought to bear upon Congress, and the Act would soon be rescinded.

Why the Act was drawn as it is, was a marvel. Of the physical difficulties, Mr. Babcock had nothing to say. He thought at times there might be some accumulation of sand in the grating after the lake had been agitated. No man can foresee the result of the legal question, but he apprehended that it would be settled by Congress.

Buffalo was in no better position than a private corporation.

From the speaker's own observation he judged the pier would be a serious obstacle to navigation. A single steamer could go down easily, but with barges and rafts there was a difference. It looked as if there was no doubt about the pier being an obstruction.

Mr. Potter said it was his opinion that the tunnel should be carried out a thousand feet, and thought it practicable to carry it to that point.

Mr. Ryan said he had formed the opinion some time ago that the pier should be put where it was now proposed. He did not think it would obstruct navigation.

Ald. Sears wished to say a word in behalf of the Common Council, which had acted under advice of engineers in charge of the city work. The fault should not be fastened upon the Council. He did not think building the pier in its present position practicable, and it was against public interest to do so.

Ald. Van Buren thought the new tunnel would be durable, and it would take ages to fill it up.

Mr. Bemis said he would undertake to say that he never saw an acre of ice going down the river together. Before reaching the river it was all broken and in detached pieces.

Ald. Van Buren here moved toadjourn, and the motion was carried. There will be a regular meeting of the Water Committee this evening, at which the whole question will probably be decided.

A description of this was given in the *Buffalo Commercial Advertiser* as a

HISTORY OF A CITY CONTRACT.

A committee of the Common Council and other persons meet this evening for the purpose of considering a proposition submitted by the contractors for constructing the new tunnel and inlet pier of the City Water-works. The proposition is a very strange one on the face of it, but perhaps it is a perfectly innocent one nevertheless.

Briefly, the contractors now propose to abandon the inlet pier work, and instead of the pier to put a grating over the mouth of the tunnel, allowing the city an abatement of ten thousand dollars from their contract price if the change of plan shall be adopted.

In order to judge whether this offer is fair, or liberal, or otherwise, it is necessary to know how much it would cost the contractors to complete the inlet pier according to the plan on which the contract is based, and how much less it will cost them to do the work they now propose instead. The difference should constitute the abatement from the contract price.

We have no means of arriving at this information, but the Council ought to take measures for procuring a fair estimate of the difference before closing with the contractors.

In this connection, however, a short history of the tunnel and inlet pier contract will not only be interesting to the public, but may refresh the minds of the Aldermen upon several matters which ought not to be forgotten by them in any further dealing with the same contractors.

The original contract was made May 9, 1870. It provided for a tunnel 700 feet long, and for the inlet pier and shaft, the shaft and tunnel the entire length of the latter to be cased with brick wall twelve inches thick. The price for the whole job was $170,000.00, and the tunnel was to be completed in two years; say just a year ago. Bear in mind these original figures.

August 7, 1871, the Common Council directed the Water Commissioners to modify the contract so as to provide for a change in the plans of the inlet pier, and to allow the contractors $70,000.00 additional compensation in consideration thereof. Satisfied that the allowance was excessive, the Water Commissioners did not for a time follow these instructions, hoping that some better arrangements could be made with the contractors. At length, November 27, 1871, they sent a communication to the Council giving the reason for their delay and suggesting a reconsideration of the question of the cost of the proposed alteration. The Council replied immediately by peremptorily ordering the Commissioners to carry out and sign a contract, which has been presented to them in behalf of the contractors in accordance with the resolution passed as aforesaid by this Council August 7, 1871. The Mayor vetoed this resolution of the Council, and recommended a reconsideration of the estimates as recommended by the Water Commissioners, in order to set at rest the anxiety which now agitates the public mind. The Council appointed a committee to examine and report the estimates, and on the report of that committee passed their former resolution over the Mayor's veto by 23 ayes to one no, Alderman John Pierce being the solitary member who stood up for the city against the contractors. Under advice of the City Attorney the Commissioners finally signed the contract, but they sent a

communication to the Council in which were given estimates upon which they had based their refusal to sign the contract in the first place, and adhering to their former opinion that the allowance to the contractors was largely excessive.

The next alteration occurred April 1, 1872, when the Council ordered the Water Commissioners to modify the contract by adding 300 feet to the length of the tunnel, making it 1,000 instead of 700 feet long, and to allow the contractors $109,000 for the difference. The contractors had previously been released from the obligation to case the tunnel its entire length with a brick wall 12 inches thick, and, fortunate contractors, they were not required to make any allowance to the city in consideration of the vast saving which this important change must have made.

The next change occurred December 2, 1872, when the Council ordered that the contractors be allowed to complete the tunnel at 878 instead of 1,000 feet in length, on account of the difficulties they had discovered in carrying the work beyond the former point, the Council, however, deducting $18,300 from the contract price, on account of this 122 feet shortening of the tunnel, or at the rate of $150 per foot for the most difficult part of the work. The Council had previously agreed to allow the contractors $109,000 for adding 300 feet to the original length of the tunnel, or at the rate of $363.33 per foot. This deduction could not but be deemed very liberal treatment to the contractors, but perhaps fearing that their feelings might be hurt, the Council at the same time allowed the contractors the sum of $22,000.25, on the plea that the amount had been expended by them in changing the position of the inlet pier and building a wall at the termination of said tunnel, as now constructed.

