47TH CONGRESS, 1st Session. | SENATE | EX. DOC. No. 107.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING

A report from Capt. William Ludlow, Corps of Engineers, upon an examination of Frankford Creek, from its mouth in the Delaware River to Frankford Avenue.

FEBRUARY 15, 1882.—Referred to the Committee on Commerce and ordered to be printed.

WAR DEPARTMENT,
Washington City, February 14, 1882.

The Secretary of War has the honor to transmit to the United States Senate, for the information of the Committee on Commerce, a communication from the Chief of Engineers of this date, and accompanying copy of a report from Capt. William Ludlow, Corps of Engineers, upon an examination of Frankford Creek, from its mouth in the Delaware River to Frankford Avenue, made in compliance with requirements in the river and harbor act of March 3, 1881.

ROBERT T. LINCOLN,
Secretary of War.

The PRESIDENT *pro tempore*
of the United States Senate.

OFFICE OF THE CHIEF OF ENGINEERS,
UNITED STATES ARMY,
Washington, D. C. February 14, 1882.

SIR: I have the honor to submit herewith a copy of a report to this office from Capt. William Ludlow, Corps of Engineers, of the results of an examination made under his direction, to comply with provisions of the river and harbor act of March 3, 1881, of Frankford Creek, from its mouth in the Delaware River to Frankford avenue.

Very respectfully, your obedient servant,

H. G. WRIGHT,
Chief of Engineers, Brig. and Bvt. Maj. Gen.

Hon. ROBERT T. LINCOLN,
Secretary of War.

EXAMINATION OF FRANKFORD CREEK, FROM ITS MOUTH IN THE DELAWARE RIVER TO FRANKFORD AVENUE.

UNITED STATES ENGINEER'S OFFICE,
Philadelphia, January 25, 1882.

SIR: I have the honor to present herewith tracing and papers in connection with the examination of Frankford Creek, Philadelphia, made in pursuance of the river and harbor act of March 3, 1881.

The topography of the creek was mainly supplied by drawings kindly placed at my disposal by Mr. Samuel L. Smedley, Chief Engineer and Surveyor of the city. The detailed operations of the survey are given in the report by Mr. Gieseler, assistant engineer, who had charge of the field work and subsequent preparation of the chart.

Frankford Creek lies entirely within the city limits of Philadelphia, traversing the districts of Frankford, White Hall, and Bridesburgh, which are rapidly becoming the centers of large and varied manufacturing industries. The stream formerly afforded a good navigation, which has gradually become impaired from the operation of natural causes, supplemented by faulty shore and bridge structures, until at the present time the lower portion only possesses any value as a medium of traffic, leaving the numerous establishments on the upper part dependent upon land transportation by rail and wagon for the shipment and receipt of freights. As shown by the appended commercial statistics, the aggregate of these, both in quantity and value, is very heavy, and there is a corresponding urgency on the part of those interested for the deepening of the navigation.

The tidal section, which is about 3 miles in length, terminates at Frankford avenue bridge, below which considerable deposits were made some years ago by the bursting of dams formerly built across the creek at points above. The low-water depth varies from about 5 feet at the mouth, with a mean rise of tide of 5.7 feet to practically 0 at Frankford Avenue, with a rise of 4.4 feet, showing a loss of about 1.3 feet of elevation due to the intervening obstructions. The average mean low-water width is rather uniformly about 100 feet, the high-water width varying considerably between 70 and 250 feet, in conformity with the position of the natural or artificial banks.

Referring to the longitudinal section drawn on the chart, the red line gives the low-water sectional areas by multiplying the distance at any point below the blue line (representing the plane of mean low-water) by 100. This distance, therefore, is the mean depth of the low-water section assumed as having a uniform width of 100 feet. The brown line is the line of proposed deepening.

Drawing a mean position for the red line, it will be observed that the improvement line is nearly parallel thereto, indicating that the proposed deepening will approximate closely to a uniform increase of depth throughout, which should, therefore, be comparatively permanent, if artifical obstructions are not permitted to interfere.

The effect will be to give a low-water depth at the mouth of 7 feet, decreasing to 3 feet at Frankford Avenue Bridge, with a uniform navigation between.

The quantity of material, principally sand and mud, to be removed to effect the improvement, with a bottom width of 50 feet and slopes of 1 on 3, is about 100,000 cubic yards, which, at 40 cents, will cost $40,000.

The designated width is about the least that would afford suitable facilities, and is as great as can be judiciously projected at the present

time, the actual width of passage way at certain points being considerably less.

Examination of the chart, in connection with the lines shown on the longitudinal section, discloses numerous illustrations of the injury that may be caused by faulty shore structures, and how nearly the navigation of a stream may be destroyed through the lack of knowledge and the absence of intelligent supervision and proper control of their construction.

