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Report

OF THE

COMMITTEE

APPOINTED BY THE COMMON COUNCIL TO
ENQUIRE INTO THE STATE OF THE

Water Works.

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Printed by order of the Common Council.

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1802.

REPORT.

The Committee appointed

“ To enquire into the state of the Water Works, the money already expended, and the probable sum which may be required to complete the same, and to report to Council a full and general statement, respecting the Works,”

Beg leave to Report,

THAT, in discharge of the duty assigned them, your Committee have conceived it proper, in order to furnish Council with the fullest information, respecting the commencement and carrying on the Works, to give, in this their Report, a copy of a letter from Mr. Latrobe to Mr. Miller, chairman of the committee of the Select Council, on the subject of watering the city; and copies of the several contracts entered into with Mr. Roosevelt and Mr. Latrobe, respecting the Works.

Mr. LATROBE's LETTER.

Philadelphia, Dec. 29th, 1798.

“ SIR,

“ AGREEABLY to your request, I now submit to you my ideas upon the subjects which you have communicated to me for consideration : viz.

1. “ To supply the city of Philadelphia with a sufficiency of wholesome water, for culinary purposes.

2. “ To introduce an additional supply of water for the purpose of washing the streets, and, if possible, of cooling the air of the city.

“ The season and the weather are at present both unfavourable to an investigation of all the circumstances, which may affect a measure of so much importance ; and, indeed, the time allotted to me has been so short, that it cannot be expected that my opinion should extend far into the minutiae of estimate and execution : I have, however, endeavoured to establish general principles, which cannot be affected by any variations of detail, and to which every attempt to accomplish your object must be made to bend.

“ The indispensable requisites, of every work which may be executed, appear to me to be the following : indeed, so indispensable do I consider them, that every proposal in which they do not meet, ought, I think, to be at once rejected. Their importance is in the order in which I have arranged them.

1. “ The works must be in full operation before the end of July, 1799.

2. “ They must be *certain* in their effects, and *permanent* in their construction.

3. “ They must not be liable to interruption from ice or freshes, but be equally useful in the severest winter, and in the wettest summer.

“ Having maturely considered all the schemes, which I have seen published, or have heard mentioned

in conversation, I shall proceed to state to you what appear to me to be the *only* means of concentrating all these requisites in *one* work, and having laid before you, what I propose to accomplish, with the means, and the probable expence of effecting it, I will then give you my reasons for rejecting every other proposal.

“ The nearest waters to the center of the City of Philadelphia, are those of the Delaware and Schuylkill. I conceive them both to be wholesome, for reasons which I will mention in a postscript, in order that I may not interrupt the consideration of the principal object.

“ It is evident that the exertions of only seven months, cannot in the country bring water from a greater distance.

“ In choosing between the waters of the Delaware and Schuylkill, the following considerations occur :

1. “ In favour of the Delaware: it is true that works erected upon the margin of the river would supply water to the city immediately, from the river upwards, and save all the expence, which must, in the other case, be incurred between the Schuylkill and the center square.

2. “ Against the Delaware will operate, the impurity of its water, which is subject to a strong running flood tide, and which must be supposed to be contaminated by the decayed vegetables of the marshes over which it passes; independently of the filth, thrown from the numerous vessels lying along the wharves or running into it from the public sewers.

3. “ In favour of the Schuylkill: the principal circumstance is the uncommon purity of its water; its bed every where narrow and rocky, its sources lie entirely in the limestone country, and the tide opposite the center of the town, does little more than raise the water by accumulation.”

4. “ On the other side; the extraordinary expence of works from the banks of center square may be alledged.”

“ I believe however that you will agree with me in thinking, that, as the difference of expence on the largest estimate cannot exceed thirty thousand dollars, there ought not to be a moment's hesitation in preferring the Schuylkill. I shall therefore confine my remarks to that river.

“ Neither the waters of the Delaware, nor of the Schuylkill can become useful unless they be raised to an elevated level, commanding every part of the city. To do this, in sufficient quantity, very powerful machinery will be required; and I am very certain, that human ingenuity has not hitherto invented any thing capable of producing the proposed effect with constancy, certainty, and adequate force, excepting the *steam engine*.

“ Taking therefore all the preceding principles for granted, I submit to you the two following proposals, which are in fact the same; and the choice between which must depend upon the practicability of the *first*.

“ N. B. The distribution of the water over the city being the same under every scheme that may be adopted, I shall postpone its consideration to the last.

“ The objects which I propose to accomplish are :

1. “ To raise a reservoir in center square. It is not sufficient that this reservoir should be elevated so high, that it will discharge its water into the distributing pipes: I think it should be forty feet above the level of the pavement, in order that the pressure of the water in so elevated a head may not only propel it to every part of the city, but throw it up into fountains in every street, wherever it may be required.

2. “ To bring to the reservoir the waters of the Schuylkill.

3. “ To raise them into the reservoir.

“ A culvert, or tunnel, six feet in diameter, carried under ground, the bottom of which should be

level with the bed of the Schuylkill, would bring the water into a reservoir in center square, at the depth of about forty feet. I am not perfectly informed of the levels, but ten feet more or less, would affect the expence very inconsiderably. Over or near this reservoir, which ought to be a cylindrical well of at least twenty-five feet diameter, the engine house should be erected. It may, at the same expence that would render it useful, be made an ornamental building. Upon the top of the engine house should be the reservoir. With the reservoir all the distributing pipes are to be connected. The engine will keep it perpetually full, being of a power sufficient to supply every possible demand of the city.

“ There is however a circumstance, which may render the scheme impracticable, or at all events unadvisable. It is this. The gravel stratum, to which all the wells of this city are sunk, seems to be nearly on a level with the waters of the adjoining rivers, and to be supplied by them with that inexhaustible quantity of water, for which it is remarkable.* Should it so happen, as I believe it will, that the tunnel lay near or in this stratum, it might be difficult, if not impossible to keep the work sufficiently dry; and, I doubt, whether, at any rate, workmen could be induced to labour in this subterraneous situation, which will always be wet, and the safety of which may depend upon the certainty of working the pumps above. I shall therefore make another proposal, which is liable to no inconvenience in the execution, but which though not more expensive at first, will, as it requires two engines, be liable to more *annual* expence.

* The perfect permeability of the stratum is evident from the connection of the wells with each other, and with the sinks and privies from whence arises the extreme unpleasantness of the water in the crowded parts of the city. It is worth considering, whether the pumps do not act as chimnies to bring up volumes of noxious gas from the putrifying water, which may predispose the inhabitants to receive the yellow fever.

2. " A reservoir being made on the banks of the Schuylkill, an engine will throw up a sufficient quantity of water into a tunnel, carried from thence to a reservoir in the center square. This tunnel should be sunk so low, that three feet of earth, may cover it, in its whole length. The reservoir in center square, would be sufficiently elevated to supply all the streets from Water-street to Fourth or Fifth-street, with water for culinary uses. To supply the rest and to raise fountains for the purpose of washing the streets, a smaller engine would still be necessary.

" It is very evident, that in either of these proposals, the three requisites meet: the supply of water would be inexhaustible; the work might be accomplished in a few months; the ice would never obstruct the operations of the works, as the tunnel would be inaccessible to frost; and the power employed is that, of which the amount, and the effect depends not on the variable seasons, or on the natural advantages of situation, but solely on the *option* of man. In every species of machinery in which mechanical powers alone operate, the bulk, the friction, and the unwieldiness of the works, encrease nearly in proportion to the effect required; in the chemical operation of a steam engine, power is encreased in a ratio far outstripping the bulk and the price of the engine, and when the first expence is incurred, the *two* men that are necessary to attend the smallest, can manage the most gigantic mechanism. The expence would be seventy-five thousand dollars.

" Having accomplished thus much of the proposed object, enough to substitute pure, for putrifying water, and effectually to provide for the cleansing and cooling the streets, a very important part of it, still remains unfinished, but which may be a work of more leisure. This is to bring to Philadelphia the spring, which turns the mill, called spring-mill, for the sole purpose of supplying the city with water for culinary use.

“ It has been generally supposed, and perhaps with great truth, that limestone water has a medicinal effect in bilious cases. The mill-springs form a rivulet gushing from a limestone bason, and, as nearly as I could ascertain it, under all the disadvantages of the season, and the want of instruments, it would run through, and fill a trunk of from four to five feet in section, not calculating upon a head.

“ This quantity would give a perpetual supply to 2,880 pipes, the bore of which should be equal to 1-4 of an inch square, and supposing the water were permitted to run, only twelve hours each day, it would supply 5,760 houses with a quantity more than ten times their possible consumption. As the aqueduct, before it reached Philadelphia, would gain a very considerable head, the same supply would be received, but in less time. A more detailed calculation is at present unnecessary: this is enough to show that the spring produces water in sufficient quantity.

“ The spring has never been known to increase in wet, or to diminish in dry seasons. Its temperature is, as I am well informed, lower than that of most other springs, being only 42° or 43° of Fahrenheit, and the water issues in such quantities that it maintains a warmth above the freezing point, in a course of three miles down the Schuylkill, keeping the river open for canoes in the severest winters. Even the winter of 1796 did not affect it. To the information which I received of this fact, from several most respectable men in the neighbourhood, I can add that it was open as far as I could see it, on the 27th of this month, when every other part of the river was frozen over.

“ The practicability of bringing this spring to the city, is ascertained by the practicability of the canal, near the proposed bank of which it rises. Its level is four feet higher than that of the canal, it would go over better ground, the distance would be shorter,

and it is to the south and eastward of all the rocky knolls. I have good reason to think that the distance would not exceed twelve miles.

“ In executing this work, only two objects of indispensable consideration occur :

1. “ To prevent the quantity of water from being diminished by evaporation or absorption.
2. “ To preserve its temperature both in summer and winter.

“ Both these ends would be attained, by conducting the water in a close tunnel, (say an elliptical culvert of three feet by six feet)---three feet at least under the surface of all the natural ground, provided with the necessary air-holes and air-traps, and carrying it in light aqueducts of segment arches, across all the vallies, avoiding every attempt at a forced canal of earth.

“ The expence of bringing the water as far as the city, would not exceed 275,000 dollars.

“ It is evident that in this work the water would never freeze, nor yet acquire any perceptible degree of heat. Only while passing along the aqueducts, it would lose in winter, and gain heat in summer.

“ But supposing even that the aqueducts amount to a mile in length, and that the course of the water be only two miles an hour, it would never be exposed to an atmosphere hotter or colder than itself, for more than thirty minutes. We have seen that it will retain a temperature above the freezing point for near three miles, though it has passed a mill, and is mixed with the colder water of the Schuykill. As the aqueduct would be in short lengths, the water would re-acquire in the tunnels the temperature it might lose in the open air.

“ Should the mill-spring at any time be found insufficient, the aqueduct, once constructed, might receive, in its course, supplies from all the neighbouring springs, which rise in levels sufficiently elevated,

and perhaps convey water to the city, sufficient in quantity to render the steam-engine on the Schuylkill unnecessary.

“ Even when the first supply arrives, the engines may be dormant, from the month of November to the beginning of August.

“ I have now to consider the works necessary in the city itself.

“ In the *first instance*, they will consist of wooden pipes of four inches bore, leading from center-square, in the following arrangement :

1. “ Four pipes down Market-street, supplying at their extremities ranges of cross-pipes of three inches bore, running north and south, in Water-street, Front-street, Second and Third-streets. These pipes will lie under or near the gutters. From them will branch laterally the leaden pipes which supply each house. The detail of cocks, public spouts, fountain and fire plugs, would be particularly attended to. These four mains will be served from the bason in center-square, and they must be so connected, as at option to be served also from the reservoir upon the engine-house.

2. “ Four pipes down Chesnut and four down Arch-street, to supply the cross-streets upon the same principle, as high as Eleventh-street. If no more could be accomplished in the first year, it would be sufficient, as the pumps above Eleventh street, furnish, as yet, very good water.

“ If time permit, *before*, and certainly after, these pipes are in operation, the east and west pipes must be doubled, so as to serve separately, one the north, the other the south streets. In the course of time, they ought to be replaced by cast iron pipes of nine inches bore.

“ This may be done gradually, beginning with the longest.

“ In all the pipes, plugs or cocks will be fixed, which, when drawn, will throw up fountains, playing to a height proportionate to the elevation of the reservoir, the lower cock being previously closed. A main of four inches bore, for instance, will, when closed at the lower extremity, throw up, in different parts of the same street, twelve fountains, of an inch diameter each, and thus the whole city may be alternately cleansed and cooled.

“ In cases of fire, these fountains will fill the engines without manual labour, by the proper application of a hose. This is of itself an object worthy of the whole expence of distribution.

“ The pipes ought to lie at least two feet below the pavement. Wooden pipes require much attention and repair. I cannot, in the short time allowed me, furnish any probable calculation of the annual expence of these repairs. The experience of the London New River Company, shows, that notwithstanding their frequency, the water can be supplied, and all the works kept up, at a small annual water-rent, reserving a very large income to the company.

“ Neither can the original expence of laying down the pipes be very exactly calculated, without better information than I have been able to procure. My enquiries, however, lead me to believe, that the pavement may be opened, the pipe manufactured and laid down, and covered again, for half a dollar a foot, allowing for plugs, cocks and hoops.