The Mayor vetoed this action, on the ground that it gave the contractors a larger sum for the shorter tunnel than they were to receive for the long one, which they had undertaken to construct, so that the effect of the resolution was virtually offering a premium to Douglas & Co. for not fulfilling their contract. The Council unanimously repassed the resolution over the Mayor's veto.

This covers all that has been done between the contractors and the city up to this time. The figures are significant enough to deserve the following recapitulation:

Original price for 700 feet tunnel and inlet pier,	$170,000.00
The first change added,	70,000.00
The second change added,	109,000.00
Total for 1,000 feet tunnel and inlet pier,	$349,000.00
The third change, shortening the tunnel 122 feet, deducted,	18,300.00
Making for 878 feet tunnel and inlet pier,	$330,700.00
But the third change also added,	22,600.25
Making a grand total of,	$353,300.25

Now, compare the difference between the relative prices of the original and the altered contracts.

In the first contract, the price per foot of tunnel was not quite $243; in the contract as altered, the price is over $402 per foot. The inlet pier is provided for in both contracts.

At $243 per foot for the tunnel, the contractors were required to protect the work with brick walls 12 inches thick; at $402 per foot, they are allowed to omit this expensive brick casing.

These figures suggest their own comments. We respectfully submit them for the consideration of the meeting to-night, with this simple question, with which we dismiss the subject for the present: "Why is it that the contractors have so much more influence with the Council than have the Mayor, the Water Commissioners and the public sentiment?"

From the *Commercial*, May 18, 1873:

THAT COMPLICATED CITY JOB.

Very little information of a satisfactory nature was developed at the inlet pier meeting last evening, to which we invited attention in our last. For it cannot be considered at all satisfactory to learn that the principal reason why this costly inlet pier is dangerous to navigation is because it is not located where the contractors were ordered to place it, *i. e.*, at the end of a tunnel 1,000 feet long, and this appears to be the only fact that was clearly established last night.

What a sorry piece of bungling and corruption (we are not quite clear which) this inlet pier and tunnel business has been all the way through. Consider the plain, unvarnished statements which were presented in our "History of a Contract" yesterday. At first the contract was let for a tunnel 700 feet long, and let, of course, to the lowest responsible bidder; but before the job is well under way, additions and alterations are made, which give the contractors at least double their price for the work. What is the use of accepting the lowest bid, if the contract can be altered in this way! What is the use of bidding against such fortunate and influential contractors?

After securing the contract for a tunnel 700 feet long at $243 per foot, they found no difficulty in persuading the Council to allow them $70,000 extra for a change in the work, in spite of the remonstrance of the Water Commissioners and of the Mayor's veto. They found no difficulty in making a greater change on their own account—that of leaving off the stipulated expensive brick casing, without any allowance to the city therefor. They found no difficulty in persuading the Council to allow them $363.33 per foot for an addition of 300 feet to the length of the tunnel, and when they encountered difficult work, they found no difficulty in persuading the Council to allow them to stop 122 feet short of the specified distance, and allow them $4,300.25 more than they were to receive if they had completed these 122 feet. The Mayor's veto did not form the slightest obstacle to the contractors' persuasive powers in this case. And now the contractors are trying to persuade the Council to abandon the inlet pier entirely, and accept for the city an abatement of $10,000 from the contract price on the work for which the city was charged at least $100,000 in the contract.

It will not surprise us at all if these influential contractors succeed in persuading the Council once more, though the latest effort is surely about the hardest pill the taxpayers have been called upon to swallow. Certainly Messrs. Douglas & Co. could not have been more successful hitherto, even if they had owned the Council as well as the contract.

May 19, 1873, in the *Buffalo Commercial*:

IT IS CONDEMNED BY THE ENGINEER WHO MADE THE PLANS AND SPECIFICATIONS.

Editor Buffalo Commercial Advertiser:

As the *Commercial* is a paper of great power and influence, and always ready to expose any project that is likely to injure the prosperity of the city of Buffalo, I was glad to find in its issues of the 14th and 15th days of May an interesting account of "That Complicated City Job"—the tunnel and inlet pier—showing the different changes.

Being a citizen and a taxpayer, and having, in a small way, to help bear the burdens of taxation, I ask the privilege of making a few remarks respecting the Buffalo City Water-works, the construction of the new tunnel, inlet pier, etc.

In the first place, I would say, as the *Commercial* has frequently said, it would have been well for the city if it never had purchased the old water-works. But having made a bad bargain, the next thing ought to be to make the best of it; but instead of doing

so, it seems to me we are making a bad bargain worse every move. When I sent in my plans and specifications for the alteration and improvement of the water-works, according to the public advertisement by the Water Commissioners, inviting engineers to send in plans for extending the present old tunnel or driving a new one under the Niagara river, constructing an inlet pier and certain other improvements to the Buffalo City Water-works, I sent with those plans a communication recommending, instead of extending the old tunnel or driving a new one under the Niagara river, that the water be taken from the lake, as by so doing the city would get a supply of water free from sewage matter and street washings. If the recommendation had been followed, there would have been no difficulty about constructing the inlet pier. My plans and specifications were adopted by the city, and the contract was made to construct the work according thereto; but they were never carried out, having been altered several times, as shown in the *Commercial* of the 14th and 15th inst., at a great expense to the city, without any improvement and with the prospect of never being completed by the present contractors, unless the city allows them to do the work in their own way and pay them a premium for non-completion. This has, indeed, been a complicated job from the commencement.

