

1799.

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# REPORT

OF THE

*Manhattan Committee.*

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Printed by JOHN Furman, 102, in PEARL-street.

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*THE Committee who were directed to Report to the Corporation of the Manhattan Company, the best mode of procuring a supply of Water, from sources in the vicinity of this city, and the probable expence thereof, do Report accordingly, as follows, viz.*

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**T**HAT in every point of view, it appears to your Committee extremely desirable, that a part of the city, at least, be furnished with a supply of Water, during the ensuing summer.— With respect to the mode of accomplishing this, we have no alternative. We must depend altogether on the supply which a well, or wells, sunk in the vicinity of the city, are capable of furnishing. On this head there is, however, every reason to believe the Springs which supply Water to the Sea-Water Pump and to the Collect are very copious, and may probably be adequate to the supply of Water for culinary purposes, *at least*. But in order to distribute the Water, thus procured, into the several quarters of the city, it will be necessary to raise it by some sort of Machinery. It is well understood,

that the only effectual means of doing this, which in the present case we have it in our power to command, is to have recourse to the power of a Steam Engine. Your Committee have therefore applied to Mr. Nicholas Roosevelt, of Second River, to know on what terms and in what time he will engage to furnish the Company with a Steam Engine, of sufficient power to raise the necessary quantity of Water. Mr. Roosevelt's statement, in answer to their enquiries, accompanies this report.

YOUR Committee have not been able to obtain any correct information, with respect to the probable expence of procuring a Steam Engine from Europe. Mr. Weston tells us, "It is difficult to say what the cost will be:" Be it however what it may, as it would be utterly impracticable to import one, in time, to have it put up before the first of December next, at soonest, the Company would not have it in their power to make any fair experiment, with respect to the competency of the Springs in the vicinity of the Collect, until the succeeding Autumn. Thus a whole year must necessarily be lost by having recourse to the importation of an Engine; whereas by closing with the offer made by Mr. Roosevelt, they would have it in their power to furnish a supply of Water to a considerable portion of the city during this season, as it will depend only on the practicability of procuring and laying the pipes, which, if wood is used, may very soon be effected. It is highly probable the Company would be able to supply 2,000 houses with Water, before next winter,

which at eight dollars per house, would yield them a revenue of 16,000 dollars. Thus it must appear evident, that any saving which might accrue to the Company, by importing a Steam Engine would in effect be attended with a real loss. At any rate, it can never be considered as an object with the Company of so serious a nature, as to compensate for the risque, uncertainty, necessary delay, and probable embarrassments, attending an attempt to import a Steam Engine from England.

As the certainty of obtaining a sufficient supply of Water from a Well to be sunk in the vicinity of the Collect, must necessarily remain problematical, until the experiment is fairly tried, during the dry season of the months of August and September, and as Mr. Roosevelt offers to contract with the Company to have an Engine completed in three or four months, which will be in due season for making the experiment, your Committee take the liberty to recommend closing a bargain with him without delay.

Your Committee are of opinion, that no time should be lost in carrying into effect every measure necessary for putting the Engine now offered to their acceptance into operation. To this end, the ground belonging to the Corporation of the city, on which Mr. Colles erected an Engine before the revolution, for a similar purpose, should be purchased without delay. The Well which was formerly sunk thereon should be opened again, and deepened, if necessary,



a reservoir formed, and the pipes procured and laid as far as is deemed expedient during this season.

MR. WESTON, in his Report to your Committee, has given a comparative estimate of the cost of iron and wooden pipes, and finally recommends the use of iron cylinders, for the mains to be laid down the Broad-way to the Government House, down Beckman-street, and down Wall-street. The distance, in the whole, is 2,970 yards; which, according to an estimate your committee have made, would, if laid with Iron Cylinders, cost upwards of 50,000 dollars. As this would prove a very serious item, in the expence of the undertaking contemplated, it certainly deserves mature consideration, previous to its adoption. Your Committee are induced to believe, that two wooden Cylinders, of five or six inches caliber, will be amply sufficient for the mains down Broad-way, and that a single one of equal bore, will also be sufficient for the lateral mains, down Beckman-street and Wall-street. Your Committee conceive, from the information they have obtained on this head, that the whole expence attending the first cost of the Logs, boring and laying down the same, would not exceed three shillings per foot. They will, however, estimate it at four shillings per foot. The total length of the pipe required, would be 14,520 feet, which, at four shillings per foot, is 7,260 dollars; according to this estimate then, the first cost of iron pipes would, in the present instance, exceed wooden one's seven fold. Indeed, were iron Cylinders no more than

double the price of wooden one's, yet still your Committee conceive wood would prove the cheapest material, provided they are carefully laid; we may reasonably count upon their lasting 20 years, whereas it takes only about ten years to double your capital, by the accumulation of interest.—But an objection which weighs more, in the minds of your Committee, than even this immense difference in point of expence, between using iron or wooden Pipes, is the delay which will necessarily attend the use of iron Pipes.