“ On this supposition, and allowing 10,000 feet of pipe, (or nearly two miles) to Front-street, 8,000 feet to the three next, 5,000 each as high as Eleventh-street, and 35,000 in the east and west mains; the whole amount will be 104,000----amounting to 52,000 dollars.

“ This expence would distribute water through all the crowded parts of the city, and render the pumps wholly unnecessary. The expence of laying the water by small leaden pipes from the main to the private

houses, should be borne by the individuals. It would amount to 50 cents per foot more, and in no case exceed 25 or 30 dollars, an expence, which, I think, every family would cheerfully incur, to avoid the inconveniencies arising from the necessity, as at present, of sending their servants to the pumps. For these pipes a rent would be paid. The poorer inhabitants would supply themselves from the public plugs without any charge. I think half the expence of laying down the main pipes, i. e. 25 cents per foot, if assessed upon the city, would not be objected to. The rich would pay in proportion to their fronts, the poor would be slightly affected: the expence, in fact, would fall upon the landlord. Corner houses should pay only for one front. This assessment would pay the whole expence, one half being levied on each side of the street. If a tax is to be levied on the city for the work, a lighter and a juster could not perhaps be devised. It would, in fact, be the *purchase money* of health and convenience, and occur only once. Every new house would pay its share as it was built, and thereby contribute to the future repairs.

“ But I ought to apologize for these suggestions. I have made them only to show, that the effort, which it is proposed to make, is much within the powers of this wealthy city.

Recapitulation of Expence.

“ Erecting the engines, and bringing water from Schuylkill to center square.....	75,000
“ Bringing the mill-spring to the city.....	275,000
“ Distributing the water throughout the city---first expence.....	52,000

Dollars 402,000

“ A further expence will be necessary to extend the distribution to every distant part of the town. This may be executed in anno 1800. The expence cannot easily be ascertained.

“ I will furnish you, at any time you please, with the detail of my estimates, which, I believe, will not be found short of the reality.

“ In order to ascertain the probable proceeds of the works, I will suppose, that of 6,000 houses 4,000 families will supply themselves with water from the main. The water-rent which I paid, while residing in London, in a house of 24 feet front, was 36 shillings sterling, or eight dollars.---Fixing ten dollars as the *first* average rent, which, as the funds become prosperous, may be annually lowered, this alone would produce an annual rent of 40,000 dollars, independently of extra supplies to brewers, distillers, or very large families.

“ 40,000 Dollars rent, at 6 per cent. per Dollars, Cts.
annum, is equivalent to a capital of 666,666 66

“ I will now add a few remarks upon the following proposals, which have been supposed to be worthy of consideration, and which indeed, are the only schemes that have come to my knowledge, that deserve attention.

1. “ To complete the canal immediately.
2. “ To conduct Wissahiccon creek to the city.
3. “ To erect water-works to be driven by one of the two rivers.
4. “ To collect water from any practicable source, and bring it, over hill and dale, in wooden, or perhaps in iron pipes, to Philadelphia.

“ If, and I presume it will not easily be disputed, the three requisites of, 1. *immediate* utility---2. per-

manence---and, 3. security against *frost*---be indispensable, I may dismiss these proposals in a few words.

1. " The first is deficient in the first, and, I fear, in the last.
2. " The second, (if at any time the water were sufficient) in the first and last.
3. " The third, in the second and third.
4. " The fourth, in permanence, and, I think, in efficiency.

1. " As to the Canal---I am convinced, that the very eminent and acknowledged abilities of the engineer, Mr. Weston, could overcome any obstacles which art dare combat ; and that a work, in which he has already done himself so much honour, would not want completion, if it depended upon his genius or his industry. If, therefore, the work could be accomplished in time, it certainly would render great part of the expence which I have proposed unnecessary. But, from what I have heard, doubt may be entertained of the possibility of the necessary expedition. But I confess myself very imperfectly informed. I fear the ice would embarrass the winter supply for culinary use ; but to every other purpose its waters would be amply adequate.

2. " Wissahiccon creek, has, I believe, not a sufficient quantity of water. Besides, to get the water upon a proper elevation, it would be necessary to purchase two mills, and then to bring the water to town over very unfavourable ground. The creek has been, even this winter, almost frozen to the bottom, and yielded little water.

3. " The examples of London (London Bridge works) Versailles (Marly) and Bremen, would forever deter me from attempting works to be driven by a river, subject to ice and freshes. The expence of

keeping up the timber-work, is enormous, and equal to re-building once in seven years. To give such works power, they must be unwieldy.---*Cranks*, which are their necessary appendage, are the very worst things in mechanism. In the Delaware, or Schuylkill, the works might stand still six hours in twenty-four ; perhaps during the raging of a fire.--- I once saw several houses in London burnt down, while the works were waiting for the tide. This happens not unfrequently. In winter they would be wholly useless.

4. “ To bring water in pipes of any description, a yard further than necessity requires, is very bad economy. All water has more or less sediment, and pipes cannot be cleansed without taking them up. It is difficult often to find where the fault lies. Metal pipes are very liable to injury from the frost, and in a long extent, every part could not be equally secured. Wooden pipes, like every thing else that is wooden, are a perpetual source of expence, repair, and interruption. The inconvenience attending them, in distributing the water, must be borne, because it cannot be avoided ; but where it can be avoided, it ought not to be borne.

“ By the length of this letter, you will see that I have endeavoured to comply fully with your request ; by the want of detail, you will observe that I have been straightened in time.

“ I am, Sir,

“ With great esteem,

“ Your's faithfully,

(Signed)

“ B. HENRY LATROBE,

“ Engineer,

“ To John Miller, Esq. Chairman
of the Committee of the Select
Council of the city of Philadel-
phia.”

POSTSCRIPT.

“ I am induced to add still the following remarks, as connected with the subject of my letter.

1. *Prejudice against River Water.*

“ Although most men prefer spring, to river water, it may be doubted, whether the latter be not the most wholesome. It is certainly supposed by physicians to be more generally free from noxious ingredients. The Indians, I am informed, from motives of health, now grown into habit, never drink water from a spring, when they can procure it from a stream. London is entirely supplied with river water. It is taken from the Thames in different places, from the New river and from the river Lee ; and has very little to boast of the cleanliness of its aqueducts. The water is received in each house, in wooden, or leaden cisterns, where it deposits a black impalpable mud. When boiled, the New river water crusts the vessels with a calcareous precipitate, so as in time to choak the spouts of the tea-kettles. I believe that the country in which the river rises has a basis of chalk. The water must therefore be similar to that of the Schuylkill, in quality, though very inferior in purity. The houses in London are supplied only once in two days. The water then runs about three hours. Yet during some years residence in London, I thought it very pleasant, and I am certain it is very wholesome. It is preferred to the water of any spring in the two cities and suburbs, and those that have any fame, (such as St. Pauls, or Aldgate) owe it to their coldness, not their superior salubrity. I must remark, that I never knew a deficiency of water in my family, notwithstanding the distant intervals between the supplies. The cisterns always ran over during the last hour of the waters coming in. This shows how sufficient our own resources are.

“ In this hot climate however, cool water is more valuable than in London, and perhaps absolutely necessary. The mill-spring seems to possess every desirable quality in a degree which our most sanguine wishes could scarce have expected.

2. *Fountains.*

“ The engine proposed for center square, may be considered as a necessary and unavoidable expence, by whatever means the water is brought to town. It may be rendered an ornament to the city. Its use is to supply water to the higher levels of the town, and fountains to all the streets. They are the only means of cooling the air. The air produced by the agitation of water is of the purest kind, and the sudden evaporation of water, scattered through the air, absorbs astonishing quantities of heat, or to use the common phraze, creates a great degree of cold. Coal mines, which are troubled with foul air, are supplied with pure air, by the simple means of pouring a small stream of water, through a trunk, down the shaft into a cask. The air extricated in the trunk and cask is conveyed by means of pipes to distant parts of the works. When the shaft is deep, it will blow out so strongly, that a man cannot stand against it. The water-blast, used in Switzerland in the furnaces, which is produced by the same simple means, is the strongest that can be devised, and, on account of the purity of its air, partakes of the superiority of the chemical oxygen furnace.

“ As to the mechanism of the fountains, it consists merely of a short wooden pipe, set perpendicularly into the main, and stopped by cock, which is turned, when the fountain is not in use. The *name* produces an idea of great expence, but they may be realised at a very small one.

3. *Public Baths.*

“ I have often wondered, that while in many despotic countries, all ranks of men have been provided

with the convenience, and the wholesome pleasantness of public baths, fountains, and porticoes, the American people do not indulge themselves, in the smallest gratification, as salubrious, as it is innocent, of this kind. Our abstinence is commendable, as it arises from industry, and our attention to more serious pursuits; but highly blameable as it injures our health. We retain, indeed, both in our buildings, our diet, and our modes of life, the habits of our northern ancestors, and have not yet learned how to live healthily in a hot climate. In the city of Philadelphia, I think baths almost an absolutely necessary means of health. When the engine in center square is at work, it will, with great ease, supply a requisite number of baths. I mention this only as a hint. It might be worth while to look forward to some such thing in the arrangement that may be thought of, provided the preparation may be made without expence. I think it may. Such baths would be a source of a large revenue, and perhaps it might not be bad policy in the citizens of this primary metropolis of North America, to counterbalance the fashionable inducements which point to the Potowmac, by conveniencies and advantages, which cannot for many years be thought of in a city, which is at present almost destitue of dwellings."

First Agreement with Mr. Roosevelt.

"ARTICLES OF AGREEMENT, indented, made, concluded, and agreed upon, this twenty-third day of May, in the year of our Lord one thousand seven hundred and ninety-nine, between Nicholas I. Roosevelt of Soho, in the township of Newark, of the county of Essex, in the state of New-Jersey, of the one part, and the Mayor, Aldermen and Citizens of Philadelphia of the other part, to wit: The said Nicho-

las, in consideration, as well of the sum of nine thousand dollars to him heretofore in hand paid, by the Mayor, Aldermen and Citizens of Philadelphia, the receipt whereof he doth hereby acknowledge, as of the covenants and agreements hereinafter stated on the part of the said Mayor, Aldermen and Citizens of Philadelphia, and their successors, to be fulfilled and performed for himself, his heirs, executors, and administrators, doth covenant and agree with the Mayor, Aldermen and Citizens of Philadelphia aforesaid, as follows :

FIRST. " That they the said Mayor, Aldermen and Citizens of Philadelphia, well and faithfully fulfilling and performing their several covenants and agreements hereinafter contained, on their part to be fulfilled and performed, he, the the said Nicholas, on or before the first day of September next, will in a workman-like manner, construct, complete, and securely fix, erect, and have ready for use, within the engine-houses respectively hereinafter covenanted and agreed to be built and prepared for the purpose, on the part of the Mayor, Aldermen and Citizens of Philadelphia aforesaid, two perfect double steam-engines, upon the most improved plan, each of which shall be of a power to raise to, and deliver at, the height of fifty feet, three millions of gallons of water, in every day, or period of twenty-four hours, throughout the year, unless and except it so happens, that some unforeseen and unavoidable accident or event, necessarily prevents, impedes or delays, their construction, erection and completion ; in either of which cases, he, the said Nicholas, when, and as soon as the accident or event which so prevents, impedes, and delays the same, is removed, or remedied, to which remedy and removal whereof, he shall contribute, as early and effectively as he reasonably can, will use his best diligence and endeavours, to construct, complete, and securely fix, erect, and have ready for use, as aforesaid, the said engines, with all

reasonable expedition, and as soon after the said first day of September next, as possible ; and will freely, according to the best of his knowledge and ability, give and afford his instructions and advice, touching the manner of building the said engine-houses respectively, and the materials to be used therein, whenever he shall be thereto required by the said Mayor, Aldermen and Citizens of Philadelphia, or their successors, or lawful agent or agents ; so however, that he, the said Nicholas, shall not be therefore compelled to travel from his home ; and he will likewise furnish and provide, at his own cost and charges, to be used in and about the said engine-houses, the following articles, to wit : the lever-beams, the spring-beams, the guide-posts, and the plugs ; and that it may be precisely ascertained how far the several covenants and agreements, of the said Nicholas, herein contained, shall have been fulfilled and performed, he will further construct and fix, within such one of the said engine-houses, as shall be appointed and fixed upon, by the said Mayor, Aldermen and Citizens of Philadelphia, for the purpose, an index, which shall accurately mark the number of strokes made by the same, the key or keys for the security of which shall be kept by such person or persons, as shall be appointed by the Mayor, Aldermen and Citizens of Philadelphia, aforesaid, and in case the said Mayor, Aldermen and Citizens of Philadelphia, and their successors, shall well and faithfully fulfil, and perform their several covenants and agreements, as hereinafter contained, according to the true intent and meaning of these presents, and the said Nicholas, do not well and faithfully fulfil and perform the several covenants and agreements, herein above contained on his part to be fulfilled and performed, the said Nicholas, his heirs, executors or administrators, shall and will, forthwith repay to the said Mayor, Aldermen and Citizens of Philadelphia, or their successors, all and every sum and sums of money which have heretofore

been, or which shall at the time of such non-fulfilment and non-performance, have in pursuance of these presents been advanced and paid by them to him, and if the failure of such fulfilment and performances, shall be occasioned or accrue through the wilful default or negligence of the said Nicholas, and not by any casualty or other cause, he, the said Nicholas, his heirs, executors and administrators, shall forfeit, and will pay to the said Mayor, Aldermen and Citizens of Philadelphia, as a penalty therefor, the further sum of twelve thousand dollars, in addition to the sum or sums of money so to him paid and advanced.

