

America's Historical Imprints

Date of Publication: 1799

Early American Imprints, Series 1, no. 35714 (filmed)

Title: Remarks on the address of the Committee of the Delaware and Schuylkill Canal Company to the Committee of the Senate and House of Representatives, as far as it notices the "View of the practicability and means of supplying the city of Philadelphia with wholesome water." By B. Henry Latrobe, engineer. In a letter to John Miller, Junr. Esquire, chairman of the Committee of the Select Council. Printed by order of the Committee of the Councils.

Author: Latrobe, Benjamin Henry, 1764-1820.

Subjects:

Water resources development--Pennsylvania--Philadelphia.
Philadelphia (Pa.)--Water-supply.
Schuylkill River (Pa.).

Publication Information:

--Philadelphia:-- Printed by Zachariah Poulson, Junior, no. 106, Chesnut-Street., 1799.

Physical Description:

18 p.

Additional Index Points:

Miller, John.

Printers, Publishers, Booksellers:

Poulson, Zachariah, 1761-1844, printer.

Place(s) of Publication:

United States--Pennsylvania--Philadelphia.

Language:

English

References:

Evans 35714

Copyright 2002 by the American Antiquarian Society and NewsBank, inc. All Rights Reserved.

Record Number: 0F301A3A4216E598

Record Number: w009819

Article Bookmark (OpenURL Compliant): Early American Imprints, Series 1, no. 35714 (filmed)

http://docs.newsbank.com/openurl?ctx_ver=z39.88-2004&rft_id=info:sid/iw.newsbank.com:EAIX&rft_val_format=info:ofi/fmt:kev:mtx:ctx&rft_dat=0F301A3A4216E598&svc_dat=Evans:eaidoc&req_dat=1095A8734553BB87

35714

Latrobe, Benjamin Henry, 1764-1820.

Remarks on the Address of the Committee of the Delaware and Schuylkill Canal Company.

Philadelphia, Paulson, 1799. 18 pp.

LCP copy.

R E M A R K S

ON THE .

Address of the Committee

OF THE

Delaware and Schuylkill Canal Company

TO THE

Committee of the Senate and House of Representatives,

AS FAR AS IT NOTICES THE

*“View of the Practicability and Means of supplying
the City of Philadelphia with wholesome Water.”*

By B. HENRY LATROBE, Engineer.

I N A

Letter to JOHN MILLER, jun^r. Esquire,
Chairman of the Committee of the Select Council.

Printed by order of the Committee of the Councils.

—Philadelphia:—

PRINTED BY ZACHARIAH BOULSON, JUNIOR,
No. 106, Chestnut-street.

1799.

Philadelphia, January 21st. 1799.

S I R,

NOTHING can exceed my surprize, but my reluctance to be engaged in any thing like a personal controversy with any man or body of men, in consequence of the opinions which, at your request, I delivered to the joint Committee of the Councils of the city of Philadelphia,—which has been printed, and which, by some means, has crept into the public papers. But in the pamphlet which you have transmitted to me for my perusal and remarks. I am treated in a manner, so unjustifiable upon any principle of candor, that I owe it as much to myself as to the Corporation to endeavour to protect my opinions and assertions against misrepresentation. At the foot of the pamphlet I observe the name of a man whom I too much respect to believe that he had the smallest share in the *manner* of the piece. I shall therefore consider it as the production of a majority, which it was his duty to sign; regretting most exceedingly that in treating a public subject, a stile has been adopted which makes either him, or Mr. Henry Latrobe, Esquire, as I am very foolishly called, any part of the question. Of what use can it be to the afflicted city of Philadelphia to engage the self-love of individuals in a controversy about the accuracy of their observations, the justice of their opinions, or the extent of their mathematical knowledge? As far as I am concerned, I have great reason to complain. The whole pamphlet under consideration, entitled,
“ An

“ An address of the committee of the Delaware and Schuylkill Canal Company to the committees of the Senate and House of Representatives, &c.” as far as it regards my “ view of the practicability of of supplying Philadelphia with wholesome water,” is a continued series of misrepresentation and misstatement. The real merits of my piece are kept out of view, and it is attempted to discredit my arguments, by destroying my professional character: for if the representations of the address be true, I am not fit to be consulted. In noticing what regards myself, I hope the necessary egotism will be pardoned.