YOUR Committee are, from good authority, furnished with a striking proof of the superiority of wooden to iron Cylinders, in point of economy. About ten or twelve years ago, Water was introduced into the new city of Edinburgh, and into the town of Leith. And although the Charon iron works, (the most famous in the Island of Britain for casting) is within 25 miles of Leith harbour, and by a water communication too, yet the conductors of this business laid down Cylinders of wood, in preference to iron, procured at a great expence from London.

By pursuing the plan suggested above, your Committee conceive the company have it completely in their power, in the course of the summer, to furnish a supply of Water to a large portion of the city; provided the Pipes, necessary for the purpose, can be procured and laid. This your Committee presume from the information they have been ena-

bled to obtain on this head, may readily be effected. In the mean time every preparatory measure may be taken, during the course of the summer and autumn, for extending the supply of Water into every quarter of the city, before the completion of the year 1800.

In conformity therefore to this plan, your Committee beg leave to report the following resolutions :

***RESOLVED, That***

he empowered to agree, in behalf of this Corporation, with Mr. Nicholas Roosevelt, for a Steam Engine, on such terms as they shall conceive most advantageous to the Company. That they also be empowered to treat with the Corporation of this city, for the ground in the vicinity of the Collect, on which Mr. Colles formerly erected an Engine, and formed a reservoir for the supply of Water, &c.

***RESOLVED, That***

he empowered to contract with proper persons, to dig and wall up a well on said ground, near the Collect. That they also contract for the erection of a suitable building, or buildings, to contain the Steam Engine, &c. and also for the formation of a Reservoir, and for furnishing the necessary number of Logs and Pipes, boring and laying the same.— That they likewise be empowered to employ a suitable person to superintend these different operations.

Your committee, in pursuance of the objects referred to them, caused an advertisement to be in-

serted in several of the newspapers, published in this city, requesting information. They have also applied to Mr. Weston, and to Mr. Colles, personally. These gentlemen have each of them made a report to the committee, which is herewith presented to the board.

THE Committee beg leave to state to the board, what they conceive would be the probable expence of procuring a supply of water from sources in the vicinity of the city, on the plan recommended in the former part of this report.

*Estimate of probable Expence.*

Steam Engine agreeable to Mr. } Roosevelt's offer, }	DOLLARS.
House for do. - -	9500
Reservoir - -	4000
Digging and walling up well -	5000
20,000 feet of pipe, at 4s. per foot,	1500
	10,000
	<hr/>
	30,000

exclusive of consideration to be paid the Corporation, for the ground formerly occupied by Mr. Colles' works; also of sundry incidental charges.

ALTHOUGH it is not probable that the laying of more than 20,000 feet of Pipe, will be accomplished during the ensuing summer and autumn, yet the Committee conceive it would be advisable to secure a quantity of Logs, sufficient for laying down Pipes throughout the whole extent of the city, so that they may be bored in time for laying next spring :

	DOLL.
Say 10,000 logs, of 14 feet long, } at 12s. per log, is	12,500
Incidental charges, including con- } sideration to the Corporation, } for ground,	7,500
Brought over,	30,000
Total Estimate of expenses for this year	<u>50,000</u>

One yard of Iron pipe, by Mr. } Weston's estimate, weighs } 230 lb, which, at 50s per } cwt. is	£.5 15s.
Laying do. including screws } and nuts,	80
Taking up pavement, digging the } trench, filling in again, re-pa- } ving, &c.	8
Transportation of pipes, from the } Furnaces, to the place where } laid,	5
	<u>£.6 18s.</u>

2,970 yards, at £.6 18s. per } £21,302 14s. 6d.  
yard, is

Two Cylinders of Wood down the Broad-way	3740
Berkman Street	660
Pearl Street	443
	<u>4843 yards.</u>
	3
	<u>14,520 feet.</u>

14,520 feet, at 4s. per foot, is 7,260 Dollars.

*Sunday Morning, April 29, 1855.*

To John B. Coles, }  
Sam. Osgood, } Esquires,  
and John Stevens, }

GENTLEMEN,

IN consequence of an application to me, by Mr. Stevens, that I should give in proposals for building a Steam Engine, capable of raising two million gallons of water, in 24 hours, to the height of 50 feet, and the expence of annual maintenance, I take the liberty of informing you that I will be happy in undertaking the same, at the price of 15,000 Dollars; and find hands, fuel, &c. for 2000 per ann. when the quantity of water required does not exceed 300,000 gallons, and so, in proportion, for any larger quantity, up to two millions. In this estimate, I include the lever beam, guide posts, and the erecting of the Engine.