SECONDLY. "That he, the said Nicholas, will, for the term of five years, to commence from the day on which the said engine shall be so completed, erected, and had ready for use, or twenty-four hours thereafter, furnish with attendance and keep in complete repair, the two steam-engines as aforesaid, to be by him constructed and erected, and will provide fuel and every other necessary article for working the same, and during the said term, will, from each of the said engines, raise to, and deliver at the height of fifty feet, such quantities of water, to be provided by the said Mayor, Aldermen and Citizens of Philadelphia, and their successors, as may by them, or their lawful agent or agents, from time to time, be required and demanded of him, not exceeding three millions of gallons, in each and every day or period of twenty-four hours, at the following rates and prices, to be paid as hereinafter stipulated, to wit: for the quantity of one million, of such gallons in a day, or period of twenty-four hours, at the rate of three thousand dollars per annum, for each engine; for the quantity of one million and one half of a million, at the rate of four thousand dollars per annum, each engine; for the quantity of two millions, at the rate of five thousand dollars, each engine; for the quantity of two millions and one half of a million, at the rate of five thousand five hundred dollars, each en-

gine; for the quantity of three millions, at the rate of six thousand dollars, each engine; but if any quantity between any two of the said specified quantities, shall at any time be demanded, the same shall be furnished as required, the said Mayor, Aldermen, and Citizens of Philadelphia, paying to the said Nicholas, for so much thereof, as is equal to the next lowest specified quantity, the sum above stated for the next lowest specified quantity, and for the excess beyond the same, a sum in addition thereto, at the rate above stated for the next highest specified quantity; it is however understood that these rates and prices are fixed and agreed upon, on a supposition that coal may be procured, at the rate of eight dollars for every thirty-six bushels, delivered at each engine-house respectively, and that if the price of coal should exceed or be less than that rate, the difference shall be respectively allowed to the said Nicholas, or to the Mayor, Aldermen and Citizens of Philadelphia aforesaid, and their successors.

THIRDLY. "That the said Nicholas, will procure and give to the Mayor, Aldermen and Citizens of Philadelphia aforesaid, and their successors, good and sufficient real security, for the re-payment of all and every sum and sums of money which have been, or shall in pursuance of these presents, be paid and advanced him, by the said Mayor, Aldermen and Citizens of Philadelphia, or their successors, according to the true intent and meaning of the several covenants and agreements, of the said Nicholas, in the article first above written, and further will procure good and sufficient personal security, in the sum of twenty-four thousand dollars, conditioned for the good and faithful fulfilment and performances of the several covenants and agreements, in the second article in these presents, next above written contained, on the part of the said Nicholas, to be fulfilled and performed.

“ It is however understood between the parties to these presents, that in case the said Mayor, Aldermen and Citizens of Philadelphia, shall be prevented by the weather, or other unforeseen and unavoidable accident or event, from compleating and finishing the said engine-houses, by the first day of August next, as hereinafter covenanted and agreed, and the same shall be so compleated and finished within one month thereafter, no penalty or cause of suit shall therefor accrue, against the said Mayor, Aldermen and Citizens of Philadelphia, but the said Nicholas, shall, in that case, be fully bound to fulfil and perform, in every particular, the several covenants and agreements in these presents contained, on his part, to be fulfilled and performed, within one month after the said engine-houses shall be so compleated and finished, under each and every penalty herein above stated; but if the engines, so as aforesaid, by him covenanted and agreed to be constructed, shall in every respect, be complete and ready to be erected, and fixed in such engine-houses, and shall be delivered or tendered to the said Mayor, Aldermen and Citizens of Philadelphia, in the city of Philadelphia, on or before the first day of September next, the said Mayor, Aldermen and Citizens of Philadelphia, and their successors, shall pay to the said Nicholas, within fourteen days thereafter, the full balance, or last payment of twelve thousand dollars, which should then be due to him, agreeably to the covenants and agreements of the said Mayor, Aldermen and Citizens of Philadelphia, hereinafter contained.

“ And the Mayor, Aldermen and Citizens of Philadelphia, in consideration, of the covenants and agreements above written, on the part of the said Nicholas, to be fulfilled and performed for themselves, and their successors, DO covenant and agree with the said Nicholas, his executors and administrators, as follows :

First, " They the said Mayor, Aldermen and Citizens of Philadelphia, in addition to the sum of nine thousand dollars heretofore advanced and paid by them to him, as above recited, will pay and advance to the said Nicholas, or his order, provided he shall, before the expiration of the period appointed for the payment of the first instalment hereinafter mentioned, have procured, given and perfected to the said Mayor, Aldermen and Citizens of Philadelphia, and their successors, the several real and personal securities as above written, the sum of three thousand dollars on the sixth day or within three days thereafter, of each and every of the months of June, July and August respectively, and the further sum of twelve thousand dollars, at or before the expiration of fourteen days after the said engines shall have been constructed, and compleated and securely fixed, erected and had ready for use within the said engine-houses respectively, provided however that each of the said engines shall have been proved, by fair experiment, within the said period of fourteen days, to be, respectively, of power, sufficient to raise to, and deliver at, the height of fifty feet, three millions of gallons of water as aforesaid, and that they the said Mayor, Aldermen and Citizens of Philadelphia, and their successors, will at the expiration of each and every year, during the said term of five years, to commence as aforesaid, pay to the said Nicholas, or his order, each and every sum and sums of money which shall be then due to him, for the delivery of the several quantities of water from time to time required of him, as aforesaid, at the rates and prices above mentioned ; the said Nicholas, not to be allowed less than at the rate of three thousand dollars per annum, each engine, for any one day or period of twenty-four hours throughout the year, and that they the said Mayor, Aldermen and Citizens of Philadelphia, will also, in case the said engine-house shall not be erected, built and made fit and ready by the first day of

August, as hereinafter covenanted and agreed, and the said engines shall be in every respect, complete and ready to be erected and fixed therein, and be delivered or tendered as aforesaid, on or before the first day of September next, pay to him, the said Nicholas, the said sum or last instalment of twelve thousand dollars above mentioned, on the said first day of September, or within fourteen days thereafter.

Secondly, "That they, the said Mayor, Aldermen and Citizens of Philadelphia, will, at their own costs and charges, on or before the first day of August next, erect, build, and make fit and ready for the reception of the engines aforesaid, respectively, two good and sufficient engine-houses, in the city of Philadelphia, one of which shall be placed on or near the banks of the river Schuylkill, for the enclosure, support and security of the said engines, they, the said Mayor, Aldermen and Citizens of Philadelphia, finding and providing every material and thing necessary and proper for the said engine-houses, and in and about the same, excepting however the lever-beams, the spring-beams, the guide-posts and plugs, which said articles are to be furnished and provided by the said Nicholas, at his own costs and charges, as aforesaid.

Thirdly, "That if the fulfilment and performance of the covenants and agreements in the article first above written, stated and contained, on the part of the said Nicholas, to be fulfilled and performed, shall be prevented, or unreasonably delayed, by default of the said Mayor, Aldermen and Citizens of Philadelphia, in the payment and advance of any of the several sums of money herein before covenanted to be paid and advanced to him by them, at the respective periods abovementioned, or if the said Nicholas shall therein be wilfully impeded or obstructed, by the said Mayor, Aldermen and Citizens of Philadelphia, or any person or persons legally empowered by, and acting on that behalf under them, the said Mayor,

Aldermen and Citizens, and their successors, shall forfeit and pay to the said Nicholas, as a penalty therefor, in addition to the several sums of money which have been or shall have been advanced to him by them, in pursuance of these presents, the sum of twelve thousand dollars, and the several covenants and agreements in the present articles contained, on the part of the said Nicholas, to be fulfilled and performed, and all and every security of whatever kind, given for the performance of the same, shall thereupon become utterly void and of no effect.

“ In TESTIMONY whereof, the said Nicholas hath set his hand and seal, and the Mayor, Aldermen and Citizens of Philadelphia aforesaid, have caused their corporate seal to be affixed to these presents, the day and year first above written.

(Signed) “ NICH^s. I. ROOSEVELT. (*Seal.*)

“ *Sealed and delivered in the }
presence of us,*

“ S. JONES, Jun.

“ A. S. TEN EYCK.”

Obligation,

OF N. I. ROOSEVELT, AND OTHERS.

Said Nicholas I. Roosevelt, together with Jacob Mark and John Speyer, both of the city of New-York, merchants, by an obligation, dated the 27th day of May, 1799, became bound unto the Mayor, Aldermen and Citizens of Philadelphia, in the sum of twenty-four thousand dollars, conditioned for the said Nicholas' faithfully fulfilling and performing the several covenants and agreements, which by the se-

cond article of the foregoing agreement he covenanted and agreed to fulfil and perform.

Mortgage,

OF N. I. ROOSEVELT, AND OTHERS.

Said Jacob Mark and Rosetta his wife, John Speyer and Catharine his wife, and Nicholas I. Roosevelt, by Indenture of Mortgage, dated the 4th day of June, 1799, and recorded page 231, in book E. of the Records of Mortgages for the County of Essex, in the state of New Jersey, mortgaged unto the Mayor, Aldermen and Citizens of Philadelphia, and their successors, certain real estates, situate in the township of Newark, in the said county of Essex, and state of New Jersey, to secure to the said Mayor, Aldermen and Citizens the faithful fulfilment and performance, on the part of the said Nicholas, of such of the covenants and agreements of him the said Nicholas, in the foregoing agreement contained, as by the said agreement he covenanted, to secure to the said Mayor, Aldermen and Citizens the faithful performance by mortgage.

SECOND

Agreement with Mr. Roosevelt,

“ARTICLES of AGREEMENT, indented, made, and concluded, this twenty-fourth day of December, in the year of our Lord one thousand seven hundred and ninety-nine, between the Mayor, Aldermen and Citizens of Philadelphia, of the one part, and Nicholas I. Roosevelt, of Soho, in the township of

Newark, and county of Essex, in the state of New-Jersey, of the other part, to wit :

“ Whereas the said Nicholas, by certain former articles of agreement, bearing date the twenty-third day of May last, did, amongst other things, covenant and agree, with the said Mayor, Aldermen and Citizens, to construct, erect, and have ready for use, within two certain engine-houses, to be built and prepared for the purpose, in the city of Philadelphia, by the said Mayor, Aldermen and Citizens, one of which was to be placed on or near the banks of the river Schuylkill, two perfect double steam-engines, upon the most improved plan, each of a power to raise to, and deliver at the height of fifty feet, three millions of gallons of water, in every day, or period of twenty-four hours, throughout the year : and the said Nicholas did likewise further covenant, that he would, for the term of five years, to commence from the day on which the said engines should be so had ready for use, or twenty-four hours thereafter, furnish with attendance, and keep in complete repair, the said two engines, and provide fuel and every other necessary article for working the same, and during the said term, from each of the said engines, raise to, and deliver at the height of fifty feet, such quantities of water, to be provided by the said Mayor, Aldermen and Citizens, as by them, or their lawful agent or agents, from time to time, should be required and demanded of him, not exceeding three millions of gallons in each and every day, or period of twenty-four hours, throughout the year, at certain rates or prices therein mentioned, as by reference to the said articles will more fully appear. And whereas, the said Nicholas hath concluded and determined to construct the engine which is to be erected in the engine-house to be placed on or near the banks of the river Schuylkill, upon a larger plan, and of a greater power than that so contracted for, as aforesaid. Now, the said Mayor, Aldermen and Citizens, as well in con-

sideration thereof, as of the rents hereby reserved, and the covenants hereinafter stated, on the part of the said Nicholas, to be fulfilled and performed, provided the said Nicholas shall give and perfect the security hereinafter stipulated and agreed to be given by him for the full performance of the present articles, DO grant, demise, and to farm let, for and until the full end and term of forty-two years, to commence within thirty days from and after the said engines shall be completed and at work, the two following lots or pieces of land, on one of which the said engine-house, so intended to be placed on or near the banks of the river Schuylkill will be erected, to wit: one lot beginning at the north-west corner of Chesnut-street and Schuylkill Front-street, and running thence northwardly along the said Schuylkill Front-street, one hundred and eighty-nine feet, thence westwardly one hundred feet on a line parallel to Chesnut-street, thence southwardly one hundred feet on a line parallel to Schuylkill Front-street aforesaid, thence westwardly about one hundred and seventy-three feet, more or less, to Asheton or Schuylkill Water-street, on a line parallel to Chesnut-street aforesaid, thence along the said Asheton or Schuylkill Water-street, about eighty-nine feet to Chesnut-street, and thence along Chesnut-street about two hundred and seventy-three feet more or less, to the place of beginning. And one other lot beginning at the northwest corner of Chesnut-street and Asheton or Schuylkill Water-street, and running thence northwardly along the said Asheton or Schuylkill Water-street, eighty-nine feet, thence westwardly on a line parallel to Chesnut-street, to a line parallel to the said Asheton or Schuylkill Water-street, at the distance of ten feet east of the mouth of the subterraneous aqueduct leading to the engine well, thence southwardly on the last mentioned line, to a line parallel to the south edge of the open canal at the distance of eight feet therefrom, thence along this last mentioned line, westwardly to

the present high-water mark of the river Schuylkill, being at the west line of the said canal sluice, thence along the said high water-mark to Chesnut-street, and thence along Chesnut-street to the place of beginning, together with the free use and occupancy of any wharf or pier which shall or may be erected on the north side of Chesnut-street, from the north line thereof, and extending northward to the distance of thirty feet and no more, saving, only to the said Mayor, Aldermen and Citizens, the right of landing thereon any goods or things for their own proper use, free of any charge whatever, and the full right and privilege of using and applying for his own benefit all the extra power or force of the engine, so to be placed on or near the banks of the river Schuylkill, beyond the force or power necessary to be applied for the furnishing of water therewith, to the said Mayor, Aldermen and Citizens, as by the aforesaid articles, and the present articles of agreement is stipulated and provided for, and the free use and occupancy of the engine-house, so to be placed on one of the lots hereby demised on or near the banks of the river Schuylkill, for all works and machinery of any sort or kind, the said Nicholas rendering and paying to the said Mayor, Aldermen and Citizens, yearly, and every year throughout the first period of seven years, of the said term, the sum of five hundred dollars, and yearly and every year throughout the second period of seven years, of the said term, the sum of eight hundred dollars, and yearly and every year throughout the third period of seven years, of the said term, the sum of one thousand dollars, and yearly and every year throughout the remaining period of twenty-one years, of the said term, the sum of eighteen hundred dollars, the said sums severally, as they become due, to be deducted out of the amount, which from time to time will become due to the said Nicholas, for the maintenance of the said engines.