My proposal consisted of two parts, perfectly distinct. The first; to supply the city, before the first of August, with water from the Schuylkill for every purpose: The second; to bring the mill-spring to the city, (at a season of more leisure) for culinary purposes only.—The first being accomplished, the second, though very important, might be wholly omitted. The city would omit to possess herself of the best of all the water in her neighbourhood, but still her supply would be exhaustless of *good*, though inferior water. In the address, however, these two schemes are considered as one, their expence jumbled together, and arbitrarily encreased, and an assertion wholly inaccurate is made concerning what I have said of the time necessary for their separate execution. I am at a loss in what order to unravel all this misrepresentation, and have to grope my way through quotations, notes, and remarks, confused together, as well as I can.

My journey to spring-mill with Mr. William Sanson has been rightly called “ a party of pleasure.”* It was in a sleigh, over roads bare of snow,

* Page 19. “ Our investigations were not the work of a day, or riding out on a party of pleasure. The truly public spirited and ingenious D. Rittenhouse and others, had devoted months of their labor and attention to this subject; &c. &c.

snow, after two days thaw, and yet his company might make it so. If the circumstances and remarks which occurred on the way, entertained his committee, I am glad they were repeated. Some of them, it seems, have been thought worthy of publication (see page 25.) But, however short the time, as to all that it was useful to ascertain by that journey, it was a very efficient survey. I ascertained the level of the spring, by referring to the level stake of the canal, which stands between the miller's house and the river, and is between four and five feet below the level of the mill head. My own eyes told me this, and the miller confirmed it. I also ascertained that the water was sufficient in quantity, and excellent in quality. The labors of Dr. Rittenhouse and of Dr. Smith, authorized me to take the course of the proposed aqueduct for granted. It is nearly the same with that of the Canal, and being higher, the distance would be shorter. My particular attention to the Geology of our country for some years, enabled me to decide on the nature, and difficulty of digging the soil which we might have to pass. The estimate I have made is extremely detailed. It was annexed to my "view," but for very good reasons, it was not printed. The charge, that I have omitted to estimate the purchase of the mill-seat, and of the ground to be passed through by the aqueduct, ought not to have been made, unless my estimate had been exhibited. The price which would probably purchase the mill seat, the buildings, and the land, was not forgotten, and the proprietors, whose candor and kindness I take this opportunity to acknowledge with high respect, gave me the necessary data to calculate upon. The gross amount of 275,000 dollars, may, for ought that appears in the view, contain all these items, and it was unfair to suppose they did not. As to the purchase of land (see page 22 and 23 of the address)

address) there is no comparison to be made between the purchasing for a canal, and for a close tunnel carried along in a narrow trench, and covered as soon as finished. Permission to put a pump into the tunnel would purchase the right of carrying it through any Gentlemen's yard, who knew his own interest. The Proprietor who sells land to a Canal Company, independently of dissevering his property, exposes it to the depredations of boatmen, who at a distance from their homes, are often in want of fruit and poultry, and fence-rails for firing. He therefore demands a price which will cover the land lost, perhaps the destruction of his meadows, the inconvenience, and the nuisance, and also an insurance from depredations: and the published account of the Delaware and Schuylkill Canal shews, that juries take these things into consideration.

It is impossible for me to wonder at the suspicion, that the sum, stated by me as the gross expence of the work, should be thought short of what it will cost,—because the Committee of the Canal Company must from experience know how little estimates can in general be relied on. But I object strongly to the method which has been taken to amend it. (page 22.) If any one will take the trouble to measure on the map the length of the streets to be supplied by 104,000 feet of pipe, he will soon see that a very small quantity, in proportion, will remain to be laid down. It is, therefore, absurd to add 52,000 dollars as the remaining expence. Neither have I neglected Southwark or the Northern Liberties.* For Front-street I have allowed 10,000 feet: Its length, including the suburbs, is only 12,000 feet: (see Hill's map,) for the rest I have provided in proportion. The 70,000 dollars
for

* "Southwark and the Northern Liberties, which are entitled to their share in the distribution, agreeably to the acts of incorporation." See p. 21.

for purchasing ground cannot be at all admitted for the reasons stated above. As to the work and materials stated in the gross sum of 275,000, I need only say, that contracts for executing and finding the whole of them may immediately be made below the estimated price.