But the changes have been made and the money paid. The next thing is to make the best of what is left of the tunnel. By the report made by the engineer and the communication sent by the contractors to the Common Conncil, they seem to have found (to them) an insurmountable difficulty in the way; but there is no difficulty that might not be overcome by a little engineering skill and perseverance.

The first obstacle in the way of driving the tunnel to the distance intended seems to be a little water struck in a seam of the rock. This seems to have scared everyone connected with this ring tunnel. I have had some experience myself in walling water out of shafts of the coal mines in England. I had in one of these shafts one plunger pump, 20 inches in diameter, one 14-inch lifting pump and one 13-inch lifting pump, all working a ten-foot stroke each by a heavy Cornish engine, and it was all they could do to pump the water as fast as it came into the shaft. This was probably more than twenty times the water that ever came into the tunnel. Now, if our engineers and contractors are so badly scared at the little water struck in the rock in the tunnel, that they can not or will not drive it any farther, I think that, rather than lose the hundreds of thousands already paid on this ring tunnel, it would be better for the city to employ some good practical hydraulic engineer. Such an engineer would probably have nerve and skill enough to see that the inlet pier is located far enough in the river to be out of the current of navigation, and where the water is more clear than at the present intended location, and to drive the tunnel out to the pier.

But it would be better to abandon the whole project than let the water into the tunnel through a grating from the bed of the river, as proposed by the contractors. If the water is let into the tunnel as proposed by the contractors, the tunnel will be filled up with sand and sediment within five years, and it could never be cleaned out.

I would ask, in conclusion, if so much water was struck in the rock of the tunnel that it could be driven no farther, how did the contractors manage to build the brick wall at the end of the tunnel to try to keep the water out? I understand it was a failure, although a big bill was paid for this piece of work.

THOMAS DARK.

From the *Buffalo Evening Post*, May 21, 1873:

Thomas Dark, Esq., a citizen of great experience in tunnel and pier building, has written a letter upon the subject of what has been very properly styled a complicated job, or in other words, the contract for building the new tunnel and inlet pier. Additional

weight will be attached to Mr. Dark's views when it is remembered that he prepared the plans and specifications for the original work, and that they were selected as the best presented in response to the advertisement and reward offered for such work. When Mr. Dark states that it would have been well if the city had never purchased the old water-works, we all say Amen! When he says now that we have got them on our hands and must make the best of a bad job, we are all prepared to endorse his views again.

He also claims that had his plans been carried out instead of set aside, a great deal of unnecessary expense would have been saved to the city. He recommended that instead of extending the old tunnel or driving a new one under the Niagara river, that the water be taken from the lake, as by so doing the city would have got a supply of water free from sewage matter and street-washings. If that recommendation had been followed, there would have been no difficulty about the construction of the inlet pier.

He then holds that we must make the best of what is left of the tunnel. By the report made by the engineer and the communication sent by the contractors to the Common Council, they seem to have found to them an insurmountable difficulty in the way, but there is no difficulty that might not be overcome by a little engineering skill and perseverance.

The concluding paragraphs of Mr. Dark's letter, which was published in the *Commercial* of Monday, we give below on account of their interest to the public:

"The first obstacle in the way of driving the tunnel to the distance intended seems to be a little water struck in a seam of the rock. This seems to have scared every one connected with this ring tunnel.

"I have had some experience myself in walling water out in shafts of the coal mines in England. I had in one of these shafts one plunger pump 20 inches in diameter, one 14-inch and one 13-inch diameter lifting-pump, all working a 10-foot stroke, each by a heavy Cornish engine, and it was all they could do to pump the water as fast as it came into the shaft. This was probably more than twenty times the water that ever came into the new tunnel. Now, if our engineers and contractors are so badly scared at the little water struck in the rock in the tunnel that they can not or will not drive it any farther, I think that rather than lose the hundreds of thousands already paid on this ring tunnel, it would be better for the city to employ some good, practical hydraulic engineer. Such an engineer would probably have nerve and skill enough to see that the inlet pier is located far enough in the river to be out of the current of navigation, and where the water is more clear than at the present intended location, and to drive the tunnel out to the pier.

"But it would be better to abandon the whole project than let the water into the tunnel through a grating from the bed of the river, as proposed by the contractors.

"If the water is let into the tunnel, as proposed by the contractors, the tunnel will be filled up with sand and sediment within five years, and it could not be cleaned out.

"I would ask in conclusion if so much water was struck in the rock of the tunnel that it could be drawn no farther, how did the contractors manage to build the brick wall at the end of the tunnel to try to keep the water out? I understand it was a failure, although a big bill was paid for this piece of work. THOMAS DARK."

Now let us review what different opinions were expressed at the special meeting held May 15, 1875.

This meeting was attended by members of the Committee on Water, the Water Commissioners, and members of the Common Council, civil engineers, and some of the best professional gentlemen of the city, and others.

Ald. Carmichael called the meeting to order.

Mr. Behn, the Canal Engineer, who had been a great friend to the contractors in making previous changes from the original plans, was the first gentleman called to give his views on dispensing with the construction of the inlet pier and to substitute therefor an iron grating on the bed of the river.