“ And the said Nicholas, in consideration of the premises, for himself, his heirs, executors, administrators and assigns, doth covenant and agree with the said Mayor, Aldermen and Citizens, that he and they will during the said term of forty-two years, furnish with attendance and keep in complete repair the two steam-engines aforesaid, to be by him constructed and erected, and will provide fuel and every other necessary article for working the same, and during the said term, will from each of the said engines, raise to, and deliver at, the height of fifty feet, such quantities of water to be provided by the said Mayor, Aldermen and Citizens, as may by them or their agent or agents, from time to time be required and demanded of him, not exceeding three millions of gallons in each and every day or period of twenty-four hours throughout the year, at the several rates and prices, and upon the terms and conditions in the the said articles, stated and agreed, except as is hereinafter excepted, and that he and they will duly and regularly pay and render to the said Mayor, Aldermen and Citizens yearly and every year during the said term of forty-two years, the several rents or sums of money herein above stated and reserved, as they shall severally become due, and that neither he nor they will at any time during the said term, employ the said engine, in raising water for any purpose whatever (excepting for the use of the Mayor, Aldermen and Citizens as aforesaid, and such works and houses as he may erect upon the lots hereby demised) and that neither he, nor they, nor any other person or persons, acting by, from, or through him, or them, or any of them, will, during the said term, lay any vessel, boat, craft, raft, or other obstruction, within the dock or canal leading from Schuylkill towards the engine well above mentioned, without the special permission of the said Mayor, Aldermen and Citizens, or their agent or agents duly authorized, nor by any buildings, works, or other means, or act, interrupt, or

obstruct any street, alley, or public highway by law established, or erect, or otherwise commit any nuisance within or near the lots and buildings hereby demised.

“ And it is hereby, in consideration of the premises, further mutually covenanted and agreed, by and between the said parties, that the provision made in the former above recited articles, respecting the price of coal, and the deductions or allowances in consequence thereof to be respectively made to either of the said parties, shall be henceforth annulled ; and, further, that if at any time hereafter the maintenance and working of the engine upon Schuylkill, shall appear to the said Mayor, Aldermen and Citizens to be unnecessary for their use or benefit, they shall be at liberty to discontinue the payment of any further sum or sums of money on account thereof ; and it is also understood and agreed, by and between the said parties, that the engine-house so to be erected and placed on one of the lots hereby demised, shall be kept in full and complete repair by the said Nicholas, his executors, administrators and assigns, at his and their own proper cost and charge, and that the other engine-house shall be kept in full and complete repair by the said Mayor, Aldermen and Citizens, at their own proper cost and charge. And it is further mutually covenanted and agreed, that, at the expiration of the said term of forty-two years, the lease of the hereby demised lots and privileges shall be renewable for the further term of twenty-one years, upon such terms and conditions as may then be mutually agreed upon, but if no agreement can then be made between them, the value of such permanent improvements as shall then have been made upon the said lots, or either of them, at the proper cost and expence of the said Nicholas, shall be ascertained by the appraisement of disinterested persons, mutually to be chosen between the said parties, and shall be paid to the said Nicholas, his executors, administra-

tors and assigns, by the said Mayor, Aldermen and Citizens.

“ And the said Nicholas doth further covenant and agree, that he will, before the commencement of the abovementioned term of forty-two years, give to the said Mayor, Aldermen and Citizens, good and sufficient security, to their satisfaction, for the due and full performance of the several covenants and agreements herein contained on his part to be fulfilled and performed, and until the same shall be so given and perfected, all securities heretofore given for the performance of the former above recited articles, or any part of them, shall be, and remain in full force and virtue.

“ In TESTIMONY whereof, the Mayor, Aldermen and Citizens aforesaid, have caused their corporate seal to be affixed to these presents, and the said Nicholas hath set his hand and seal, the day and year first above written.

(Signed) NICH^s. I. ROOSEVELT. (*Seal.*)

*Sealed and delivered in the }
presence of }*

“ THOMAS NIGHTINGALE,

“ JOSEPH OGILBY, Jun.”

Agreement with Mr. Latrobe.

“ ARTICLES of AGREEMENT and Covenant, indented and made on the twentieth day of August, in the year one thousand seven hundred and ninety-nine, between the Mayor, Aldermen and Citizens of Philadelphia, of the one part, and B. Henry Latrobe, late of Richmond, in Virginia, but now

of Philadelphia, in the commonwealth of Pennsylvania, Architect and Engineer, of the other part.

“ Whereas the said B. Henry Latrobe, hath proposed to the Mayor, Aldermen and Citizens of Philadelphia, a plan or project for supplying the inhabitants of the city of Philadelphia with wholesome water, to be taken from the river Schuylkill, and conducted and distributed throughout the said city, in manner following :

First. “ By forming a canal and subteraneous aqueduct, of a stability and construction capable of resisting and being secure against the damages of river freshes and inundations at all seasons of the year, to be of a depth at least two feet six inches below the low-water mark of the lowest known tides, and to extend at least from the low-water line of the river Schuylkill, flanked with proper and secure embankments, along the flat marsh and low fast land, and into the rising bank or hill of a piece of ground belonging to the Mayor, Aldermen and Citizens aforesaid, being situate and adjoining on the north side of Chesnut-street, and lying between the said river and Schuylkill Front-street, so that the said canal and subteraneous aqueduct shall communicate with, and convey the water of said river into the bottom or lower part of a walled well, proposed to be sunk of a sufficient depth for the purpose, from the surface of the ground, in an old redoubt now situate at or near the corner of Chesnut and Schuylkill Front-street.

Second. “ By erecting and completing over the aforesaid well, a building, of dimensions and stability sufficient to receive and protect a steam-engine to be constructed and placed therein, under his direction, for the purpose of raising water from the before named well, and pouring and delivering it into the brick tunnel hereinafter mentioned.

Third. “ By constructing a circular brick tunnel, of six feet diameter, having its exterior summit or

crown at least three feet under the surface of the earth, in its whole length, and to extend from within the before named engine-house, to and along Chesnut-street, eastward, to Broad-street, and from thence into the center-square of the city; which tunnel shall be of a construction capable of resisting any internal water or air pressure, as well as external weight or compression, and of receiving and retaining the water which shall be poured into it by means of the steam-engine herein before mentioned.

Fourth. "By erecting and completing one other building at the eastern termination of the aforesaid circular brick tunnel, of a stability and dimensions sufficient and suitable, first, for receiving and securely protecting, one other steam-engine, to be constructed and placed therein, under his direction, for the purpose of raising water from the eastern end of the aforesaid brick tunnel, to an height of fifty feet. And lastly, for supporting an elevated reservoir, capable of receiving and retaining, at the said height of fifty feet, the water which may be raised and poured into it, by the last named steam-engine, from the eastern termination of the tunnel aforesaid. And,

Fifth. "By laying, at a depth of not less than three feet under the surface of the earth, in any place throughout the several different public streets, lanes, alleys, and thorough-fares of the said city, wooden pipes, properly and strongly connected together and made water-tight, having at suitable distances from each other, fire-plugs, hydrants, stop-cocks, mud-cocks, and other devices necessary and proper for the extinguishing of fires, the equal distribution of water to the inhabitants of the city, for drinking and culinary use, for the scouring of sewers, for the cleansing and cooling the streets, by occasional flooding, the playing of fountains, and the cleansing of the pipes themselves.---And for the effectual accomplishment of these various purposes, as well as of any others to which spouting water shall be necessary, to

have the said wooden pipes of distribution connected with the elevated reservoir aforesaid, in such manner that the water in said reservoir shall act as an head on the water in said wooden pipes of conduct in all and every of the public streets of the city, when the same shall be laid down as aforesaid.

“ And whereas the said B. Henry Latrobe, hath estimated and stated unto the Mayor, Aldermen and Citizens of Philadelphia, that a sum of one hundred and fifty thousand dollars will be fully sufficient to cover all expences of executing the foregoing plan, in all its parts, and for the payment of such commission or compensation as shall become due to himself, or to other agents engaged in the execution of the works by his advice and recommendation, that is, on computing the length of all the pipes of distribution throughout the public streets, lanes and alleys of the city, to the eastward of Broad-street, to be not more than one hundred and four thousand feet ; and on consideration of the foregoing plan and statement of expence, the same having appeared to the Mayor, Aldermen and Citizens, eligible and practicable to be executed within a reasonable space of time, the Select and Common Councils of the city aforesaid, have passed an Ordinance for raising the necessary capital on loan, and made divers provisions and regulations, having for their object the accomplishment of the plan aforesaid, and among other measures, by concurrent resolutions, passed the second day of March, in the year one thousand seven hundred and ninety-nine, have duly authorised and empowered a joint committee of their appointment, in conjunction with the Mayor of the city, to form and execute contracts and agreements, as well as to direct and attend to other matters having relation to the introduction of water into the city.

“ Now this Indenture witnesseth, That the Mayor of the said city, and the joint committee of the Select and Common Councils, acting by virtue of the pow-

ers in them vested as aforesaid, for and on behalf of the Mayor Aldermen and Citizens of Philadelphia, and B. Henry Latrobe, for and on his own behalf, have, and by these presents do, mutually agree, engage and covenant with each other, in manner following, that is to say,----That on his part, he, the said B. Henry Latrobe, in and for the considerations to be unto him allowed and paid, as hereinafter mentioned, hath, and hereby doth agree, engage and covenant, to and with the Mayor, Aldermen and Citizens of Philadelphia, for the accomplishment of the plan by him proposed, and of which the outlines are herein before described---to make and procure all contracts and regulate bills, as the same are or shall be found necessary, by and with the consent of the Mayor and of the joint committee of the Select and Common Councils of the city of Philadelphia, or with the consent and approbation of any other agency, which may or shall hereafter be specially constituted, and duly authorized by the said councils; to give every information when thereto required; to furnish all designs and give every direction for the proper and most perfect execution of the said plan; and faithfully to render his own personal attendance, until the same shall be finished and complete, unless prevented by any act of the Mayor, Aldermen and Citizens, or their agents, or any of them, or the means provided by the said Mayor, Aldermen and Citizens shall prove inadequate for the completion, and they shall refuse or neglect to raise or furnish any further necessary supplies; that the construction of all and every of the works under his direction shall be of a permanent stability, and good and perfect in kind; and that for the ultimate success thereof, he will, and hereby doth hold himself, unless prevented as aforesaid, completely responsible, and bound under the penalty, in case of failure, of forfeiting all emoluments or compensation to which otherwise he would be entitled by these

presents, and of refunding unto the said Mayor, Aldermen and Citizens, the sums or sum which may have been advanced to him in part payment, of such compensation, stipulating only, that he shall be at liberty to appoint the clerk, or superintendant of the works, being in every respect responsible for his conduct, and appointing no one, unto whom there can be any reasonable objection.

“ And he, the said B. Henry Latrobe, hath, and doth further engage, that provided, the necessary funds do not fail, and the several contracts at present made, and entered into by several manufacturers, artificers and workmen, shall be by them, duly and seasonably fulfilled, and provided no inundations continued rains, or river freshes, shall interrupt his progress, or want of health retard him, he will cause the said works to be in operation, for supplying the city with water, on or before the second day of October, in the present year, and that they shall, in all and every part, be entirely completed, on or before the first day of July, which will be in the year one thousand eight hundred.

“ On the part of the Mayor, Aldermen and Citizens of Philadelphia, the Mayor, and the joint committee of the Select and Common Councils as aforesaid, reposing confidence in the integrity, judgment, skill and experience, of the said B. Henry Latrobe, have, and do hereby agree, engage and covenant, to, and with him, that on the full and faithful performance on his part, of the engagements and covenants agreed to, by him, as herein before enumerated and expressed, they the said Mayor, Aldermen and Citizens, shall, and will pay unto him, the said Henry, the full and entire sum of six thousand three hundred and fifty dollars, as a full compensation for his services in completing his plan for watering the city, and also shall, and will allow, and repay unto him, all travelling and other reasonable expences, which shall be actually incurred and paid by him, in the service

of the city, and under the direction, or by the consent of the said Mayor, Aldermen and Citizens, or any agents, legally and duly appointed and authorized on their behalf, on the occasion.