In regard to the time allowed for executing each separate proposal, I will only copy the paragraph from my "view," and the deduction drawn from it in the address, and then ask, whether *inattention* can have been the cause of the misstatement?

View, page 13, after estimating the distribution of the year 1799 at 52,000, I have said:

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

Address, page 23, after recapitulating the expence of bringing the Mill-spring to town, and arbitrarily increasing it from 275,000, to 449,000 dollars, the addressers proceed, thus:

"Estimate of the time necessary for the execution."

"On this head Mr. Latrobe says, "It may be executed in the year 1800, that is, in about TWO YEARS, undoubtedly meaning, *after the money is provided, and the works commenced.*

"To this expence of - Dollars, 449,000

"Add the first expence for the }
engines, reservoirs, &c. } 75,000

"The whole for watering the city }
without noticing the suburbs } 524,000
(as we have said before) is }

It is in the highest degree painful to me to point out such a contrast, not on my own account,—for it saves me the trouble of argument,—but because
it

it obliges me to seek the motives of others in something less pardonable than error or ignorance.

On the slightest inspection of the passage in my "view," it is evident, that the work proposed to be done in 1800, respects only the further distribution of the water to the extremities of the town, and to the streets above Eleventh-street. I have given a good reason *why* this further distribution may be delayed, because "the pumps furnish as yet very good water." (View, page 11. II.) I have not spoken of the Mill-spring as capable of being brought to the city in any definite time. I have said it might be a work of *more* leisure. This work alone cannot, with the utmost exertion, be executed in less than two years. It might as well be supposed that the canal, with its reservoirs, locks, aqueducts, culverts and towing-paths, could be executed in three years, *after the work was commenced, and the money provided.* Both works, as to time,—under the actual population of the country, and the price of labor,—are of those things which "art dare not combat." On both points I could appeal to Mr. Weston's candor and experience. I have also some experience, and have long ago learned, that the most cautious are generally too sanguine in their expectations of the time in which public works may be completed. I have promised much in respect to my own proposal, but my promises are founded on conditional contracts already made, and on other very rational grounds, which I am ready to explain to any one, who will take the trouble to call upon me.

I am very unwilling to say any thing on the *Italic* compliments, and the ironical remarks scattered through page 17, 18 and 19. Irony, though it had even been well managed, is a very improper mode of discussing a subject of public importance. It excludes candor, and baffles the discovery of facts. In page 19, an attempt is made to charge me with extreme

treme filliness in having said “ that after *enough* had been done in supplying the city with *pure* water, and in washing and cooling the streets, still a very important part of the work remained unfinished.” I have said no such thing. I have said that enough would have been done to supply pure water, &c. *that is*, a supply of pure water would have been effectually accomplished, but nothing would have been done to supply cool water, or water against which there is no popular prejudice. This prejudice I have attempted to remove, and yet have given reasons why cool water is desirable. (see postscript I. page 17.) I believe the water springing immediately from the limestone strata to be medicinal, on account of its alkaline and carbonic qualities. I have said so:—and I believe the citizens, although they may find the water of the Schuylkill wholesome and pure,—will still think it *important* to obtain the Mill spring water.—Let me again ask, of what use it can be to the cause of the city, or of truth, to provoke an altercation of this sort,—an altercation of which every man of sense and feeling must be ashamed.

In page 24, an attempt is pretended to be made to remove two doubts which I am stated to have expressed.—Any one who had read my view, must have known, that I have never said that my work would *possibly* be completed in two years, I have asserted, and repeat it,—that the first part of the work (proposal II.) may be completed before the first of August 1799, which would supply the city (my dimensions include the suburbs) as high as Eleventh-street with wholesome water: that in 1800 the distribution may be completed; and that the Mill-spring may be brought to the city “ at more leisure.”