Mr. Behn said he doubted whether the pier could be constructed at the estimated cost, meaning, of course, the $70,000 added to the first contract price, on account of the change made in the plan. He was very considerate for the interest of the contractors and to further help in trying to dispense with the construction of the inlet pier altogether. He was not sure the city had a right to construct the pier in the river.

Mr. George Vomberge, the Assistant Engineer, was next called on, and stated that he appeared to give Mr. Ditto's opinion, as that gentleman was unable to be present.

As Mr. Ditto had worked so earnestly in behalf of the contractors to get the original plans annihilated he might have been justly excused for nonattendance at this meeting; nevertheless he instructed his assistant to say that the proposed grating would answer the purpose.

Mr. George Vomberge was then asked to give his own opinion.

He said that he was always opposed to taking the water supply from Niagara River, but thought it safer to have an inlet pier than the grating. The new tunnel would fill up sooner than the old one.

Water Commissioner Potter said the old tunnel was filled up and was to be pumped out next Sunday.

Mr. Peter Emslie, civil engineer, was next requested to give his views.

He thought the grating would answer, but the tunnel was located in the wrong place.

Water Commissioner Ryan said if the pier was constructed, could it be maintained against the Spring ice, and the charges that it would be an obstruction to navigation?

Ald. Dickey thought the sewage would never reach the mouth of the new tunnel.

Commissioner Ryan said there was no bad water when the canal was clear.

Mr. George Vomberge said the inlet pier could be built to resist any current or any accumulation of ice.

Ald. Carmichael said the proposed change was on account of the remonstrance of citizens of Tonawanda, Wheatfield and Grand Island.

Mr. Clark, of the firm of Clark & Douglas, said that rafts could not pass inside the pier without tugs.

Next the plans of the tunnel made by Thomas Dark were shown and explained by Mr. George Vomberge, who said the walls were of solid masonry, with three openings for the water to pass into the tunnel, and could be shut off at any time.

Mr. Peter Emslie, civil engineer, said he thought the pier would stay in its position. He said he thought the pier a good, substantial one, which would resist the ice and current, and remain in position.

Mr. Vomberge further explained the placing of a grate about one foot above the bed of the river, as proposed by the contractors.

Mr. A. S. Bemis thought the pier would be no great obstruction to navigation, and said the city had expended large sums of money and the water kept growing beautifully worse.

Ald. Van Buren said there was no doubt the location of the tunnel was wrong; it was also wrong for the city to buy the water-works.

Commissioner Ryan said he had formed the opinion some time ago that the pier should be put where it was now proposed.

Mr. Bemis said he would undertake to say that he never saw an acre of ice going down the river together. Before it reached the river it was broken and in detached pieces.

It will here be observed what a contrast there was between the statement of Mr. Bemis, who had been well acquainted with Niagara River, and the statement previously made by Mr. Ditto in his recommendation to the Council to change the plans made by Thomas Dark, and to adopt the plans made by him, wherein he tried to make it appear that a field of ice 1,500 feet square and one foot thick might come down the river and strike the pier with a force of 65,000 tons weight.

I had seen the river covered from shore to shore, and in my judgment, six feet above water level, but it was all broken up.

The opinions given at this meeting by the different gentlemen are worthy of note.

Mr. George Vomberge, who was one of the best and most practical civil engineers in the city of Buffalo, approved of my plans, and was followed by Mr. Peter Emslie, who was a practical civil engineer, and who said he thought the pier a good, substantial one, which would resist the ice and current and retain its position.

Ald. Van Buren thought the pier was in a wrong location, but the new tunnel would be durable.

Notwithstanding the good opinion of these two good, practical civil engineers and others as to the practicability and substantial character of my plans, it was determined by the contractors and their friends that a change must be made for the benefit of these influential contractors and their friends, and the whole of the plans made by Thomas Dark must be

annihilated, even though it would cost the taxpayers of the city of Buffalo $183,300.25 more than if the work had been done according to the original plans.

And now we will try to show what the city got by making the change:

First—The city has an inlet pier built of masonry upon a timber foundation, laid upon the uneven rock of the river bed, which has been broken by the weight of masonry laid upon this timber foundation. The breaking of the timber foundation caused the masonry in the inlet pier to settle, and a massive wrought-iron shield, at a great cost, is laid over that part of the inlet, which covers the settlement in the masonry.

The weight of masonry on a timber foundation, as I have been informed by one of the best civil engineers in Buffalo, is all that is holding the masonry in the pier in its present location, as it is not anchored to the rock-bed of the river; and if it were possible for such a field of solid ice, with the force of 65,000 tons, as described by Mr. Ditto in his communication to the Common Council, to strike it, it must start toward Niagara Falls.

Second—The city has a pier of masonry with only two inlets to admit the water from the river into the well in the pier, and those two inlets are without any gates fixed in them to shut the water out of the tunnel if required at any time, and on account of the contracted space in the inlets, the danger of the water supply being cut off by slush ice is increased.

Third—The city has an uneven and unshapely hole blasted in the rock from the bed of the river to act as a well to convey the water from the inlets into the tunnel. It has an irregular and unshapely tunnel driven in a rotten strata of bastard lime stone full of small seams; and the rock being shaken by blasting, no doubt many tons of loose rock are in the tunnel, being washed out by the rapid current of water flowing through the tunnel to the pumps. It has the main tunnel shaft on the shore end. And all this without any brick work to protect the well, the tunnel, or the main tunnel shaft.