In the absence of shore lines, established in conformity with a proper regulation of the stream, the high-water banks exhibit every form of irregularity, and in several cases narrow the width to less than the normal low-water dimension, with effects clearly shown on the longitudinal section.

If the improvement of the creek is to be undertaken these lines should be corrected and fixed without delay, making such modifications as the circumstances shall require at every point. The most serious obstructions are the bridges shown on the chart.

The Bridge Street Bridge has a draw opening of 37 feet, while the water area, already narrowed by the bridge abutments to 70 feet, is further reduced by a pier 8 or 9 feet wide.

The Orthodox Street Bridge, with a width between abutments of 80 feet, swings on a central stone pier, with a diameter of 20 feet, leaving openings for navigation of 30 feet only on each side.

These two bridges should unquestionably be rebuilt, the piers removed, the abutments separated, and an available clear width of not less than 100 feet be left for the flow of water and the use of navigation.

The Pennsylvania Railroad, it is understood, is about to take down its present bridge and replace it with a more suitable structure.

An important adjunct to the improvement of the creek will be the rebuilding of the wall of the Frankford Arsenal, which occupies some 900 yards of frontage between Bridge Street and the mouth. The present wall is in bad condition and should be rebuilt on the brown lines shown on the tracing. At present the wharf has an injurious effect, and by the projection of the wall the width of the creek is reduced to about 80 feet. If docks are needed for the service of the arsenal they should be built into the shore, rather than by the protrusion of wharves into the stream.

It is perhaps needless to say that if Frankford Creek is to be maintained as a navigable stream, it should be kept as free as possible from extraneous sources of injury, and no attempt should be made to utilize it for the reception or discharge of any solid matter whether from sewage, street-washings, or otherwise.

Very respectfully, your obedient servant,

WILLIAM LUDLOW,

Captain of Engineers, Brt. Lieut. Col., U. S. A.

The CHIEF OF ENGINEERS, *U. S. A.*

REPORT OF MR. E. A. GIESELER, ASSISTANT ENGINEER.

UNITED STATES ENGINEER OFFICE,
Philadelphia, December 21, 1881.

COLONEL: I have the honor to report as follows upon the examination of Frankford Creek:

The examination extended over that part of the creek lying between its mouth and the head of navigation at Frankford Avenue Bridge, a distance of about 2¾ miles, measured on the water.

A chart of recent date, showing the shore lines, having been found in the city surveyor's office at Philadelphia, and a copy taken therefrom, it only remained to procure the required hydrographical data. The field work for this purpose was executed between the 12th and 19th November, 1881.

The soundings were taken by means of a pole, and their positions located by a line, divided into parts of 10 feet, and stretched across the creek from points determined by measurements on shore.

Three tide gauges were established in the creek, viz: one at the arsenal wharf, near the mouth; one at Orthodox street bridge, and one at the Pennsylvania Railroad Bridge. During the time they were observed, simultaneous observations were taken on the standard gauge at Harrison's wharf, Delaware River. From these observations the mean rise and fall at the United States Arsenal Wharf and at the Orthodox Street Bridge were found to be nearly the same, viz: 5.7 feet, while at the railroad bridge, about 800 feet below the head of navigation, it was found to be only 4.4 feet, consequently 1.3 feet less.

Although no line of levels was run connecting the three tide gauges, yet, for the following reasons, it appears almost certain that this difference in the mean rise and fall is due entirely to the slope of the low-water surface, and that the mean high-water surface is practically level:

1. Because the water on the upper gauge does not commence to rise until at the lower gauges it has risen to about 1.3 feet above mean low-water, the subsequent ratio of rise then being about an equal one in all the gauges, the upper one slightly leading.

2. Because the time of high-water is nearly the same on all the three gauges, and attended by little current throughout the creek.

3. Because the marked shallowing of the river-bed between Orthodox Street and the head of navigation, in itself gives indication of a strong low-water slope.

On the assumption of the high-water line being horizontal, which seems to be justified by the above data, is based the diagram of the longitudinal section of the creek traced on the map.

The creek is crossed by four bridges, which, in regard to their situation as well as their manner of construction, may be said to form two distinct groups.

The upper of these groups consists of the Frankford Avenue Turnpike Bridge and the Pennsylvania Railroad Bridge, both of which are permanent, and situated near the head of navigation, at a distance of about 800 feet from each other.

The lower of these groups consists of Orthodox Street Bridge and Bridge Street Bridge, both of which are drawbridges and situated, respectively, 1 mile, and half a mile above the mouth of the creek.