As to the *second* doubt, “ respecting the freezing of the canal and the embarrassment of the winter supply for culinary use,” no one who reads my view can think that I rested my observation on what

I saw at Wiffahikon-creek. It would have betrayed ignorance to have done so. The denial of what I said, that Wiffahikon was frozen almost to the bottom and yielded little water, is more positive, than polite, or even just. To have justified the mode of contradiction which has been adopted, it would have been necessary to have given a precise meaning to the word *almost*. My assertion respecting that creek was founded on the assurances of a miller who uses the stream, not on what I saw. Mr. Sansom might have informed the Canal Committee, that when we saw the creek from the bridge, it was discharging the water of two days thaw.—The observation quoted as mine is otherwise correct. The insufficiency of the elevation I learned from my own eyes, and from an authority which may perhaps be thought as good,—the mouth of Dr. Smith.

In page 17 of the address, the limits of my appointment are stated, in page 24, a rivalry between myself and Mr. Weston is insinuated. Neither the appointment, nor the rivalry exists. I have been consulted on two solitary points, and have since been desired to make the enquiries resulting from them: there my employment rests. As to Mr. Weston, my personal respect for him, is equal to my high opinion of his professional merit, and renders rivalry impossible between us. Besides, there is room enough in America for us both, and I am content with the gleanings of his harvest.

I think I have now done with all the personality of the piece, and am at leisure to answer professional objections, and to attend to the instructions offered to me in hydraulics.—I shall always feel myself much obliged for the communication of professional knowledge, whether the boon be offered by a Merchant or a Divine. I am far from thinking that Belidor, Bernoulli and Kaestner hold a monopoly of Hydrodynamic science, and that after having studied
all

all they have written, I may not receive improvement even where I should not expect it. The principle however laid down in page 25 and 26, No. I. II. III. is not one of those of which I was ignorant, having stated it in page 8, (near the bottom) of my View. But I would submit the deduction drawn from it to the re-consideration of the gentleman who made it, and I am very sure he will see, that it is wholly inadmissible and contrary to fact.—I will state in language free from technical phraseology the principle as it applies here, and the deduction as it ought to have been made.

A *head* of water may be compared to a vessel of a certain depth, as for instance, a cask discharging its water from a hole in its side. The water from the level of the hole to the top of the cask, is the *head*, and the quantity of water discharged at the hole, in a given time, can be exactly ascertained, if the size of the hole, and the height of the head be known. All the water of the upstream part of any river, acts upon the water below it as the head in the cask acts upon the water running out at the hole,—and the water near the upper surface of the river, acts also as a head upon that nearer the bottom, so that the water at the bottom of a stream, runs faster than that on the surface,*—or, which is the same thing, discharges, in a given time, through the same space, more water than the upper surface.

In the instance of the cask, if friction, of which I shall speak presently, be left out of the question, no more water will run out of the hole than a certain quantity, whether it spout from the hole upon
the

* This may be seen in a very familiar manner, by attempting to drink the grated nutmeg from the surface of a bowl of toddy: It will be seen, that the nutmeg, following the motion of the surface, is stationary, or even runs back from the mouth, while the liquor at the bottom of the bowl is drank first. Nor is it easy to get rid of a fly swimming on the surface of milk or tea by endeavouring to pour it out.

the ground,—or be conveyed in a sloping pipe to a distance,—or be carried along in a level trunk. In the same manner—if a level or nearly level canal be taken out of a river,—that canal will receive, in a given time, an exact and equal proportion of water, determined by its width and depth at the river, while the level of the river remains the same.—If the river swell by rain. the quantity will be in proportion greater, if it shrink in drought, it will be less.—If the opening of the canal, at the river, be made shallower or narrower, it will, in both cases, be diminished, just as, in the instance of the cask, more water will run through an inch, than through an half inch hole, the head remaining the same.