If the plans made by Thomas Dark had been carried, out the city of Buffalo would have had a substantial pier of masonry built upon a solid bed of rock, with a sufficient number of wrought-iron anchors three inches in diameter dovetailed into the solid rock and running from the bed of the rock to the top of the masonry in the pier, with a large cast-iron washer and a nut on the end of each anchor, which would have held more than twice the amount of the weight of masonry in the pier against the current, or flow of ice, and could never move unless the stone in the wall became crushed.

It would have three inlets in the pier for admitting water to the tunnel, with three shut-off gates, which could be closed when needed.

It would have a well at the inlet pier six feet in diameter in the clear, with a lining of twelve-inch brick wall.

It would have a tunnel seven feet high by five feet wide at the springing of the arch, with a uniform egg-shape, and having a twelve-inch brick wall for a lining.

It would have the tunnel shaft at the shore end of the tunnel six feet in diameter in the clear, lined with twelve-inch brick wall.

The city would have all of the above, according to the plans made by Thomas Dark, at a cost of $183,300.25 less than the cost made by changing the plans.

This ought to convince the taxpayers how a small portion of their money was used, and also show, as the *Commercial Advertiser* and many persons have said, that it would have been well for the taxpayers if the city had never purchased the water-works.

The above shows what power the contractors had with the City Engineer and many members of the Common Council and other officials to make changes in the plans so as to allow the contractors to carry out the work to suit their interest and the interest of their friends at an extra cost of $183,300.25, at the same time giving an inferior class of work in an improper location without due consideration to the important matter of supplying an abundance of pure water to the city of Buffalo, as will be seen as we follow along the line of the construction of the work, the mode of supply, and the quality of the water supplied.

As the population of the city increased, the demand for a larger supply of water increased, and the demand for more pumping machinery increased, and the commissioners found the storage reservoirs would hold only about one day's water supply. They felt alarmed, as in case anything should happen to the machinery or pumping mains, the city would be deprived of water, although some of the statesmen in the Council, in their scheming to alter the original plans which had been accepted and adopted as the best for the requirement of improving and enlarging the city water-works, had, in their wisdom, said that large reservoirs were not necessary where steam pumping machinery was in use, as the pumps could be depended upon.

On July 21, 1873, the water commissioners sent a communication to the Common Council as follows:

The present reservoir, bounded by Prospect avenue, Niagara, Vermont and Connecticut streets, and upon which the entire city is dependent for its water supply, is entirely inadequate for the purpose for which it was designed.

The commissioners recommend to your honorable body that the present reservoir be raised at least ten feet from its present height, which will give an increase of capacity to

the present reservoir of 8,000,000 U. S. gallons, making a total capacity of 21,000,000 U. S. gallons, giving to the reservoir a storing capacity of over two days.

We recommend this measure to your honorable body as being in our judgment the only relief at this time.

C. J. WELLS,
P. S. MARSH,
JAMES RYAN,
Commissioners.

No doubt those gentlemen were honest in stating that in their judgment this was the only relief.

But to any hydraulic engineer conversant with the construction of earth embankments of reservoirs, and knowing the location of the Prospect reservoir, the size of the lot on which the reservoir stood, and the mode of its construction, the recommendation of the commissioners would have been considered impracticable and a dangerous one if ever carried out.

August 18, 1873.

From the Water Commissioners:

On the 4th inst. your honorable body adopted a resolution approving the recommendation of the Water Commissioners, that the present reservoir be raised ten feet above its present height, and directed them to advertise for proposals to do said work.

Plans and specifications of the proposed work have been prepared by our engineer, and are on file at our office.

We would therefore recommend that the Common Council adopt these plans and specifications and order the work to be done according to them.

These preliminary steps being taken, we can proceed at once to advertise for proposals for doing the work.

C. J. WELLS,
P. S. MARSH,
JAMES RYAN,
Commissioners.

Referred to the Committee on Water.

August 25, 1873.

By Ald. Carmichael, from the Committee on Water:

That the plans and specifications submitted to this Council by the Water Commissioners for raising the embankment of the reservoir, now constituting a part of the city water-works, be, and they are hereby adopted; that the work proposed be ordered in accordance therewith, and the Water Commissioners be, and they are hereby directed, to advertise for proposals for doing the same accordingly, and report said proposals to this Council.

Adopted.

September 22, 1873.

From the Water Commissioners:

In compliance with your instructions we have advertised and received the following proposals for raising the banks of the present reservoir, bounded by Prospect avenue, Niagara, Connecticut and Vermont streets:

E. W. Enign, with Berea face stone and backing from quarries here,	$155,622.85
John Hickler, with limestone or sandstone facing and concrete foundation,	137,900.00
The same with timber foundation,	134,000.00
Barker, Whitney & Co.,	127,000.00
George B. Allen,	148,766.00
Thomas Dark,	131,484.00
Isaac Holloway, concrete foundation,	139,500.00
" " timber "	134,500.00
Clark & Douglas,	122,500.00
McNamara & Higgins,	285,000.00

The Board has carefully examined the several proposals submitted to them, and they are of the opinion that the bid of Mr. John Hickler is a reasonable one and just to the city.

In his bid he proposes to build the face of the walls with limestone or sandstone, which, for the locality of the work, *in our judgment*, is greatly to be preferred to that of walls built entirely of flintstone.