I WILL engage to finish this work by the month of March, next ensuing, at farthest, and as much sooner as possible.

I WILL have no objections to giving satisfactory security, for the performance of any contract that I may enter into with the Committee or Board of Directors.

And have the honor to be, with great respect,

Your obedient and humble servant,

NICHOLAS ROOSEVELT.

*To John Stevens, John B. Coles, and Samuel Osgood,  
Esquires.*

GENTLEMEN,

IT has occurred to me, since I handed in my former proposals, that I might engage to put up an Engine for the Corporation, within the space of three or four months, capable of raising 300,000 gallons of water, to the height of 50 feet, in 24 hours, and find the pumps, pump rods, and frame for the engine, for the sum of nine thousand five hundred dollars.

I am, Gentlemen,

Your obedient and humble servant,

NICHOLAS ROOSEVELT.

*New-York,*  
*April 30, 1799.* }

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NEW-YORK, *April 26, 1799.*

GENTLEMEN,

THE following observations on the respective objects of enquiry, submitted to my consideration, will furnish you with such information, as will enable you to form some idea of the expence, attendant upon the plan adopted by the Directors of the *Manhattan Company*, for the purpose of watering the city.

I do not offer the estimate as perfectly correct ; to do that, would require more time, and better information, than I am now possessed of ; nor do I



consider a previous knowledge of the probable expenditure, an indispensable preliminary ; as the case is a matter of necessity, and not of choice, and whatever the cost may be, must be pursued to completion, all that is necessary, is, that the execution be attended with skill, speed and œconomy.

As a subject of opinion, the adoption of iron or wooden Pipes, is an exception. The statement annexed of the difference of expence, will shew that the cast iron Cylinders, are dearest in the first instance ; but when it is considered, that when once done, the work is permanent, not subject to decay or accident ; nor liable to the frequent repairs inseparable from wooden Pipes ; I believe it will be deemed most eligible to have all the *Mains* of cast iron. The unerring test of experience, has convinced the New River Company of their superiority ; and the circumstances being nearly similar, should induce us to follow their example.

In the estimate, I have considered the *Mains*, as of an uniform diameter ; but in practice, there will be a considerable, but gradual reduction of *Bore*, and consequently of expence. This reduction depending upon a variety of contingencies, to be known only by calculations founded upon the difference of *levels* and *distances*, and the requisite *dissipal supply* must be a work of labour and time.—It is a curious and difficult question in Hydraulics, yet absolutely necessary to be known, previous to the general distribution of the Pipes through the



city ; more particularly, as the smallness of the contemplated supply, will require a judicious and economical use of it. To proceed at random, would certainly occasion either an unnecessary, or inefficient effect : that the Steam Engine may be obtained much cheaper, and of superior workmanship from England, is so very apparent, as to need no recommendation of mine.

It is difficult to say what the cost will be, but having had occasion professionally to consult Messrs. Bolton and Watts, on the erection of two Engines, for the supply of the summit level of the Oxford canal with water, I obtained from them such information as will enable the Committee to judge of the probable expence of an imported Engine, on the last improved construction.

To raise 300,000 gallons of Water in 16 hours, from the Collect to the Reservoir, will require an Engine, the diameter of whose cylinder must be 22 inches, and Pump 13. Supposing the length of the *Stroke* 6 feet, and the number 10 in a minute, such an Engine would consume about 200 ton of coal per Ann. One of the Engines before alluded to, was calculated to raise upwards of a million of gallons of Water, and nearly to the same height as the one under consideration. The Engine, Boiler, House and Pumps, were estimated from 1000 to 1200 pounds sterling, exclusive of the Pump-Pit, Pit-work, fixing the Pumps, Tunnels digging or local expences of any kind. The second Engine,

raised the same quantity of Water, nearly double the height of the former ; the expence was estimated from 1800 to 2000 pounds. A third Engine, still raising the same quantity of Water, and in the same time, to something more than three times the height of the first, was estimated from 3200 to 3500, so that the expence is nearly as the height to which the Water is raised, every thing else being the same.

THE consumption of coal is deduced from a variety of actual experiments, made on different Steam Engines, furnished by Mr. Watts, and which may be perfectly relied on.

THE Reservoir, if finished on the present plan, will contain upwards of 680,000 gallons of Water ; the depth being nine feet. If it should be thought too expensive to wall the Reservoir ; it will be necessary to *ramper* the slopes, *pu*n the bottom with good clay, and to carry up *puddle gutters* in the embankments, to render them impervious to Water.