Allowing then the position, that the head in a river, (though the fact is not so) be the same, in continued frost, as in open weather, (and leaving the friction out of the question) how can “the same quantity always pass through the canal in the same time?” as is asserted in the Address of the Committee, &c.—Supposing the canal to average twenty-five feet wide, and to be three and a half feet deep (as appears to be the case in the Schuylkill canal—p. 7, 8.) and that it will, when open, discharge about nine million of cubic feet of water in a day,—can it seriously be said, that, if the ice, covering the canal, be two feet thick, and the opening at the river be reduced, in consequence, to twenty-five feet by eighteen inches deep, it will discharge the same quantity as before? If such reasoning be true,—namely, that the head continuing the same, the reduction of the space in the canal, cannot diminish the quantity of water running through it in a given time, it must hold good to every extent, and the nine million of cubic feet ought to be discharged,—the head remaining the same, through a gun-barrel.—Every miller knows that the freezing of his race diminishes his head. He also knows, that,

that, his head remaining the same, less water runs upon his wheel if he raise his gate one inch, than if he raise it four:—and whether he contract the opening by a wooden paddle, or a sheet of ice, I suppose the effect could not be much different. I am sorry that the language of the Address, &c. is so technical. I scarce know how to answer it so as to be understood by men of good understanding, whose mental exertions have been employed upon other branches of knowledge, equally useful with hydrostatics, but having different principles. I pass over, therefore, all that is said as to the proof of the very extraordinary position from experiment and fact. I think it does not apply, and to discuss it, would only lead me into an useless hydrostatic lecture.

It has been my sincere wish to avoid saying any thing about the canal, nor should I have mentioned it in my view, &c. had not my opinion been expressly asked. Advantage (p. 24) has been taken of the delicacy with which I expressed myself, to insinuate that in the little I have said, I have spoken at random. The case is otherwise. I will, therefore, put my opinions into more direct terms; If I am wrong a candid refutation will easily call forth an acknowledgment from me that they are changed.

I have expressed an idea, that the completion of the work does not depend upon the genius and ability of Mr. Weston. It is acknowledged in the last page of the address, that unless the Corporation cease to desire “that the watering of the city shall not, by any act of the Legislature, be made in any degree to depend on the completion of a navigable canal, this great work will be *orphan'd*, and all its objects, for the benefit of the city and country, frustrated or long procrastinated, for want of public aid and patronage.” My idea, therefore, must have been just. Its completion does not depend upon

upon the genius and ability of Mr. Weston, nor upon its use to the inland trade, but, in the opinion of the committee, upon the profits to be made by supplying the city with water.

I have doubted the possibility of the necessary expedition.—By the necessary expedition, I have, page 3, explained myself to mean,—completion by the first of August. I think the most sanguine will doubt with me. My experience has taught me what I am to expect from the exertion of our comparatively scanty population, and I may safely venture to add, that I have *no* doubt that the canal cannot be rendered compleat and efficient to water the city, let the exertions of its patriotic directors, and the abilities of the Engineer be ever so great, before the end of the year 1802.

I have feared the ice would embarrass the winter supply for culinary use, I will state all that may embarrass this supply, and then leave you to judge whether I have *feared* vainly.

I have explained above, in what manner the freezing of the canal will prevent the same quantity of water from being delivered into it from the river. To force twice as much water out of a given hole in a vessel, it requires four times as high a head,—the power of the head required, being to the quantity, (or which is the same thing) the velocity of the spouting water, as the square to its root. If half the canal be frozen up, to make the same quantity of water come down, it would require four times as high a head as it has when the river is open.

This hydrostatic axiom cannot be disputed, and I submit it to the “review of my instructor.” But independently of the diminished quantity of water delivered, friction is a very powerful cause to prevent a sufficient supply from reaching the basin.

Friction

Friction is the propensity of bodies in contact to resist separation, and has two causes,—the first of which,—the mechanical cause, is the only one which is usually considered. and is supposed to depend upon the hooking of the rough parts of surfaces upon each other,—by which their removal is impeded.—But friction appears to me to have a much more powerful, and which may be called its chemical cause; it depends upon this axiom,—that all substances in *perfect* contact, cohere and become one. To go fully into this subject, would take up unnecessary space, and time. Familiar instances of the fact are not uncommon. While the grains of a painter's colors are very coarse, the muller is impeded only by mechanical friction.—As they become fine, and, with the oil, fill up every space between the muller and the slab, the muller moves heavily, and can with difficulty be separated: and the instances are not uncommon of a piece of marble being forced from the slab, and adhering to the muller in an attempt to separate them. Fluids by adapting themselves to all possible surfaces have the property of coming into contact easily with most bodies, and of course adhering. Upon this principal paste and glue and other cements unite substances which have the power of absorbing a part of them easily, and thus getting into perfect contact. A body is wet, with which water is in perfect contact, and in general it can be only separated by evaporation.