“ And it is mutually understood and agreed, between the parties hereto, that if it shall be found that the funds of the Mayor, Aldermen and Citizens, are inadequate for the completion of the aforesaid plan, in all its parts, before the first day of July, in the year one thousand eight hundred, and there shall appear, no well founded prospect of raising the sum, necessary for the purpose, within any reasonable time thereafter, by means, other than the assessment of a tax, on the property and inhabitants of the city, and the Select and Common Councils, in such case shall not deem it expedient, but shall omit or decline, to raise such sum by tax as aforesaid, so as to occasion a stop or suspension of further proceeding, and the said B. Henry Latrobe, shall find it injurious to his interest, to be bound to attendance and residence in the city, or its vicinities for an unascertained length of time, waiting the deliberations and convenience of the Mayor, Aldermen and Citizens, in any unreasonably tardy operations, for providing the necessary supplies; he, the said B. Henry Latrobe, shall in any such eventual situation, on his request, be released from all obligation to further attendance and residence as aforesaid; and on furnishing ample and clear instructions and directions, as to the best manner of finishing any remaining work, for completing the said plan; and on giving the necessary full information on the regulations most proper for the equal distribution and application of water, for the various purposes and wants of the city, throughout the whole extent and parts thereof, to the eastward of Broad-street, shall on his request likewise, be released from the further prosecutions of the plan for watering the city as aforesaid; And being under the aforesaid circumstances, so released, he, the said

Henry, shall be entitled to receive, and the Mayor, Aldermen and Citizens, shall accordingly pay him, at the rate of five per centum, on the total amount of the actual sum then expended, in the execution of the plan, so far as the same shall then have progressed as a full compensation for his services, provided the works so far as effected, shall be of a permanent stability and utility, respecting the whole design, and in every respect good and perfect in kind; but if any suspension or delay, shall happen by the failure or default of any person or persons, who have or shall (either by his procurement, or with his advice, consent, or approbation) contract for the execution and performance of any part or parts of the works by him, or them, or any of them undertaken to be performed, and more particularly of the contractor, for the making of the steam-engines, and shall not be occasioned through any want of funds, or from any wilful impediment of the Mayor, Aldermen and Citizens, or of any persons acting especially under their authority, then and in such case, the said B. Henry Latrobe, shall nevertheless continue bound to personal attendance and residence as aforesaid, until the whole plan herein before mentioned, shall be fully completed and perfected in all its parts;---And notwithstanding the injury that shall or may be occasioned to his interest by any such stop, delay or suspension, shall be entitled to receive the herein before named sum of six thousand three hundred and fifty dollars, and allowance for travelling and other expences as before enumerated, as the full and entire compensation, to which he shall be entitled for services, to be by him rendered, but no more.

“ And it is further mutually understood and agreed, that notwithstanding the features and great outline of the plan are designated in the preamble of these presents, that any variation therefrom, having for its object any improvement for greater utility and more for the advantage and interest of the city, the

said variation being first proposed and submitted to the said Mayor, Aldermen and Citizens, or their lawful agents in the case, and by them duly considered and approved, the same shall be allowed and carried into effect without prejudice to this agreement, or either of the parties hereto, any thing herein contained to the contrary in any respect, notwithstanding.

“ Signed and interchanged the day and year within above written.

(Signed)

“ BENJAMIN HENRY LATROBE.

“ HENRY DRINKER, Jun. by order

“ of and for the Mayor, and the

“ joint committee of the Select and

“ Common Councils.

In presence of

“ JOHN BARBER,

“ JOHN GRIMES.”

YOUR Committee having thus given the foregoing copies, now proceed with the following statements and observations.

1. *Mr. Roosevelt's Contracts.*

The Index is not yet furnished, but your committee are informed that it is in a considerable state of forwardness.

The Flues in the Boilers discover some leakage.

An additional Boiler remains to be furnished at each engine-house, by Mr. Roosevelt.

The engines cannot, in their present condition, conveniently pump more than 2,198,620 gallons, in each and every twenty-four hours; but, by enlarging the working barrels at the pumps, they may be made to throw up the quantity contracted for, and Mr. Roosevelt is bound to make such alterations in the engines as that they can pump the quantity required by contract.

The quantity of water now delivered from the center square engine-house, is about 400,000 gallons per day, or period of twenty-four hours.

The progress made by the watering Committee towards the erection of the two additional boilers, on Mr. Roosevelt's account, is as follows :

All the plank for both boilers has been ordered, and about four thousand feet of it is delivered, about three thousand feet of which is prepared for the boiler at center square---the rest is now sawing, and may be expected daily.

The sheet-iron for the center square boiler, is also contracted for, and about two-thirds of it delivered.

The workmen are preparing the tools and the moulds to work this iron into its proper shape.

One ton of round iron for the bolts has been contracted for.

A considerable portion of the square iron for bolts and rivets, is also procured.

As the settlement with Mr. Roosevelt, respecting his contracts, has been committed by the Select and Common Councils to the Committee for watering the city, and who are to submit their determination in the premises to Councils, for their consideration, your Committee conceive it improper to state any thing further respecting Mr. Roosevelt's contracts.

2. *State of the Water Works under Mr. Latrobe's Contract.*

The different parts of the Water Works which remain to be completed, are as follows :

BASON.....At this nothing remains to be done, but the coping on the southern moiety of the wall. A small part of the stone for this work is prepared, ready for setting, being all that is delivered. It is uncertain whether any more will be delivered this season or not, but your Committee are informed that it is now quarrying, and will at all events be delivered early in the spring. It is not proposed to set any more this season.

CANAL.....The work to be done here is, only, coping the wall and sluice; fixing a grate at the mouth of the lower tunnel, and painting the sluices. The stone for the coping will be delivered in the spring, with that for the bason wall; therefore, no part of this work can be done this season, excepting the painting of the sluices, which is but a trifling article.

SCHUYLKILL ENGINE-HOUSE.....The marble coping of the well and pump chamber, in this house, must be deferred for the present, the marble not being cut, and it being too late in the season to set it. The walling of the cellar may be done at any time, the stone being ready. The rest of the work unfinished here, viz. the carpenter's work, is in a great state of forwardness. The eastern door is fixed. The western door and window frames are prepared and fixing. The sashes for two windows only remain to be made. Stages and ladders for the well remain to be made, their use and necessity will be easily conceived, when it is known that the pump piston frequently requires packing, and other work is often required to be done in the well.

UPPER TUNNEL.....This is finished, all to cutting and fixing marble and iron grates on the two air-drains, unless it should be thought proper hereafter to have the tunnel pointed in the inside. It is not yet certainly known whether or not this will be necessary.

CENTER SQUARE ENGINE-HOUSE...The carpenter's work remaining to be completed at this building, consists of floors, doors, sashes and frames, bases and surbases, &c. for the four corner rooms, and the two lobbies on the north and south sides of the buildings, besides stairs and stages for the circular part. The floors are all prepared, and, in one room, laid. The doors, the sashes and frames, are now in hand, the stuff being procured and cut out for the whole. The bases and surbases are prepared. The work to be done in the circular part must be left until the new boiler is erected, and the temporary reservoir removed. The outside cellar-doors are prepared.

The marble work to finish this building is all ready for setting. And there remains to be set at the west portico, the architrave, frieze, cornice and steps for

the same, together with two pannels, and two cellar-door cheeks. As the setting of the architrave will require no mortar, the weather will not occasion that part of the work to be postponed, and the masons are now at work on it. As much of the rest may be done as the weather will permit, and if it cannot be completed so far as to admit the permanent roof, it should be protected from the frost by a covering of board and straw. The present situation of the roof over the east portico requires that it should, as speedily as possible, receive its permanent covering, either of tin or copper.

There is further remaining to be done, to complete this building, viz. plaistering---copper gutter over the porticoes---four copper pipes to convey the water from the roof of the square building---glazing the windows---painting.

The permanent reservoir in this building is now finished. It will contain about 22,500 gallons, and is now ready to receive the water as soon as the rising and descending mains shall be extended to, and connected with it. The pipe for this purpose is prepared, and the labour of fixing it may be performed in the period of a week at farthest, whenever directed to be done.---While it is doing, the engine must, of necessity, stop pumping.

3. *Distribution of Water.*

Most of the leaks which have hitherto made their appearance in the pipes now laid, have, with difficulty and much labour been repaired.

Twenty-nine thousand nine hundred and sixty-three feet of pipe are now laid.

Forty-two hydrants are erected.

Two stop-cocks of the same and one of a different construction, have been fixed in the pipes, but do

not effectually answer the purpose, not being perfectly tight : one other, somewhat differing from both of the above kinds, is now preparing for trial.

The present distribution of water is as follows, viz.

High-street Main.

From the engine-house to Fourth-street, 6 inch bore
From Fourth-street to Water-street..... $4\frac{1}{2}$
lying on the south side of High-street.

Service Pipes attached to the above Main.

Along the middle of Sixth-street to Walnut-street $4\frac{1}{2}$
Along the middle of Walnut-street to near Seventh-street, then along the north side of Walnut to Eighth-street..... $4\frac{1}{2}$
Along the west side of Fifth to Chesnut-street.....3
Along both sides of Fourth to Chesnut-street.....3
Along both sides of Third to Chesnut-street.....3
Along the east side of Second to Chesnut-street...3

Mulberry-street Main,

Lying on the north side of Mulberry-street.

From the engine-house along Broad-street to ^{Inch.}
the north side of Mulberry-street.....6
From Broad-street to Front-street..... $4\frac{1}{2}$

Service Pipes attached to this Main.

Along the west side of Third to High-street.....3
Along the west side of Second-street from Sassafras-street to Walnut-street.....3

Chesnut-street Main.

From the engine-house along Broad-street to the ^{Inch.}
south side of Chesnut-street.....6
From Broad-street to Third-street, along the
south side..... $4\frac{1}{2}$

From Third-street to Front-street, along the middle of the street.....4½

Service Pipes attached to this Main.

Along the west side of Third-street to Walnut...3
 Along the middle of Bank-alley to Elbow-lane....3
 Along the middle of Front-street to Mulberry-st..4½

4. *Supply of Schuylkill Water to Dwelling Houses, &c.*

For a private dwelling house, the rent for a supply of water is (as established by ordinance) five dollars per annum, to be paid in advance. In all these cases, the ferule through which the supply is drawn from the pipe of conduit, must not exceed half an inch in diameter.

For manufactories, &c. where a larger ferule is applied for, the committee have agreed to two other sizes, at the following rates, viz.

One inch in diameter; at twenty-four dollars per annum.

One and an half inch ditto; at fifty-three dollars per annum.

And that the ferules in all cases shall be accompanied with a leading pipe, to the place required, whose internal diameter shall not exceed that of the ferule, contracted for more than one quarter of an inch, and that the ferules shall be used in the state in which they come from the sand, in which they are cast, without any polish on their internal surface.

Besides this, the following rates have been established by the Committee (or Commissioners) for manufactories, &c. where only an *half inch* ferule is requested, viz.

Sugar Refiners, - - - -	twenty	dollars,	} For each and every half-inch Ferule used by the applicants.
Dyers, - - - - -	ten	do.	
Distillers, - - - - -	twenty	do.	
Soap and Candle Manuf.	fifteen	do.	
Hatters, - - - - -	ten	do.	
Curriers, - - - - -	five	do.	
Innkeepers, including the supply for their own families, }	fifteen	do.	

*List of Houses supplied with Schuylkill Water, for
Subscribers to the Loan, being free of Water
Rent, till July 1st, 1804.*

- No.
1. William Poyntell, No. 72 Chesnut-street,
 2. William Young, 52 do.
 3. Thomas Parker, 13 South Third-street,
 4. Robert Haydock, 38 South Second-street,
 5. Ephraim Clark, S. E. corner High and Front-st.
 6. Daniel Boehm, 96 North Second-street,
 7. Robert Waln, 6 Chesnut-street,
 8. James I. Mazurie, 28 South Front-street,
 9. Waddington and Harwood, 30 do.
 10. Edward Tilghman, 116 Chesnut-street,
 11. Thomas Ewing, 19 do.
 12. Samuel M. Fox, do.
 13. Thomas M'Euen, 78 do.
 14. Philip Nicklin, 165 do.
 15. Baltis Emrick, 234 High-street,
 16. William Poyntell, 24. do.
 17. John Fromberger, 32 North Second-street,
 18. Edmund Kinsey, for George Fox, 93 Chesnut-street,
 19. Robert Annesly, corner Sixth and Walnut-street,
 20. Matthias Corless, 69 South Third-street,
 21. William Sansom, 96 Mulberry-street,
 22. William Page, 31 Chesnut-street,
 23. Thomas Hale, 78 do.
 24. Thomas Leech, 61 do.

25. John Graff, 299 Mulberry-street,
 26. ditto, 301 do.
 27. William Dawson, 79 Chesnut-street,
 28. James Wills, 84 do.
 29. William Young, Bank-street, or Alley,
 30. Christopher Marshall, 58 Chesnut-street,
 31. George Taylor Junr. 67 do.
 32. James Wills, 82 do.
 33. Charles Marshall, 56 do.
 34. }
 35. } John Dunlap, corner Twelfth and High-street,
 36. } three houses,

Making in all thirty-six houses, supplied for subscribers to the Water Loan.