THE surface of the Water in the Reservoir will be 49 feet above the Collect, and 12 feet above the Park. This head will prepel the Water through the *Main Pipe*, in Broad-way, with a velocity of 37 inches per second. A Cylinder of *nine inches* diameter, is more than sufficient to discharge the limited quantity of Water in 12 hours ; supposing the Cylinders to be three quarters of an inch thick, and allowin<sup>g</sup> for the *Flanch* and *Astragals*, the

weight of a running yard, will be about 230 lb.—

To produce the same effect, would require at least,  
*six wooden Pipes* of 4 inch bore—The length of the  
 Cylinder from the Reservoir to the Government  
 House, will be 1870 yards.

The Lateral Main down Beckman st. 660

Do. do. Wall-street, 440

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2970

The wooden Pipe along Pearl-street, 528

THE total expence of the work to be done this year, including the cleaning out of the Pump-well, rebuilding it, formation of the Reservoir, fencing round the ground occupied by the Company, building Engine house, first cost and execution of the Steam Engine, cast iron Cylinders and wooden Pipes, laying the same, opening and filling the trenches, turn-cocks and Fire Plugs, wheel-barrows, planks, picks, shovels, shears, and other necessary materials, including contingencies of all kinds, I apprehend will amount to not less than the sum of £.24,535 exclusive of the purchase of the ground for the Reservoir, Steam Engine and Well.

I am, Gentlemen,

With respect, yours, &c.

WILLIAM WESTON.

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➤ Mr. WESTON's subjoined estimates, on the succeeding page.

*Estimate of one yard of iron Pipe.*

230 lb of cast iron pipe, at 45s. } £.4 12s. 5d.  
per cwt.

Laying one yard of Pipe, 1 6

Pulling up the Pavement, digging }  
the Trench, filling in again, } 8  
Repitching, &c.

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£.5 1s. 11d.

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*Wooden Pipe.*

6 Pipes of 4 inch bore, at 2s. } £.1 16s.  
per foot,

Laying the same at 1s. 6

Trenches, &c. 1

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£.3 2s.

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NEW-YORK, April 22, 1799.

GENTLEMEN,

BEING willing to comply with your request, of furnishing you with notes relative to the Water Works, I herewith lay before you such memorandums as I can recollect, and judge may be necessary, for your consideration.

THE well which was sunk in the place which I pointed out to you last Saturday, was thirty feet

diameter, at the inside, and about twenty-eight feet deep, below the surface of the ground; the soil towards the bottom was a very fine running sand; I sunk this well until I had eight feet water; this Water was tried by Doctor Bard, in my presence, and compared with the Water from the Tea Water Pump: He filled a wine-glass of each, and dropped therein two drops of Solution of Silver; the Tea Water had a visible tinge of white, about as much as if two drops of Sweet Milk had been put into it; whilst that of the great Well was no more discoloured, than if two drops of clean Water was put into it. This Water would raise a lather with Soap, and would wash well: As to the quantity, the Steam Engine (which we once worked for twenty-four hours without intermission) threw out two hundred gallons of Water, fifty feet high in a minute. In about an hour after it was set a going, it would lower the Water two feet; but by continuing pumping, we could not lower it another inch.

THE Steam Engine had a Cylinder, of twenty inches diameter, and seven feet long; the Pump was eleven inches diameter, and the stroke six feet;—the Engine made ten strokes in a minute, with a consumption of three or four loads of hickory wood, per day; many of the present inhabitants have seen it working.

AN idea has been proposed, of sinking a Well, and erecting a Reservoir in the area, opposite the

**Bridewell and Poor House.** I cannot think this an eligible situation, as it is doubtful whether the Water will be good, as most of the adjoining Wells are brackish; the digging in this place may also be more difficult.

A SMALL matter would sink a Well at Mr. Rutgers's; but the water which would be supplied to a Machine of any considerable power in this place, might almost as well be taken out of the East River. Moreover, there is no high ground convenient for the erection of a sufficient Reservoir.

WITH respect to Bronx's River, there appears to me many difficulties. To conduct it in an open channel, so as to enable it to run with sufficient velocity, it must be both wide and deep; less than five feet wide and two deep, I sho'd judge not adequate the various windings, will fall little short of thirty or to the purpose; the distance, I believe, taking in forty miles, and passing through rocks and a variety of soils, will be exceeding liable to leak away; it will be certainly frozen to a considerable thickness in the winter, as the velocity of its motion will be little.