I have gone so far into this consideration, in order to explain what I mean by the friction of water. It is a powerfully retarding principle, and will detain a small quantity upon any declining surface, as a table. If it did not exist, water could not stand a moment upon any thing that was not mathematically level. The application of this principle is evident. The lower surface of the ice upon the canal of 25 to 30 feet wide is a surface of friction.

and will retard the velocity, and the supply of water.

If mills be any where erected above the reservoir, which taking the overplus water from the canal shall use and discharge it into the Schuylkill,—as will of course be the case,—it remains to be considered how far this deduction from the diminished quantity may embarrass the winter supply for culinary use: for to judge by the thickness of the ice which I have this year seen in the Delaware, at Trenton, where the river is very rapid, it appears to me, that it is by no means extravagant to suppose that three feet of ice and frozen snow may often clog the almost stagnant water of the canal. The new river at London indeed never has been known to be without a considerable supply in winter. But, if I recollect right, it is six feet deep, and yet I have seen it frozen to a great depth, and very little water running in it. Besides an English winter in severe seasons cannot be compared to a common Pennsylvania winter. It is however candid to leave the decision to those who know the climate better than myself. There is enough to justify reasonable doubts upon the subject, more I have not expressed, nor does any thing that I find in the address remove them.

In respect to the canal as a work of great public importance, it would be very impertinent, in me to offer my opinion upon it, without a perfect knowledge of the countries which it is intended to unite. All works of this kind are in their very nature eminently useful, and from the information which with much assiduity I have been able to collect, none seems more deserving of support than that which is the subject of present consideration.

If the opinion I have given respecting the immediate supply of water to the city by other means than
the

the canal should be thought deserving of attention, so as to induce measures militating collaterally against the progress of the work, I most sincerely regret it. But I cannot alter the facts upon which it is founded, nor the misfortunes of the city which call for immediate relief. I have endeavoured to treat the subject with delicacy and candor. I have given reasons for all I have advanced, and if my arguments and assertions have been mistated, misquoted, and misrepresented, I cannot help thinking that it was only because they could not be refuted. Let any candid man read the third *result and conclusions* offered to the legislative body of the state which is pretended to be drawn from my view, and say whether I am blameable in feeling something like indignation at such unwarrantable liberties taken with truth, with my letter, and with the professional opinion of a man who is dependent upon his reputation for judgment, skill, and integrity.

I cannot conclude without noticing the note to page 18, in which it is asserted, that the canal reservoir will send floods of water down all the streets, and raise fountains in most of them, by simply remarking that the inequality of the levels will not easily admit the first, nor the want of elevation the second. No fountain will play up to its head even though the connecting pipe be short, owing to the effect of friction in the pipe and in the air, and I will boldly assert, that the elevation of the reservoir is insufficient, under these circumstances, to raise a fountain of five feet in any part of the city above Front-street. As to "*aerial castles* and elevated reservoirs of *different stories*," they are an amusing proof of the gaiety of the writer's disposition, I would recommend an excellent work in French upon fountains, by Monsieur Mariote, to his perusal.

I do

I do not know Mr. Sambourn, but from the mention made of him by the Canal Company, I have no doubt but that he is an ingenious and respectable man. As to the expence of a Steam-engine in this country, I know that he is much misinformed.

I should be sorry to see any honest man tied down to execute the work at the sum he mentions. Besides, of 300,000 gallons per day, thrown up at the river, not half would reach the city, the rest would be lost in leakage, absorption, and evaporation, in near a mile of canal and ten acres of reservoir. In a hot windy day not a drop would remain.

Permit me once more to express my regret at the turn this discussion has taken. I deprecate, sincerely, the necessity of personal defence. My abilities are not sufficient to bear the effect of detraction, without my feeling the injury in the diminution of my usefulness to myself and my employers, and it is cruel in a public body to substitute an individual, for a cause.

I am

Your's faithfully,

B. Henry Latrobe.