*List of Houses, &c. supplied with Schuylkill
 Water on Rent.*

No.		Annual Rent.
1.	George Simpson, dwelling-house, No. 78, Chesnut-street,	Dollars. 5
2.	Michael Keppele, ditto, 138, ditto,	5
3.	Thomas Fitzsimons, do. Chesnut between Seventh and Eighth,	5
4.	Abraham Van Beuren, do. 85 Mulberry-st.	5
5.	John Welsh, do. 42 South Sixth-street,	5
6.	Joseph Pemberton, do. 102 Chesnut-street,	5
7.	Elizabeth Sergeant, do. 245 Mulberry-street,	5
8.	Jacob Cox, do. 226 High-street,	5
9.	William Folwell, do. 36 North Second-street,	5
10.	Sermon & Abbett, do. 26 do.	5
11.	William Thackara, do. 36 South Sixth-street,	5
12.	Joseph Cooper, do. 35 North Front-street,	5
13.	William Walker, do. 12 North Second-street,	5
14.	Joshua Lippencott, do. 54 North Front-street,	5
15.	James Cooper, do. 56 do.	5
16.	Edward Davis, do. 212 Mulberry-street,	5

Carried forward, 30

Dollars:

No.	Brought forward,	80
17. Peter Ozeas, do. 295 Mulberry-street,		5
18. James Milnor, do. 97 do.		5
19. J. B. Dumoutet, do. 55 South Second-street,		5
20. David Landreth, do. High, between Twelfth and Thirteenth-streets,		5
21. George W. Morgan, brewery Moravian-alley	24	
22. William Dawson, do. 81 Chenut-st.	24,	
Mr. Dawson being a subscriber to the Water Loan for one share, exclusive of one share for which he receives water in his house, there is to be deducted from this rent 5 dollars per annum for 3 years,	—5,	
Leaves the rent per annum, Mr. Dawson has to pay, for 3 years,		19
23. John Aitken, dwelling-house, S. Sixth-street,		5
24. William Ogden, do. 86 Chesnut-street,		5
25. John Mansell, do. 75 do.		5
26. Sarah Collins, do. 60 do.		5
27. George Simpson, Cashier, Bank U. States,		5
28. John Dunlap, fountain, corner of High and Twelfth-streets,		24
29. David Jackson, dwelling-house, 69 Chesnut- street,		5
30. Jacob Clarkson, do. 71 do.		5
31. Thomas Morris and Son, brewery, North Second-street,		24
32. Henry Pepper, do. South Fifth-street,		24
33. John Dorsey and Samuel M. Fox, sugar re- finery, Church-alley,		24
34. Wm. Sansom, fountain, 96 Mulberry-st.	24	
Mr. Sansom being a subscriber to the Water Loan for four shares, exclusive of one share for which he re- ceives water in his house (see No. 21, of list of water furnished to subscribers) there is to be deduct- ed from this rent 20 dolls. p. ann. for 3 years,	—20,	
Leaves the rent Mr. Sansom has to pay for said fountain, per annum, for 3 years		4

Dollars, 278

Making in all thirty-four houses, breweries, &c. supplied with water on rent, and amounting in the whole to two hundred and seventy-eight dollars, per annum; on account whereof there has been received and paid into the hands of the city treasurer, the sum of sixty-five dollars and fifteen cents.

5. *Statement of expences incurred, on account of the Water Works, up to the 16th November, 1801. Charged in the books of the Water Works, under the following heads, viz.*

	Dollars	Cts.
BASON, including the bason wall and sluice, cost, - - - - -	22383	82
CANAL, digging, walling and materials, cost, - - - - -	3438	69
CANAL SLUICE, cost, - - - - -	2264	43
WESTERN (or lower) TUNNEL, cost, -	6921	93
ENGINE WELL, in Schuylkill engine-house, cost, - - - - -	952	68
SCHUYLKILL ENGINE HOUSE, cost,	11178	71
EASTERN (or upper) TUNNEL, including the marble pump-chambers, at each end, cost, - - - - -	26120	15
CENTER SQUARE ENGINE HOUSE, exclusive of the carpenters wages, and a part of the marble work, not yet measured, cost, - - - - -	40760	53
Carried forward,	Dollars, 114020	95

Brought forward, Dollars, 114020 95½

DISTRIBUTION, including the expence of that part of the plan, viz. pipes, cocks, hydrants, and other devices, together with the distributing chest, and the iron main, descending from the reservoir, cost, - - - -		32203 75
SCAFFOLDS, &c. including the cost of scaffling, shops, centres, lime-houses, fences, tools, and utensils, and <i>all</i> the carpenters wages, cost, - -		16790 75
BUILDINGS; being the cost of some materials, glass, &c. used at both houses, and not yet apportioned, cost,		669 17
SHINGLES, 33650 were purchased, of which some have been used at both houses, and some remain on hand, the whole cost, - - - -		565 41
SMITHS WORK, being the expence of erecting and finishing smiths forges, coals, iron, smiths wages, - -		2652 7
SAWYERS, wages of two sawyers, sawing scantling, &c. - - - -		937 66
ENGINES, being the cost of the two steam-engines, by contract, 30000		
And sundry expences in the pumps, &c. - - - -		1818 32
		<hr/> 31818 32
ENGINE FRAMES, cost of some timber used in the engine-frames, - - -		942 81
LIQUOR, supplied the workmen, cost,		898 44
CENTER SQUARE, expence in making circular-fence, planting trees, leveling and improving the square, -		1241 82
Carried forward, Dollars,		<hr/> 202741 15½ <hr/>

Brought forward, Dollars, 202741 15

SALARIES, being as follows, viz :

B. H. Latrobe, engineer, his compensation, per contract, - - - 6350

John Davis, clerk of the works, up to 1st October, - - - 2313

James Todd, two years and six months salary, as clerk of the watering committee, and accountant at the water-office.

---Also, up to 1st October, 1900

Frederick Graff, drawing and assisting, generally, - - 372 75

10935 75

INCIDENTAL EXPENCES, being costs of stationary, advertising, printing, water loan, certificates, &c. travelling expences, making out water tax books, drawing mortgages, contracts, &c. - - - - - 1796 76

PETER BRADY, marble-mason, paid him, on account of marble work done and not yet measured, - - - - - 1119 65

1119 65

Dollars, 216593 31

Add thereto the following Bills, &c. not yet entered in the books of the water-office, viz.

Foxall & Richards, for castings, 33 75

John Stow, turning, - - - 16 37

Richard Hill Morris, lumber, 26 8

N. & D. Sellers, wire grates, 17 92

William Rice, carting, - - 130 63

Jonathan Knight, lumber, - 403 20

627 95

Carried forward,

216593 31

Brought forward, Dollars, 216593 31½

Brought forward, 627 95

Four weeks wages to workmen
being up to 12th Nov. 1801. 907 43

Sundry small bills paid by John
Davis, for which he is to be
reimbursed, - - - - - 29 65

Sundry bills not yet furnished,
supposed will amt. to about 100

Peter Brady, for marble work,
at center square engine-house
done since the last measure-
ment, and not yet measured,
supposed will be - - - - 8000

Ditto, for cutting the stone for
coping the bason wall, not
yet measured, about 400

10065 3

Dollars, 226658 34½

Add interest on Water Loan—Total
amount of interest on water loan, up
to first July 1801, (it being payable
half-yearly, to wit. on the 1st. Janua-
ry and 1st. July) being, -

8711 86

Total amount of the *Cost* of the *Works*,
up to the 16th November, (except the
interest on the water loan, which is on-
ly calculated up to 1st. July, and the
above salaries of John Davis and Jas.
Todd, which are calculated up to 1st
October, -

Dollars, 235370 20½

Carried forward,

235370 20½

Brought forward, Dollars, 235370 20½

Add thereto, amount charged to Nicholas I. Roosevelt, being advances made on account of his contract for maintaining the engines in fuel, attendance, &c. for the purpose of supplying the city with water, - 7532 33

Add also, the expence of erecting the two additional boilers on account of the said N. I. Roosevelt, at least so far as orders have already been given, and contracts formed, viz.

Bill for plank and timbers for both boilers, part being delivered 313 82

Contract with Andrew Douglass & Co. for sheet-iron for the center-square boiler----

Amount of sheets now delivered by them, 340 12

Amount of the residue, supposed, 1000

-----1340 12

-----1653 94

-----9186 27

TOTAL amount of Costs of the Works, as above-stated, and of advances to N. I. Roosevelt, but which advances do not, in *reality*, form any part of the actual cost of the *erection* or *completion* of the Works, Dollars, 244556 47½

Of this amount there hath been actually paid the sum of Dolls. 212520 64½

And there remains to be paid as per the following list, the sum of - 32035 83

Dollars, 244556 47½

6. *List of Debts (being part of the above amount, of 244,556 dollars, 47½ cents) due and owing on account of the Water Works, on the 16th November, 1801, viz:*

TO—	Dollars.	Cts.
Isaac Hozey, for lumber, - - - -	29	91
Watson and Bunting, do. - - - -	13	38
James, Clibborn and English, coal, -	1236	67
Henry Foxall, and Co. iron castings, -	795	15
Samuel Wheeler, iron work, - - - -	103	49
Robert M'Mullen, lumber, - - - -	37	78
William Britton, do. - - - -	9	69
John Lynes, do. - - - -	30	73
Smith and Stokes, do. - - - -	50	
Benj. & Jas. Cooper, do. - - - -	11	94
Keyser and Gorgas, do. - - - -	16	50
Jeremiah Piersoll & Co. iron, - - - -	6	90
John Houston, digging pipe trench, -	34	8
Joseph Barger & Co. lumber, - - - -	86	79
John Lewis, masonry, &c. - - - -	4	51
Nicklin and Griffith, coal, - - - -	366	67
John Smith, ironmongery, - - - -	37	99
Lane and Salter, gun-borings for cement, -	62	7
Baker and Comegys, coal, - - - -	433	33
John Dunwoody, carting coal, - - - -	78	44
Samuel Briggs, boring logs, - - - -	135	92
Thomas Dixey, do. - - - -	263	7
Samuel Jones, do. - - - -	181	67
William and Jonathan Leedom, coal, -	1102	59
Alexander Crawford, lime, - - - -	257	93
Foxall and Richards, iron castings, -	5	68
John Owen, smith work, - - - -	7	75
B. Henry Latrobe, engineer, - - - -	305	74
Abraham Sheridan, stone, - - - -	415	77

Carried forward,

Dollars, 6122 14

Brought forward,	Dollars, 6122	14
P. and T. M'Ilwham, for brass castings,	- 49	80
Thomas Barnett, turning hydrant valves,	- 50	6
Jonathan Knight, Lumber,	- 244	15
Thomas Vickers, bricklayer,	- 875	15
James Cockran, overseer of labourers, at ba- son, &c.	- 99	
Rugan and Rodes, liquor for workmen,	- 300	
Asa Ridgway, Bricklayer,	- 722	75
Nicodemus Lloyd, smith work,	- 504	87
Jacob Brown, iron,	- 514	13
Ricloff Alberson, lumber	- 206	8
James Todd, accomptant, salary,	- 270	
Edmund Brewer, scaffold poles,	- 127	75
Rynear Tyson, lime,	- 229	51
William Davis, cordage, &c.	- 417	49
Robert Haydock, lead, glazing, &c.	- 1874	44
William Songster, Sundays attendance at the works, to 1st October,	- 112	
Thomas Dobson, stationary,	- 42	82
David C. Claypoole, printing,	- 19	33
Alexander Anderson, flannel,	- 2	28
Jacob Edenborn, leather,	- 6	87
Hugh M'Ilvaine & Co. tar,	- 4	
Henry Richards & Co. iron,	- 27	82
Elisha Fisher & Co. smith's vice,	- 9	56
John Hood, blocks,	- 6	8
Samuel Child, glass paper,	- 5	75
Warrington and Stokes, pipe timber,	- 47	77
Thomas Webster, lime,	- 83	18
David Landreth, trees,	- 36	
Jeremiah Hornketh, bricks,	- 293	38
John Britton, lumber,	- 48	
James M'Ilvain, stone,	- 490	60
Nicholas Esling, bricks,	- 979	62
William and Jacob Wayne, lumber,	- 352	36
Carried forward,	Dollars, 15174	74

Brought forward, Dollars, 15174 74

James Rowland & Co. iron,	323	48
Isaac Hazlehurst & Son, steel and dock-rent,	337	77
Augustus Le Grand, stone,	370	
Robeson & Paul, iron pipes,	128	62
John Elmslie, wages for distributing water, and for bills paid by him for smith's work,	140	1
George Ott, shalloping sand and stone,	158	44
John Davis, clerk of the works, salary,	205	13
Samuel Robinson, grindstone, &c.	27	50
John M'Ilvaine, shallopping stone,	181	50
Richard Price, lumber,	23	2

Certificates unpaid, viz.