To conduct it in close Pipes, (though in my opinion preferable) is, nevertheless, very difficult and expensive; the distance in this way, I judge, will be little less than what I have before stated. —The bore of the Pipes, I should judge, ought not to be less than eight or ten inches diameter, and

in both ways, will be liable to be destroyed or rendered useless, by accident, or the design of wicked persons ; against which, no possible security can be provided ; and after all, the water in the summer season is very bad : 'tis true, it will wash well, but it is not fit to drink ; this I know from experience, having myself resided more than a year at De Lancey's mills. Another consideration is, that the various property through which such a communication is to be made, is to be paid for, otherwise much difficulty might ensue.

A REMARKABLE anecdote relative to this, happened in the city of Dublin :—The Water which supplied that city, passed through the estate of Sir Compton Domeville, at Temple Oge ; Lord Santry, a relation of Sir Compton, committed a murder by compelling a sedan-chairman to drink a pint of brandy, of which he quickly died ; Lord Santry was tried, and condemned to be hanged ; Sir Compton declared, that if he were executed, he would turn off the Water ; this threat had the desired effect, for petitions were speedily presented to the Lord Lieutenant, by the citizens of Dublin, setting forth the predicament they stood in, and he received his pardon.

BUT why encounter so many difficulties ; why despise and reject so many advantages, by going to Bronx river, when Water so excellent in quality, so ample in quantity, can be procured in the old station, where every desirable benefit may be obtained, without the smallest risque.



THE melancholy catastrophe of yesterday, appears to me as a stimulus, that should urge the citizens of New-York, and every populous city, to procure an extended and ample supply of Water. Had the designed works been executed, three men might, without any further assistance, have extinguished the first house, before it could possibly extend to the second. In such case, what dreadful calamity would have been averted, and the hard earned property of the present afflicted and distressed sufferers, rescued from ruin.

### CHRISTOPHER COLLES.

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*To the COMPANY Incorporated for carrying on the  
WATER WORKS, of the City of New-York.*

#### THE PROPOSAL of CHRISTOPHER COLLES, of TARRY-TOWN, ENGINEER.

1. HE proposes to sink, wall, and cover a capace-well, of the dimensions of that executed by him before the commencement of the war, that is, thirty feet diameter at the inside of the wall, and which he experienced to be amply sufficient to produce a necessary quantity.
2. He will erect two compleat covered Reservoirs, of Timber, capable of containing each, at least, Three hundred and fifteen thousand gallons of water.



3. **He** will erect machines, or engines, capable of raising, *daily*, from the well into the said Reservoirs, two hundred and ten thousand gallons of water.
4. **He** will bore and lay in the streets, an extent of twenty-four miles of conduit pipes of pitch-pine timber, with a conduit pipe and discharging cock at every hundred yards ; each conduit pipe to be provided with an apparatus to connect immediately with the hoses of the extinguishing engines, by which means ten thousand hogheads of water is, if required, at any emergency, ready to be discharged upon any accidental fire.—He proposes also a number of great stop cocks, in convenient places, to stop off the water from any particular part of the pipes, which may want repairs ;—And every other part of the works shall be so contrived as to be repaired without stopping the free communication of the water, to any other part of the City, at all times, by day or by night.
5. **THAT** the Company shall contract for, and provide with all possible speed, all Materials, Workmen, Tools, Apparatus, necessary for the work ; the Subscriber requiring to make no manner of deduction from the wages of the workmen, as is customary with the superintendants of buildings and other works.

6. ANY persons wanting private pipes out of the main, into their houses, are to pay for the same independent of the annexed estimate.

7. THE Subscriber estimates the total expence of the works, at Thirty-four thousand five hundred and twenty pounds; and in that case expects as a compensation for his services, in Engineering and Superintending the execution, eighteen dollars per week for subsistence; and the sum of three thousand pounds at the completion of the work. But if the total expence should exceed, or fall short of that estimate, he proposes his final compensation to be in a reciprocal proportion of the expence: that is, if the expence should be *less*, his compensation to be *more*; and if *more*, his compensation to be *less*.

HE thinks it may be necessary to put a wall round the Reservoir, which is not accounted for in this estimate.

CHRISTOPHER COLLES.

*To the Committee of Water Works of the Manhattan Corporation, the following observations on the Collect, as a temporary means of furnishing the City with Water, are respectfully submitted to their consideration, by their very obedient*

*Humble Servant,*

**JOSEPH BROWNE.**

THE desire you have manifested that something should be done to provide against the most pressing occasions for which a plentiful supply of Water has been thought essential, indicates a zeal for the welfare and health of your fellow Citizens, which must have remained inefficient, at least for the Summer, if your attention had been exclusively applied to the Bronx.