We have accordingly awarded the work to Mr. John Hickler, and the contract for the same has been executed and is on file at this office.

Respectfully submitted,

C. J. WELLS,
P. S. MARSH,
JAMES RYAN,
Commissioners.

Referred to the Committee on Water.

Ald. Einsfield, by unanimous consent, offered the following resolution and moved its adoption:

That all action heretofore had by this Common Council, empowering the Board of Water Commissioners to advertise for proposals to raise the embankments of the present reservoir on Prospect hill, be and the same is hereby rescinded.

Adopted.

Ayes—Ald. Baynes, Bott, Carmichael, Churchyard, Cotter, Daniels, Dickey, Doyle, Einsfield, Fisher, Frank, Heinrich, Herman, Jessemin Laible, Prenatt, Reichart, Reinheimer, Sears, Seymour, Sipp, Weber, Webster—23.

Noes—Ald. McLeish—1.

In the year 1859 I had the contract for cutting a trench through the reservoir embankment in two places. When the water was drawn off from one section of the reservoir to allow me to commence work, the inside of the embankment on the Niagara street side of the reservoir caved in for its whole length. At the same time I explained to Albert H. Tracey, Esq., president of the Buffalo City Water-works, that the construction of the reservoir was altogether wrong, and that if the water should be drawn off rapidly, the embankment would be likely to slide on the inside at any time.

It will be noticed that I put in a proposal to raise the embankment according to plans and specifications, but I told several of the Aldermen before the proposals were opened that if I should be the lowest bidder, I would not sign the contract to take any responsibility for the stability of the work, as I was satisfied the embankments when raised would not stand the pressure of the water to be filled to the intended height.

I have no doubt but this had such an effect upon most of the Aldermen as to cause them to rescind their former action.

The Mayor no doubt saw the folly of the Water Commissioners in so hastily executing the contract for this impracticable work with Mr. John Hickler, making the city liable to Mr. Hickler for damages.

September 29, 1873.

From the Mayor:

To the Honorable the Common Council:

GENTLEMEN—I have the honor herewith to return without approval the following resolution adopted by your honorable body on the 22d inst.:

That all action heretofore had by this Common Council empowering the Board of Water Commissioners to advertise for proposals to raise the embankments of the present reservoir on Prospect hill, be and the same is hereby rescinded.

My reasons for not approving the foregoing resolution are that the Common Council has exceeded its legitimate authority, as the Board of Water Commissioners, acting under the instructions of the Council and by its authority vested in them by the city charter, advertised for proposals, and by the same authority entered into contract for doing this particular work.

The city is undoubtedly legally bound by the doings of the board in this matter, and in my opinion it will be bad policy to repudiate its action. ALEX. BRUSH,

Mayor.

Laid on the table temporarily.

Ald. Carmichael moved that the communication from His Honor, the Mayor, relative to the action of the Council with reference to the matter of elevating the banks of the reservoir connected with the water-works, heretofore laid on the table, be now taken therefrom.

Ald. Carmichael then moved that the resolution returned by His Honor, the Mayor, be now adopted, notwithstanding the objections of His Honor.

Adopted—Ayes 21, noes 0.

From the time the city purchased the water-works in May, 1868, up to November, 1873, the Common Council, the Water Commissioners and other officers who had charge of the enlargement and improvement of the Buffalo City Water-works, had neglected the important question of securing an abundant supply of pure water for the city. They had not taken any serious action in pointing out the great risk the city was taking if the

inlet pier was located in any part of the Niagara river by the water supply being shut off at any time by slush ice choking up the inlets, depriving the citizens of water for domestic use, and leaving the city destitute of water in case of a large fire breaking out.

They never seriously considered that the location of the old pumping-house was where the city would always be more or less subject to getting impure water if the supply was continued to be taken from the river at that point.

They did not take into consideration that when the city purchased the water-works there were only three pumping engines at the old pumping stations, and two of them getting so that they needed repairing, and after being repaired, the pumps would be sufficient to supply the city with water, such as the quality of the water was, until the city could drive a new tunnel out into the lake and construct new pumping machinery on the lake shore at a point opposite to where Michigan street extended would strike the sea-wall. In this way the city could secure an abundant supply of pure water for all time.

All of this was laid before them for their consideration, and had the suggestions been heeded and the new works honestly constructed, the city of Buffalo might to-day be in possession of one of the best and purest water supplies in the United States, and at a saving to the tax-payers of over $1,000,000. But, alas, it is too late; the money is spent and the city to-day has an uncertain supply of impure water.

Instead of the city officials who had charge of these improvements being deeply interested in giving the city of Buffalo an abundant supply of pure water at an honest cost to the city, the record shows that the principal interest manifested was in securing what was to the best interest of the contractors, ignoring altogether the question of giving the city an abundant supply of pure water, and with no consideration for the tax-payers' pockets.

I stated that there were three pumping engines when the city purchased the water-works. As the population increased, it was found necessary to increase the pumping capacity, which has been done from to time at great expense to the city, increasing the quantity of water, but without improving the quality, as the water is taken from the river in its crude state, sometimes very roily and impure. Nevertheless, as the pumps draw the water from the river, it is forced through the service mains, and all house connections with the service mains deliver the water into each dwelling for domestic use. Sometimes the water is unfit for washing a floor. This occurs when the current of water in the service main is very strong. At times it will stir up what sediment may be in the service main, which, in addition to the roily condition of the water from the river, is carried into each dwelling, and those who are not fortunate

enough to have a filter in the house, must eat and drink what the water supply gives.