Being draughts or orders } No. 323, for 650,
on the treasurer, and } 373, 295,
not yet paid, } ————945

Foxall and Richards, castings,	33	75
John Stow, turning,	16	37
Richard Hill Morris, lumber,	26	8
Nathan and David Sellers, wire grates,	17	92
William Rice, carting,	130	63
Jonathan Knight, lumber,	403	20
Four weeks wages to workmen, to 12th November,	907	43
Sundry small bills paid by John Davis, to be paid him,	29	65
Sundry bills not yet furnished, supposed,	100	
Peter Brady, marble work, not yet meas ^d .	8000	
Ditto, cutting stone for coping bason wall, supposed,	400	
Bill for plank and timbers for boilers,	313	82
Contract with A. Douglass & Co. for sheet-iron,	1340	12
	<hr/>	1653 94

Carried forward, Dollars, 29734 18

Brought forward, Dollars, 29734 18

Deduct therefrom amount due and receivable from divers persons, for sundry materials, &c. sold, and for work done as follows, viz.

George Plumstead, for digging	3	10
John Miller, jun. do.	2	10
Alex. J. Miller, materials sold him	2	12
Henry Drinker, jun. old tools sold him,	1	20
Caleb Lownes, overpaid him, and to be refunded,		4
Permanent Bridge Company, for lumber sold them,	24	57
Bank of Pennsylvania, for fire bricks and logs, sold them,		64
Benj. W. Morris, for old pipes sold him,	25	75

And which is to be applied } ——— 126 84
 towards the payment of }
 the above debts, }

Dolls. 29607 34

Add balance of interest on Water Loan remaining to be paid—the whole amount of interest up to first July 1801, being 8711 dollars 86 cents, and there having on the 16th November 1801, been paid on account thereof, the sum of 6283 dolls. 37 cts. leaves unpaid the sum of 2428 49

Total amount of Debts owing, Dolls. 32035 83

7. Estimate of the Sums necessary for the completion of the Water Works, viz.

Bason Wall—Coping the southern moiety, including stone, about 1100 feet, at 75 cts. 825

Canal—Grate for the mouth of the lower tunnel, - - - 30

Coping the wall and sluice, including stone, - - - 1000

Painting both sluices, - - - 10

—————1040

Schuylkill Engine House—Marble coping, at the well and pump chamber, - - - 80

Walling the cellar 20 perches (including and sand lime) at 2 dols. 40

Arches in do. 7176 bricks, at 13 dollars per M. - - - 93 28

Carpenter's work, at doors and windows, and for stages and ladders in the well, - - - 250

—————463 28

Upper Tunnel—Cutting and fixing marble on the two air-holes, and for grates, - - - 32 50

Pointing parts, on the inside of the said tunnel.—It is not known that it will be necessary to do this, if it should prove necessary to be done, it is supposed the expence may be

100

—————132 50

Carried forward,

Dollars, 2460 78

Brought forward, Dollars, 2460 78

<i>Centre-Square Engine House—</i>	
connecting, rising and descending mains, with the permanent reservoir, - - -	160
Carpenters' work to said building, and materials, - - -	1200
Plastering, - - -	253
Masons, Bricklayers and labourers, - - -	350
Copper gutter over the porticoes, 84 feet, at 93 cents, -	78 12
Covering the roof over do. with tin, - - -	110
If covered with copper instead of tin, it will cost 480 dols.	
4 Copper Pipes, to convey the water from the roof of the square building, - - -	60
Glazing the windows, - - -	60
Painting cannot be estimated at present.	
Ironmongery, - - -	400
	<hr/> 2671 12

Distribution.

To complete the original estimate of the engineer, of 104,000 feet of pipe, there remains to be laid 74,000 feet ; which, to be of the best and most proper timber, banded on each end, and with joints composed of a cast iron cylinder, or barrel, each end of which forming a spigot to enter into the log, in each end thereof, it is represented, will cost, when laid, 66 cents per foot. But 74,000 feet is too great an allowance, the estimate having originally been made,

Carried forward, Dollars, 5131 90

Brought forward,

Dollars, 5131 90

with the intention of laying two pipes in each street, and it being now determined to lay but one, therefore say,

50,000 feet - - at 66 cents	33000	
Devices for the above, allowing 3 hydrants for every 500 feet (and two stop cocks) viz :		
300 Hydrants, at 12 dolls.	3600	
300 Connecting pipes, at 6	1800	
200 Stop cocks, at 8 -	1600	
	<u>7000</u>	
		<u>40000</u>
Total - - -	Dollars	<u>45131 90</u>

8. Subscriptions to the Water Loan.

744 Shares subscribed for, in 1799 and fully paid up, at 100 dollars,	-	74400
273 Shares subscribed for, in 1801, on account whereof there has been received, up to the 16th November, 1801,		19800
Total, received, - -	Dollars,	<u>94200</u>

Note. On account of the shares subscribed for, in 1801, there remains to be received the sum of 7500 dollars.

The water loan bears lawful interest, payable half yearly, to wit. on the 1st January, and 1st July.

9. *Statement of the Sources, from which the monies expended, under the direction of the Watering Committee, have been received up to 16th November, 1801.*

Water Loan of 1799.

741 Shares paid up and completed, is - - - - 74100

Amount paid on 28 shares, and forfeited by the subscribers, refusing to complete their shares, - - - - 290

Dollars, 74390

Deduct—Commissions

on collecting, 68470

at two per cent, - 1369 40

Treasurer's commis-

sions on receiving &

paying, 72560.60, at

half per cent, - - 362 80

1732 20

Dollars, 72657 80

Deduct also, subscription money, received by Jonathan Robeson, who is since deceased, and not yet paid over by his executors, - - - 460

72197 80

3 Shares subscribed afterwards, by I. Elmslie, - - - - 300

Water Loan of 1801.

Received on account of 273 shares subscribed, - - - - 19800

Carried forward,

Dollars, 92297 80

Brought forward, Dollars, 92297 80

*Water Tax laid in 1799, for
50000, Dollars.*

Received for a note discounted,
at the Bank of United States,
9th August, 1799, for 10000
dollars (this note is paid) - 9893 33

Ditto—Another note of 10000
dollars, discounted at same
Bank, 30th August, 1799,
(this note is paid) - 9898 33

Ditto—A third note of 10000
dollars, discounted 14th March
1800, (this note also, is paid) 9893 33

Ditto—A fourth note of 10000
dollars, discounted 9th June,
1800, (7200 dollars, has been
paid, on account of this note ;
the balance of 2800 dollars, is
unpaid) - - - 9895

Ditto—From the city treasurer,
the sum authorized to be bor-
rowed, in anticipation of the
water tax, by ordinance of 25th
July, 1800, - - - 10000

49579 99

*Sales of Bridge and Ferry,
on Schuylkill.*

Received April 10th 1800, a-
mount of first payment, - 5000

Ditto May 5th 1800, first bond
and interest, - - - 5025

Carried forward, 10025

Carried forward, Dollars, 141877 79

Brought forward, Dollars, 141877 79

Brought forward, 10025

Ditto July 25th 1800, second bond for 5000 dollars, discounted and produced, - 5094 27

Ditto August 23d 1800, for a note for 5000 dollars, discounted on the security of the third bond, and produced, (being at eight months) - - 4800

Ditto the interest on the third bond, being the balance after paying the above note, - - 318 75

20238 2

Shares of Bridge Stock.

Received dividend and interest thereon, being on 2000 shares, - - - 960

Tolls of Schuylkill Ferry.

Received amount of tolls up to 31st December, 1799, - - - 3589 78

Appropriation of 12000 dollars in 1799 for payment of Interest on Water Loan &c.

Received the balance of said appropriation, 10371 82

Fines and Amercements.

Received the amount appropriated for the water works, - - - 2325 33

Appropriation in 1800 of 8000 dollars for meeting Contract engagements for supporting the two Steam Engines.

Received the amount of said appropriation, 8000

Carried forward, Dollars, 187362 74

Brought forward, Dollars; 187362 74

Appropriation of 1801, of the surplus income of the corporate estate for 1801 and the surplus of Corporate and Tax Funds of preceding years.

Received for a note of 6000 dolls, discounted December 9th 1800 at Bank of the United States, produced (this note is paid)	5936	
Ditto a note of 10000 dollars, dis- counted at same Bank, March 20th, 1801, produced (5000 dollars, has been paid on ac- count of this note)	9893	33
Ditto from the city treasury,	2982	3
	<hr/>	18811 36

Appropriation in 1800 for completing a Road, and planting trees in Center Square.

Received on account thereof,	-	-	93 77
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Total,	-	Dollars,	<hr/> 206267 87 <hr/>
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10. *Statement of Receipts and Expenditures by the watering committee, up to the 16th November, 1801.*

Received by the said committee, as per the foregoing statement, No. 9, Dollars, 206267 87

Deduct, amount of expenses incurred on account of the Water Works, as per statement No. 5, 244556 47½

Deduct therefrom, the amount of interest on water loans, included in said statement, No. 5, but which is paid by the city treasurer, therefore not to appear in the accounts of the watering committee, 8711 86

235844 61½

Deduct from this—

Amount of debts owing as per list of debts, No. 6; which debts are included in said statement, No. 5, - - 32035 83

Deduct therefrom balance of interest on water loans, included in said statement No. 6, but which

Carried forward, 32035.83 235844.61½ 206267.87

Brought forward, Dollars, 206267 87

Brought forward, 235844 61½

Brought forward, 32035 83

as above stated,
is to be paid by
the city treasu-
rer, and has no
connection with
the accounts of
the Watering
Committee,

2428 49

29607 34

Total expenditures, to 16th Nov. 206237 27½

In the hands of the Treasurer, 30 59½

Add, a difference between this statement,
and the Treasurers' books of 1 dollar 41½
cents, being sundry small errors ; one be-
ing a short payment made of 1 dollar 6
cents, in paying 3 certificates together,

1 41½

Balance resting in the hands of the city trea-
surer on account of the watering commit-
tee, on the 16th November, 1801, -

32 1

11. *State of the funds, at the disposal of the committee for watering the city, November 16th, 1801.*

By the appropriation ordinance, passed March 12th, 1801—" The surplus of the tax fund for the year 1800, together with the balance arising from the income of the corporate estate for the year 1801." was appropriated for the completion of the Water Works.

The report of the joint committee on the city debts and credits made the 28th January, 1801, exhibits the following excess of the *tax fund*, after meeting all demands, viz.

Dollars,

Tax fund of 1799,	-	-	949	29
Ditto of 1800,	-	-	13526	80
			<hr/>	
			14476	

And by resolution of councils of 4th December, 1800, there was granted to the watering committee 6000 dollars, of the surplus appropriations of 1800,

6000

Of the *corporate estate*, the same report exhibits a surplus beyond all demands for the year 1800 (including the rental of 1801) of

11,052 38

Deduct appropriated for repairs and improvements of city property, out of the rental of 1801,

800

10252 38

Amount of the above appropriation is,

30728 47

Out of which the committee have anticipated by discounts, viz :

One note of - - - 6000

One do. of - - - 10000

And have drawn on the treasury for - - -

2982 31

18982 31

* Leaving a balance unexpended of }
the above appropriation of }

11746 16

* This balance is mortgaged to the gentlemen who have signed the notes, and therefore cannot be touched by the committee until the notes are paid off. The one for 6000, however, is already paid, and 5000 dollars is paid on account the 10,000 dollar note.

Brought forward, Dollars, 11746 16

By the same ordinance there is appropriated "for meeting contract engagements for supplying the city with water, by means of the steam engines, and for defraying expences incidental to the distribution," the sum of - 8800

Of the water loan of 1799 there remains to be received from the estate of Jona. Robeson, - - - - - 460

Of the water loan of 1801 there remains to be collected, 7500

From which will be deductions, viz :

Commissions on collecting 27,300 dollars, at 2 per cent, - 546

Treasurers, commissions receiving and paying, half per cent, - 136 50

-----682 50

6817 50

The appropriation of 1800, for completing a road and planting trees in center square, remains good for, - 1650

Excepting two drafts of the committee, amounting to, - 93 77

-----1556 23

Balance of appropriations, remaining undrawn for by the committee, is - 29379 89

Which balance is chargeable with amount of debts owing, as per list, No. 6 - - 32035 83

Deduct therefrom, balance of interest due on the water loans,

Carried forward, 32035.83 29379.89

Brought forward, Dollars, 29379 89

Brought forward, 32035 83

which is included in said list of debts, but is not payable by the committee, but by the treasurer out of other funds, - 2428 49

29607 34

So that the whole of the debts and engagements of the committee to this time, exceed the monies appropriated by, - 227 45

12. *Statement of Appropriations made for payment of interest on Water Loans.*

By ordinance of 29th March, 1799, there was appropriated, - - 12000

By ordinance of 5th August, 1799, there was of the above sum, applied towards the erection of the works, - - 10371 82

Leaving the balance, applied to the discharge of interest, - - - 1628 18

By ordinance of 20th February 1800, there was appropriated, - - - 4200

By ordinance of 12th March, 1801, there was appropriated, - - - 4470

Total of appropriations, - 10298 18

The Interest on the Water Loan is paid half yearly, viz: on the 1st January and 1st July.