HAVING in the course of last winter measured the Collect, I found it covers about five acres of ground, and is in depth in the deepest part 12 feet ; it may therefore be admitted to contain about 15,000,000 gallons. For the purpose of washing and cooling the streets and scowering common Sewers, putting out fires, &c. it certainly cannot be objected to ; and it is not improbable that Springs in the neighborhood of the Collect may be found to contain less impurities than those waters are now supposed to possess.

It is impossible *a priori* to determine the nature of this Pond ; that is, whether it be the source of the

abundant springs in its neighbourhood, or the effect of them, or the mere collection and reservoir of rain and other water. If it should be of this last kind, then a Steam Engine, that would raise out of it 300,000 gallons of water per day, would exhaust it in 50 days, if no rain or extravasated water should occur in the mean time. An experiment cannot be very expensive, and might be very salutary—besides, admitting ~~that~~ the quantity should be insufficient for the washing ~~the~~ streets, in a very dry time it would be very easy to open a communication between it and the North River, by means of an open canal.

It is not of much importance to determine on what spot to place the Steam Engine—the lower the situation, the more easy it will be to procure water; for water cannot be had until you come to a level with the surface of the Collect—the lower the ground therefore the less expence. It is desirable that the Well should if possible be dug as low as the bottom of the Collect; it will then have a better chance of a longer supply.

THERE are three situations, that present themselves eligible, for the principal Reservoir, to wit, the place formerly occupied as such, Bunker's hill, and the Park. The first mentioned place, from its elevation and contiguity to the Collect, seems to be recommended as most suitable, and as to immediate expence, economical; but if it be contemplated, that the reservoir now to be built, is to be a per-

manent establishment, then, for the following reasons, I am inclined to think this spot an improper one.

*First.* This place is not sufficiently central, from whence the pipes and conduit can be ramified, to any advantage.

*Secondly.* As the ground adjoining, is about to be dug away, it will require a thick stone or brick wall, of near thirty feet high, around it, to support the earth, which is of a loose, gravelly texture.

The first objection does not so forcibly apply to Bunker's hill, but the second will, unless a large space be preserved round it, which will render it more expensive than to purchase an area of 110 feet square in the Park, and raising a wall round it of ten feet in height, which will give the water a sufficient head to force it with proper velocity to any part of the City.

As neither the first or second objections can apply to the Park, and as the immediate expence will not be much greater than if built on either of the other situations, I should recommend it as on all accounts preferable.

THE communication between the Steam Engine and the Reservoir should be through a cast iron cylinder, of 8 inches diameter, laid two feet under ground, into which the Water should be forced, by

two forcing pumps, of 7 inches diameter each : the cylinder of the steam Engine need not be larger than 16 inches diameter, which if wrought 16 hours per day, will force 300,000 gallons of Water daily to the Reservoir.

THE situation of New-York is a very happy one for being watered at a small expence ; that is, so far as the watering applies to washing the streets, scow-ering the common sewers, and extinguishing fires. The Broadway forms a ridge, running nearly north and south through the city, from whence all the streets, with trifling variations, descend rapidly either to the North or East rivers. All the Water, therefore, that falls on the west side of the Broadway runs into the North River, and all that falls on the east side is discharged into the East River. Consequently, if one Pipe of conduit be laid on the west side of Broadway, and another on the east side of it, with a Plug at each street it passes, the whole Water of the Reservoir, or any part of it, may be thrown through any of the streets, by simply pulling out the Plug. The intersecting streets, such as Water-street, Pearl-street, Greenwich-street, &c. may easily be overflowed, by making a small temporary Dam of old blankets, &c. below the part to be washed. The pipe on the west side of the Broad Way should be extended northwardly as far as                      street. The pipe on the east side of the Broad Way should be extended through Chatham-street, to the Bowery, and to the high ground in Pearl-street, near Cher-



ry-street, by which means pipes of conduit, of not more than four miles in length, may be made to inundate every street in the city.

The pipes of conduit need not be larger than four inches diameter, which can be laid for half a dollar per foot, including the taking up and laying down again the pavement. The whole expence will probably not exceed 60,000 dollars. If immediately commenced, the whole of this business may be completed in all the month of August, next.

This mode of supplying the city with water, will, it is presumed fully answer the great purpose of preserving it from fire and pestilence.

I have mentioned an area of 110 feet square, in the Park, as necessary for a reservoir, which, if made 10 feet deep, will contain nearly a million of gallons, which is the least quantity that it ought to contain.

It is not impossible that the water taken from the vicinity of the Collect, after it has been renewed by a constant pumping, for a few months, might be thought sufficiently pure for culinary purposes; in which case the pipes of conduit may be extended through every street in the city, and lateral pipes introduced to every house whose proprietor chooses to partake of it. At present I have forbore any calculation of this nature, because it is probable that the

pipes of conduit could not be further extended, in proper season, without too much interfering with the great object, which the citizens generally have much at heart—and on which great reliance is placed as a means of preventing, or at least diminishing, that scourge which has depopulated our cities.