Strange as it might appear for a great city like Buffalo, the system of delivering the water for domestic use continues the same to this day. The water for domestic use is pumped in its crude state through the service mains, from which citizens receive their supply, and the surplus water not drawn off from the service main for domestic use passes on to the reservoir. This way of constructing water-works and delivering water for domestic use will appear a great novelty to many prominent hydraulic engineers, whose way of constructing water-works is to have a separate pumping main deliver the water from the pumps to filter-beds, and have the water flow from the filter-beds to the reservoir, the service mains for distributing the water over the city taking their supply from the reservoir and giving a supply of pure filtered water to every citizen alike.

This was what the plans made by Thomas Dark, and accepted, and adopted by the city, were intended to do if they had been honestly carried out. And if my suggestion to take the water supply from the lake had been adopted and the inlet pier had been constructed as I intended it should, it would have been built so as to insure a supply of water for three million inhabitants, with inlets of over 600 square feet area, and constructed in such form as to be impossible ever to be choked with slush ice. The tunnel would have been constructed in such form as to increase the water supply when required, and all the water would have been filtered, which is considered to be very important by the best of scientific men in every civilized nation. I have diagrams showing what my plans would have been had they been carried out.

From the *Commercial:*

LETTERS FROM THE PEOPLE, JANUARY 5, 1885.

A gentleman called at the City Clerk's office this afternoon and inquired for the City Chemist. He was pretty well laden with bottles containing samples of Niagara water, which he showed to a *Commercial* reporter.

"These are samples of water I drew from the kitchen boiler," said he.

The first sample was of a muddy, olive green color. The next was quite thick, and a sample of the settlings was carried in a pasteboard box, being thick mud.

"This may be all right, and healthy stuff to drink," said the man, "and if it is, why, the people ought to know it. It seems to me there is a leak somewhere in the pipes. I will have this analyzed, if I have to pay the expense myself."

From the *Commercial,* January 14, 1885:

Editor Buffalo Commercial:—I read in the *Commercial* of January 9, 1885, an article on our poisoned water. It showed how it is being contaminated, &c. Please permit me to state a few facts in relation to this very important matter.

It is natural that when the water is roily in the Niagara River persons receiving their supply from the big service, or Holly mains, or from the large mains which run direct from the lower pumping house through Sixth street, Court street and Clinton street to East Buffalo, should find more sediment in their water than those supplied by the old system.

Consumers supplied from the old mains leading direct from the reservoir have the benefit of the settlings which take place in the reservoir—thus getting rid of the heaviest part of the mud and filth, but those of us who take the water direct from the high or Holly service, or from the large mains which run direct from the lower pumps to East Buffalo, have to take it just as it is received from the tunnel and pumping aqueducts, with all its load of filth and sediment. The water in those mains is always in motion, allowing no time for settlement. When drawing water for drinking purposes, of late we often find it so thickly charged with mud and muck at my house that it is not fit to wash the floor with, to say nothing about drinking purposes.

Why is it the water has become so filthy within a few weeks? I see by the *Commercial* that it is believed to be due to the mud and muck dredged from various canals, slips, harbor, &c., being dumped at the mouth of the river, so that the current passes over it, and that when this filth is disturbed by a southwest gale it is carried by the current directly to the inlet pier.

This is no doubt the cause of a great deal of the trouble.

The intercepting sewer may aggravate the trouble, but the cause you have pointed out is the leading one. The health of our people in a large measure depends upon the quality of the water they are forced to drink. Let the authorities, therefore, move in the matter promptly and take whatever steps are necessary, even to running a new tunnel out into the lake to secure a pure water supply. THOMAS DARK.

FROM THE FIRST WARD.

Editor Buffalo Commercial:—Continue your agitation for pure water until relief is granted. You are laboring in the cause of humanity. The condition of the water at my house at certain periods for two months past has been absolutely offensive to the eye as well as to the palate.

The other day it was very roily and I made a little experiment. I desired to see, if possible, what kind of substance was mixed with the water, having no special objection to a little sand or dirt from the bottom of the lake. Accordingly I drew an ordinary size pitcherfull, allowed it to stand for half an hour, and then carefully poured off the water. To my disgust I found not lake sand, but half an inch of a black, offensive looking substance, that looked for all the world like the bottom of Buffalo Creek below where the oil works, glue factory, chemical works and slaughter houses discharge their refuse into the stream. Can it be possible that the authorities are indifferent to this sort of thing? If they are, let the people hold mass meetings and express their views upon the subject. FIRST WARD.

From the *Commercial*, May 17, 1891:

The purity of the city's water-supply is a matter of paramount importance to all its citizens. That the supply is occasionally roily, impregnated with sand and very possibly with organic matter of an objectionable nature, has been quite recently demonstrated. Any suggestions in the line of mitigating the evil or indicating a remedy are therefore always in order and acceptable to readers of the *Commercial.*

Among those whose practical experience and study of the subject entitle their ideas to special consideration, is Mr. Thomas Dark, the veteran contractor, who during his long

and busy lifetime has been practically interested in many sewerage and water-supply enterprises.