Deduct--Amount of interest from the commencement, up to the 1st July 1801, - 8711 86

Leaving a surplus on account of the interest, accruing after the 1st July 1801, of 1586 32

Amount of interest, as above, to	
1st July, - - - - -	8711 86
On account whereof there was paid	
on the 16th November 1801,	
the sum of - - - - -	6283 37
	<hr/>
Remaining unpaid, on the 16th	
November, Dollars,	<u>2428 49</u>

13. *List of Persons employed by the Watering Committee—16th November.*

- James Todd.....Accomptant at the Water Works and Secretary to the Watering Committee..... salary, 800 dollars, per annum.
- John Davis.....Clerk at the Works.....his pay three dollars per day, or 18 dollars per week.
- Ten Carpenters.....at 1 dollar to 1 dollar 20 cents per day.
- One Mason.....at 1 dollar 67 cents per day.
- *One labourer, at Center Square Engine House..... at 93 cents per day.
- Four Blacksmiths.....at 1 dollar 10 cents to 2 dollars per day.
- Two Strikers.....at 1 dollar per day.
- John Grimes.....repairing Pipes.....2 dolls. p. day.
- Three men, who assist said Grimes.....at 93 cents per day.
- Francis Clark.....repairing pipes.....at 2 dollars per day.
- Three men, assisting said Clark.....at 93 cts. p. day.

* The Labourer at Center Square is also employed to pay attention to the Works on Sundays, for which service he is paid one dollar for every Sunday.

One man, assisting the Smiths and also employed about other work.....at 93 cents per day.

Two men, assisting the working the engines, (their pay is charged to N. I. Roosevelt's account).... at 1 dollar per day.

No. 14.—Letter from Messrs. Todd and Davis, to the Committee, containing observations on Wooden and Iron Pipes.

Philadelphia, November 16, 1801.

“Gentlemen,

“YOU have requested “our observations on the wooden pipes, the reason of their frequently giving way-- our ideas about the iron pipes, and the probable cost of them.”

“Had Mr. Latrobe been here, you would have received from him much useful information on these points, which his knowledge and experience as well as his professional talents, in a peculiar manner qualify him to give.

“In his absence, however, we do not hesitate to lay before you the following observations, which our attention to the work has enabled us to make.

1. “A considerable part of the pipe now in the ground was laid in the year 1799, eighteen months before the engines were ready to pump, and before the water could be admitted into them.—In such a state, acted on as they were by the dampness of the surrounding earth, and the foulness of the air within them, it is not to be wondered at that some of them should exhibit the marks and the effects of decay.—And as no method of proving them to be sound and

water-tight was adopted, at the time they were laid, it cannot be matter of surprize that many leaks should appear, when the pressure of a fifty feet head of water, after such a length of time, came to operate upon them---indeed it is rather beyond what was expected that they bore it so well as they did.

2. " It became a subject of consideration in the commencement, whether it would be best to lay the pipe with the bark on, or to take it off. There were various opinions on this point; but it was finally determined to leave the bark on. All timber is subject to perforation by worms, and white-oak timber as much, if not more so, than almost any other. These worm-holes are sometimes difficult to discover when the bark is off, and almost impossible when it is on. From hence has arisen a considerable source of leakage, which has perhaps been encreased by the circumstance of the water being admitted into the pipes, before there was a sufficient number of outlets, to keep up a current through them, for the more rapidly the water is drawn off, the less strain there is on the pipes, and the fewer leaks are created, or will appear.

3. " It often happened too, while the engines were in motion, at intervals, for the regulation of their movements, that water was thrown into the pipes, and, in a short time after, suffered to run off. Then after the air had succeeded and filled its place, water was again admitted, in some instances, without attention having been paid to opening, even, the few vents at that time existing. The air being a body extremely elastic, must in this situation have been compressed; as much as the force of the head was capable of compressing it, and being also, a thinner substance than water, must, when thus acted on, have found its way through crevices, which, without this operation, the water might not have discovered, and through which the water immediately succeeding, would find and increase a passage. This

cause of leakage has been, as it were, an auxiliary to all the rest.

4. " A great number of the pipes after being bored, remained a considerable time exposed to the action of the sun and wind. This occasioned them to crack both externally and internally, and although the cracks may not have extended nearly through the pipe, yet they certainly reduced their strength, and in many instances, have been the cause of their failing.

5. " Another, and indeed a principal cause of leakage arose from the manner in which the logs were banded ; the mode having been pursued here, which is used with success in London, where the pipes are of English elm, a wood as difficult, as white oak is easy, to split. This mode is to make a band, not to go round the outside of the log, but being wedge-like, to be driven into the end, round the counter-bored part. The effect has been to split the log in a circular direction, the shape of the band, about 3 or 4 inches in, which split, if made obliquely, or joining with the sun or wind cracks in the internal part of the pipe, must have formed an outlet for the water round the band. This was found to be *actually* the case in numerous instances. These bands were supplied of different sizes, to the contractors for boring, and were to be driven by them. In some cases, either from the want of having those of a proper size, or from some other cause, the bands designed for the smaller, were used for the larger bores. Thus they were driven too near to the joint, and almost inevitably produced a junction of the split, made by the band, and the internal sun cracks. Those bands which were larger and more judiciously inserted, have as yet done their duty. The deficiencies here pointed out, have however been perfectly remedied in all the pipes laid this season, by driving a strong band, well fitted, round the outside.

" We have now enumerated the principal causes of the leakage, which it must clearly appear, are by

no means of a nature to render them difficult, to be removed or avoided hereafter. The first *is* remedied by the water being admitted as soon as the pipes are laid—the second, by taking off the bark, carefully inspecting the logs, and by admitting the water with all its force, while the ground remains open, by which means they are effectually proved—the third, by the present construction of the hydrants, which permits the air to pass off, before the head begins to operate, and by the pipes being mostly kept full—the fourth, must be remedied in future by keeping the logs and pipes constantly immersed in water, till the moment they are wanted for laying—and the fifth, by strong bands on the outside as already stated.

“ With this view of the subject, and under these impressions we cannot have any doubts as to the efficacy of wooden pipes, provided the timber be selected with judgment and the workmanship in boring and laying, be executed with that skill which has been acquired by experience, and with that care and attention, which works of this kind require.

“ The kind of timber in our opinion, most to be preferred, is good yellow pine. The pipes should contain at least, two and one half or three inches of heart, when bored. The spigot-end not less than two inches thick where it joins with the counter bored log, and, together with the counter bored end, should be payed or done over with pitch and tar, or such other composition as may appear best calculated to protect or prevent the timber from rotting. The counter bored end should also be banded with a strong iron band, well fitted, such as are now used, and the logs should be kept in water both before and after they are bored, to prevent the sun and wind from cracking the pipe before it is laid.

“ Another, and perhaps a better mode, though a little more expensive than tapping one end of the log, which certainly reduces the strength of the timber, has been proposed for making the joints of wooden

water pipes in London. It is by the addition of a small cast-iron cylinder or barrel, each end of which forms a spigot, to enter into and fit the end of each of the logs between which it is placed. Thus the whole strength of the timber is retained, the joints made as perfectly tight, and as easily taken up for repairs, as by the mode now in use; and the only additional expence will be the cost of the cylinder, and an additional band for each log—the logs requiring, in this case, to be banded on each end.

“ We have lately had a small quantity of sweet gum, or Bilsted timber, which, from its appearance, and the testimony of those best acquainted with it, is very suitable for pipe—it has been used for pumps in many places, and in such situations has appeared perfectly sound, after standing for twenty-five years.

“ From the specimen we have had of the iron pipe which has been delivered and tried at the Center Square, there is no doubt of its answering effectually for the purpose intended—and though the first cost will be much greater than wooden pipe, yet, ultimately, it may be the cheapest.

Per Foot.

“ The cost of that delivered is, 1 53

“ Fitting up, including leaden joints, 8

“ Digging the pipe-trench and filling up, 7

“ Labour in laying the pipe, 3

— 1 71

“ Making the whole cost of six inch cast iron pipe, of three quarters of an inch thick, to be one dollar seventy-one cents per foot, running measure, when laid, all expences, except re-paving over them, included.

“ The four and one-half inch pipe, need not, perhaps, be more than five-eighths of an inch thick.— This will cost, if procured at the same rate per ton as the six inch, not more than one dollar twelve and one half cents per foot, running measure, when laid, excepting repaving, as above.

“ Stop cocks must be constructed and fixed in these pipes, at proper distances, while the pipe is laying. Beside which, some pipe will be required of a construction suitable for the insertion of cross-pipes. These pipes will cost something more than the above estimate, but how much cannot be ascertained with sufficient accuracy, as none of this kind have yet been made.

“ Yellow pine pipe may be laid for about sixty to seventy cents per foot, either with spigot and faucet joints, as now practised, or with the cast iron cylinder joints, as mentioned above; including every expence, but re-paving.—And, after all, we are of opinion, as a sufficient quantity of cast-iron pipe cannot be procured in time to extend the distribution as soon, and as far as the interest and the convenience of the city may require—and as the yellow pine CAN be procured soon enough, and in sufficient quantity, and will certainly last, without leakage or defect, for a considerable time---that it would be most advantageous to continue the distribution in yellow pine pipe.

“ We are respectfully,

“ Your’s,

(Signed)

“ JAMES TODD,

“ JOHN DAVIS.

(Addressed) “ To the Committee of the Common
“ Council.”

YOUR Committee beg leave further to state,—
That the height of the present head, when the temporary reservoir is full, is 42 feet 10 inches at the building. When the permanent reservoir shall be

used, the head of water will be raised 14 feet 7 inches higher, which will make the strain or pressure on the pipes, when the water shall thus be raised, a little better than one third more than it is at present. As it is not improbable but that some of the pipes now laid, at least those of them which are most defective, may have as much strain on them now as they can bear, it has been thought best by the watering committee, considering the advanced state of the season, to defer using the permanent reservoir until next spring.

When the permanent reservoir is in use, there will be no longer occasion for the temporary one at the center square building, but it will be removed to the Schuylkill engine, for the purpose for which it was originally intended, that is, to be placed above the boiler belonging to that engine, where, being always kept full by the pumping of the engine, it will afford a supply of water to fill the boiler when it shall have been emptied for the purpose of cleaning it, or for any other occasion. At present, this boiler being placed higher than the water is raised by the engine, it is necessary, after letting the water out of the boiler, to fill it again by hand.

Summaries of Expenditures, Debts, Appropriations, &c. &c.

Expenditures on account of the Water Works.

TOTAL amount of expenditures on account of the water works, up to the 16th November, 1801, including the sum of 9186 dollars 27 cents, amount of advances to Nicholas I. Roosevelt, and also including all debts owing on account of the works to that time, other than the water loan, as per statement No. 5, Dollars, 244556 47 $\frac{1}{2}$

Debts owing on account of the Water Works.

AMOUNT of debts owing on the 16th November, 1801, on account of the erecting and carrying on the works (being part of the sum of 244556 dols. 47½ cents, total amount of expenditures) as per list No. 6.	32035 83
Deduct, balance of interest on the water loan, included in the said sum, but for which there are separate appropriations. See said list, No. 6.	2428 49
Leaves the amount of debts on the 16th November,	29607 34
<i>Appropriations for the discharge of the said debts.</i>	
Towards the discharge of the above debts, there are appropriations made to the amount of 29379 dollars 89 cents. See state of funds, at the disposal of the watering committee, No. 11.	29379 89
Excess of debts beyond the appropriations,	227 45

Water Loan.

The corporation are indebted for the amount which has been received on account of subscriptions to the water loan, as per statement, No. 8. 94200

But as the balance or sum of 7500 dollars, due from subscribers to the water loan, is included in the statement of funds, at the disposal of the watering committee, per list, No. 10, and will be applied towards discharging the debts, now owing as per list, No. 6, it is proper here to add said balance, as though it was actually received

7500

Making the whole debts of the water loan
1017 shares, at 100 dollars, per share. 101700

Interest on Water Loan.

TOTAL of appropriations made for payment of interest on the Water Loan, as per statement, No. 12,	Dollars,	10298 18
TOTAL amount of interest on the Water Loan, up to first 1st July, 1801, per same statement, No. 12,	-	8711 86
SURPLUS of appropriations on the 1st. July, 1801, towards the discharge of interest accruing since that period,	<i>Dolls.</i>	<u>1586 32</u>

Estimated Cost of the Water Works to their Completion.

TOTAL amount of Expenditures on account of the Water Works, up to the 16th November, 1801, including the sum of 9186 dollars 27 cents, amount of advances to Nicholas I. Roosevelt, as per statement No. 5,	Dollars,	244556 47
Deduct said advances to Nicholas I. Roosevelt, which are made him on account of his contract for maintaining the engines in fuel, attendance, &c. and for supplying the city with water, but which do not in <i>reality</i> form any part of the actual cost of the <i>erection</i> or <i>completion</i> of the Works,	-	9186 27
TOTAL COST of the Works up to the 16th November, 1801,	}	235370 20
Add amount of estimate for completing the works, as per estimate No. 7,		45131 90
TOTAL COST of the WORKS, when completed, allowing said estimate No. 7, to be correct,	Dollars,	<u>280502 10</u>

If it shall be determined to complete the Works, appropriations will be necessary to the amount of estimate No. 7, being 45131 dollars 90 cents.

The Ordinance establishing the Water Loan, contemplates 1500 shares. Subscriptions have been made for 1017 shares, so that there remain 483 to be subscribed for ; these, at 100 dollars per share, amount to 48300 dollars—a sum sufficient, agreeably to said estimate, to complete the works.

All which is respectfully submitted,

GEORGE A. BAKER,
 ABRAHAM SHOEMAKER,
 OLIVER EVANS,
 WILLIAM RUSH,
 SALLOWS SHEWELL,
 GEORGE BARTRAM.

Philadelphia, }
 Dec. 5, 1801. }