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*To Samuel Osgood, John B. Coles, and John Stevens,  
the Committee to Report to the Corporation of the  
Manhattan Company, the best mode of procuring a  
supply of Water, from sources in the vicinity of  
this city:—*

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AGREEABLY to your public invitation of the 19th instant, I beg leave to propose to your consideration, the following mode for the above purposes; which is, so to secure the Water of the Collect from filth, that the prejudice against its use may effectually be removed. I shall also endeavor to shew that the water is good, and give reasons for the probability of there being a sufficient supply.

THE Collect has unjustly been stigmatized with the name of a filthy stagnated pond;—that it is not so, is evident; for a stagnated pond nei-



they proceeds from springs nor has it any stream issuing from it ; but the Collect proceeds from a collection of springs and emits a considerable stream :— If it were a stagnated pond, the water in very hot seasons would in great measure dry up, and what was left, would become thick, discolored, and putrid. But the Collect never materially varies in its height, nor is it ever discoloured, putrid, or thick, except sometimes near the banks, where it receives the wash of the streets, and is rendered in some measure filthy by throwing dead carcases into it. To preserve it from all filth of that or any other nature for the time to come, let great part of it be filled up with good earth all round (but not so as to cover any of the principal Springs) within about two feet of the surface, which top filling should be of good clay and well rammed to the distance of fifty feet all round. On this raise a bank five feet high all round, likewise of good clay, and let it descend from the water to the above distance of fifty feet ;—also let the wash of the streets adjacent to the Collect be conveyed off in small canals into the present outlet of it. The streets, likewise before they are paved, near it, should be covered one foot deep at least with clay and well rammed. These precautions will effectually prevent any filth from sinking into the Collect until it has passed at least through fifty feet of good earth, by which means the water carrying the filth must be rendered by this filtration very pure. On the top of the bank may be raised a high board fence, to prevent the throwing dead carcases or any

other filth into it. To keep the bank on the inside of the fence from mouldring down, let it be well sodded, or sown with grass seeds.

THE Water of the Collect is naturally pure, which is evident from the clear colour the body of it always maintains, and which, notwithstanding the filth that it has always been liable to receive, is never rendered nauseous by it either to the taste or smell. A comparison of it with the Tea-Water, (which is universally acknowledged to be both pure and wholesome) has been made by an eminent physician of this City, the result of which was, that the Water of the Collect was the same in quality and purity with that of the Tea-Water Pump, except that the former from having been more exposed to the open air had lost something of its briskness, and that the Tea-Water after being exposed to the open air for 24 hours, was reduced to the same state. I am also informed that another Physician has made a comparison between it and the water of the Bronx, who says, that the former is *preferable* both in quality and purity. Its amalgamating readily with soap, evinces its purity likewise, and proves that it is fit for every culinary or other domestic purpose.

THAT the Collect will supply a daily sufficient quantity of water for the consumption of the City, will perhaps best appear from considering whence the Collect is supplied. The source of so much fresh water is so well accounted for, by a piece in

the Argus Paper of the 20th March last, that I shall beg leave to introduce so much of it here as relates to the subject, in the writer's own words, viz.

“THE Island of New-York, rises from the point of the Battery to near Kingsbridge, the more Northern parts lying much higher than those to the South. It consists altogether of hills and swamps; it is surrounded by water, and must from that circumstance, as well as from its height, collect considerable quantities of Water; and yet we find no stream running into the North River, and only a very inconsiderable one into the Sound, in the whole extent of 16 miles. This can only be accounted for, by supposing (what indeed the surface of the ground warrants) that the under stratum of the Island is either rock, slate or clay, and that it dips towards the South. The water then percolating through the sand, runs on this clay or slaty bottom, towards the city, and hence it happens, that the Reservoirs of water, are all in or near it; the most distant and smallest being but three miles and a half, while (Fresh Water Pond) the Collect, and the swamp now filled up, evidence the great quantity of Water that runs toward the city. The city itself is situated upon a coarse sandy soil, through which the water easily finds its way. It is probable therefore, that though little water runs from the surface of the Reservoirs above mentioned, that a very considerable quantity runs beneath it, and by smaller channels into the bay. This is proved by the facility with which water is obtained in every part of the

city ; wherever a Well is dug, Water is found, and that in such quantities, that a single Well will not only supply a family, but a neighbourhood.—The Tea Water Pump, though the Well is small, furnishes a considerable quantity, and it is said (with what truth I know not) that the horse-pump constantly employed, cannot diminish it.