Talking with a *Commercial* representative concerning the recent cases of impurity of the water supply, he said :

"I doubt whether the proposed expenditure of $80,000 on the inlet to the old tunnel at Bird Island pier will remedy the trouble. The fact is, in my opinion, the inlet is located in the wrong place, and the roily water from the Buffalo river with its street washings coming into Black Rock harbor must more or less find its way into the inlet, and be pumped into the mains which supply the city."

"What remedy do you suggest?"

"I can best answer the question by saying that if the plan proposed as far back as 1869 had been adopted, there would be no such trouble as that which is now being experienced."

"What was that plan?"

"My plan was to construct from a point where the Pratt and Wadham slip, if extended westerly, would strike the sea wall, westerly into the lake a tunnel of sufficient capacity for a distance of about 3,500 feet so as to come into the clay bottom at the depth of from 28 to 30 feet of water. The pier for the protection of the inlet at that point would have been of less obstruction than the one in the Niagara river. The pump well, engine, boiler-house and coal sheds could have been built between the Blackwell canal and the sea wall opposite the westerly end of the Pratt and Wadham slip, and the pumping-main could have been laid below the bottom of the Blackwell canal, Pratt and Wadham slip, the Buffalo river, and Main and Hamburgh canal, through Michigan street, easterly through North street to the reservoir, which it was proposed should be constructed on High street near where the present Dodge Farm Reservoir is now being completed. In my communication to the Water Commissioners, July 1, 1869, submitting my plans and estimates, I pointed out that the very trouble which has now arisen would probably be met with. In that communication, after referring to filters, which were proposed, I said: 'The filters will cleanse the water and make it clear when it is roily in the river, but they can not purify it from the impurities dissolved from the sewerage water.'

"The tunnel, pier and inlets are located with reference to the present location of piers and banks of the Niagara river. The United States Government is now constructing a new breakwater further west from the old lighthouse, and the Canal Board of the State of New York proposes to change the location of the southerly end of the Bird Island pier and construct a jetty pier at the foot of York street. These changes will in the future alter the current, and carry the sewage of the city more into Niagara river. It will then be more difficult to obtain a supply of pure water, and I may also add that all the mud dredged from the Buffalo river and all the canals and slips is dumped into the current of Niagara river. My plan for taking the water from the lake south of the old lighthouse would have avoided all this trouble, as the only matter which the water contains would be sand from the bottom of the lake in case of rough weather, and the water could very readily have been filtered."

"Was that plan suggested after the city had purchased the water-works?"

"Yes; but not a penny had been spent in improving the machinery or in constructing the present tunnel and inlet pier."

"Do you think your plan was practicable?"

"Certainly it is. With such a magnificent supply as can be drawn from the lake, there is no reason why the people of Buffalo should continue to drink dirty water, nor to live in fear of a water famine because of slush ice clogging the inlets to the pumping wells. My plan met with great favor when first adopted."

Copied from the *Commercial:*

There is a disposition on the part of partially educated people to sneer at the suggestions of science in relation to matters of personal and public sanitation. But the statistics prove that there is safety, there is health, and, what is of more importance in the opinions of many, there is money in strict adherence to the advanced tenets of sanitary science. A report of Dr. Fuller, bacteriologist of the Massachusetts Board of Health, recently published in the *Sanitarian*, gives the results of 12,000 bacteriological examinations and analyses of water treated by filtration at Lawrence, Mass., where sand filter-beds have been erected.

The results are most satisfactory, the filters removing about 99¼ per cent. of all germs in the applied water by means of filtration of its water supply. The death rate from typhoid fever in Lawrence has already been reduced 60 per cent.

April, 1895.

From the *Commercial*—Comments on Topics of the Day.

THE WATER SUPPLY OF THE CITY OF LONDON.

The great city of London has probably the purest drinking water of any large city in the world, says the Baltimore *News*, and this notwithstanding the Thames and the Lea on their way to the metropolis pass through a populous region where there is much industrial waste and pollution. The secret is in the system of sand filter-beds that intercept and remove the impurities. A report of analyses of fifty-eight samples of water collected during the month of February has just been given to the public, by which it is shown that the fluid in the London mains is extremely pure and wholesome. Examinations made daily of the general filter wells into which the water goes after passing through the sand beds showed an average for one month of forty-four bacteria to the cubic centimeter, while the water from the river before filtration contained 7,334 bacteria to the same volume. In spite of the enormous population, London is one of the healthiest cities in the world, and this fact is no doubt largely explained by the excellence of the water supply.

After presenting the complaints of the impurities of the water and the uncertainty of a constant supply at all times, made at various times since 1868 by the press and by citizens of the city of Buffalo, as herein copied, and the whole official proceeding as herein set forth, I leave it to any intelligent and unprejudiced mind to judge which would have been best for the interest of the taxpayer, and also for the whole city at large, both for the present and for the future, to give to the whole city an abundant supply of pure water—the altered plan made and adopted by the city officials at an enormous cost extra to the city, and the present mode of supplying the city with water, or the plans, suggestions and recommendations made by me from time to time.

I have collected and arranged all the above proceedings, complaints, comments, etc., not to gain notoriety, or for political purposes, but to let the citizens of Buffalo know how the water is supplied to us, and the great risk the city is taking of the water supply being cut off at some time by slush ice choking the inlets. Of the impurities of the water at times I need not speak further, as it is a matter that is well known to most of the citizens of Buffalo.

THOMAS DARK, SR.