THE Tea-Water Pump is generally believed to be supplied from the Collect ; but whether from that or from the source before mentioned, it supplies 125 vessels, of 130 gallons each, per day, which is equal to 16,250 gallons ; and this, exclusive of what is daily used by the neighbourhood, and the occasional supply of shipping, &c.

AT the time of the fire at the Fly Market, the Horse Pump was kept constantly employed for eight hours ; and it is estimated, that this pump will afford 6,300 gallons per hour, which for 8 hours, is 50,400 gallons : at this time, the water in the well was found to have suffered no diminution of its height. In 24 hours, at the above rate, the quantity would be 151,200 gallons. The Water in the Pump is not quite 4 feet deep, and the diameter of the Well is about 6 feet ; consequently it contains no more than about 460 gallons ; therefore it must be supplied by an influx of 6,300 gallons per hour, when used so as to draw off that quantity in that time.

FROM these, and many other circumstances, that

might be adduced, if it were necessary, I think we may safely rely on the Collect's sufficiency to supply a necessary quantity of water ; not only for the present but any increased state of the city.

IN my calculations of the probable expence, I have estimated that 5 gallons per day to each person, or 25 gallons to each family, will be sufficient for their purpose, and then say that there are 65,000 inhabitants, the quantity necessary to be daily raised, will be 325,000 gallons.

IT remains for me now to point out the means of raising it to some place, from whence it may flow, in pipes, to all parts of the city ; and the most eligible situation for this purpose, appears to be the Park : first, as it is nearer the center of the city than the bank on the North-West of the Collect ; also from the additional encrease of Water, that it is most probable will accrue, from the opening for the culvert last mentioned ; and lastly, as it would be ornamental to the city ; and that it seems proper, that the verticle, of so great an advantage to its welfare, should be placed in some conspicuous situation. It must, however, be admitted, that to place the Reservoir and Works on the North-West bank of the Collect, would be attended with considerably less expence. But for the reasons above mentioned, having chosen the Park, it would be necessary that a culvert of sufficient dimensions, should be carried from the Collect, five feet below its surface, on a level to a large Well to be dug in the Park. The



culvert to be made perfectly close until it enter some distance under the bank near the Potter's Kiln, where the under part of the culvert may be built without mortar, to receive the accessions that may certainly be expected from perforating such a length and depth under the surface.

FROM the well, the water must be raised by a Steam Engine, into a reservoir capable of containing at least 500,000 and should be kept constantly full. This quantity in the reservoir will be necessary in case of fires, and also in case of any repairs requisite in the Engine, when it will be sufficient for more than 36 hours supply at 325,000 gallons per day. But as the above calculation of 25 gallons per day to each family is quite large, it is apprehended that a very considerable surplus may be daily employed, when required, in sprinkling the streets; which practice, if adopted, would probably produce the good effects of moderate and frequent rains; whereas if the streets are washed as with heavy rains, it is probable that the effects will be equally pernicious as those which such rains have been observed to produce. However, if more be required in the very dry seasons, it should now be considered to have the Engine sufficiently large, that on any emergency it may work a pump extraordinary, and the main leading pipes should be calculated of such bore as to receive the extra quantity: the difference of the first cost would be very trifling. Having thus gone through with the plan I proposed, I shall

conclude by laying before you an estimate of the probable expence, viz.

	DOLLS.
• Filling in, banking, and fencing the } Collect,	17,500
Cleanfing (if thought necessary) and } removing the ooze,	12,500
Sinking the Culvert from the Col- } lect to the Park, about 1,200 } feet to be of stone, and arched,	12,500
Sinking the Well 20 feet diameter; } and 50 feet deep,	5,000
The Reservoir,—to be lined with thick } sheet lead and secured from frost by } a thick body of earth to surround it,	12,500
The Steam Engine, Pumps, House to } cover it, &c. &c.	40,000
In the whole,	<hr/> 100,000 <hr/>

THE whole expence I will venture to say, will not exceed this sum, and very probably will fall short of it by several thousand dollars. You may possibly think it needless to cleanse the Collect, and if this is not done, 12,500 dollars must be deducted on that account. But if you do not approve of the above plan of placing the works in the Park, but on the other side of the Collect, something may be deducted on that account. But if you approve of the above plan, or some other nearly similar to it, and shall desire a more particular detail of the expence, it may possibly be made in a little time, to

more satisfaction. The above plan, if entered on with spirit, and briskly pursued, may be compleated by the beginning of July or of August next, at the farthest ; and it is needless to observe to you, that bringing plenty of good and wholesome water into the City, is of such consequence that it should not be delayed beyond that time.

ELIAS RING.

NEW-YORK, 4th Mo. }  
22d. 1799. }