In the neighborhood of each of these groups of bridges exist populous settlements, with numerous industrial establishments of importance and magnitude, which, by means of the bridges and the roads leading over them, have direct connection with other points. The upper one depends mainly upon the transportation facilities afforded by the Pennsylvania Railroad: the lower one upon the water facilities it possesses, which are good in the immediate vicinity of the mouth, but diminish further up the creek.

In proportion to this diminishing of the water facilities, the building up of the banks of the lower creek gradually dies out, until, at about Orthodox Street, we come to a central portion of the creek, contained between the upper and lower settlements, where for the length of about 1 mile, there being neither railroad nor good water facilities, nor any connection with the metropolis, the banks are sparsely occupied and on the north shore show large areas of unimproved meadow, through the partly broken embankments of which the tide ebbs and flows.

The course of the creek, with the exception of three "horseshoe" bends, may be called a fairly straight one, and the natural conditions are not unfavorable to permanence of improvement.

In the present state of the creek vessels can carry nearly 5 feet at mean low-water as far as Bridge Street. Above this point commences a series of shallows in the mud and sand bed, which continue to break the 4-foot curve until, above Orthodox Street, it practically vanishes. Thence upward the river-bed does not so much show individual obstructions as a somewhat uniform and general shallowing, the 2-foot curve practically running out near Roxborough Street, and the depth finally diminishing to nothing at Frankford Avenue Bridge, the little water there is at that place during low-water, being fresh water from above.

It should be mentioned in this connection that the peculiarly disadvantageous construction of two of the four bridges crossing the creek, viz, those at Bridge and Orthodox streets, is to a great extent the cause of existing shoals. As shown by the sketches traced on the map, each of these structures rests on a center pier in the middle of the creek, thus unnaturally narrowing the latter and causing strong scouring currents in their immediate vicinity, but comparatively slack ones in the wider cross-sections above and below, in this way creating conditions favorable to the formation of shoals.

Other narrow places in the creek seem to have produced similar results, notably at the United States Arsenal Grounds, at Grange & Company's glassworks, and at Church Street. At all these points the soundings furnish unmistakable evidence of the evil effect of cramping the water-course, consequences that are apparent by a glance at the diagram of the longitudinal section of the creek.

The manufacturing interests of the creek, and especially those in the vicinity of the head of navigation, which now to a great extent are dependent upon railroad transportation, strongly urge a deepening of the channel. A channel 50 feet wide at the bottom, with side slopes of 1 upon 3, and 3 feet of depth at Frankford Avenue, at mean low-water, deepening into 4 feet at Church Street, into 5 feet at Lefevre Street, into 6 feet at Bridge Street, and into 7 feet at the mouth, would necessitate the removal of about 100,000 cubic yards of sand and mud, which, putting the price of dredging, including engineering and contingencies, at 40 cents per cubic yard, would amount to a sum total of about $40,000.

The vicinity of the head of navigation would in all probability not get the full benefit of the excavation actually made, as doubtless the low-water plane referred to above will be somewhat lowered by the improvement, although the tidal range will be correspondingly increased.

In case the above-mentioned two bridges are removed and replaced by more appropriate structures, it is probable that this improvement, for the greater portion of the creek at least, will be practically a permanent one unless the creek should be utilized for drainage and sewage purposes, which at present it is not.

Submitting the above, I am, colonel, very respectfully, your obedient servant,

E. A. GIESELER,
Assistant Engineer.

Col. WILLIAM LUDLOW,
Captain of Engineers, U. S. A.

COMMERCIAL STATISTICS.

Showing as near as can be obtained the average amount of capital invested, number of hands employed, and average amount of annual products, &c., of the various manufacturing establishments on the line of the Frankford Creek, between the river Delaware and the Frankford Road or Avenue, in the twenty-third and twenty-fifth wards of the city of Philadelphia, and State of Pennsylvania, and other information connected therewith.

STATEMENT OF GARSED & CO., MANUFACTURERS OF COTTON YARNS WINGOKOCKING MILLS.

Capital employed in business and building and machinery		$400,000
Value of products of the mill		350,000
Wages paid per year		108,000
Coal consumed per year	tons	2,878
Cotton consumed	pounds	1,549,945
Hands employed		331
Mill contains	spindles	16,000
Number of boilers		8
Number of engines		6

We beg to say that nearly all the cotton that we use is brought here by rail or hauled by team from the city. All the coal we use is brought by rail. Although our mill is located on Frankford Creek, we are unable to make use of the same.

STATEMENT OF CHARLES LENNIG & CO., CHEMICAL WORKS AT THE MOUTH OF FRANKFORD CREEK.

We report our factories situated on the creek occupy about 1,800 feet of wharf line on the creek, and cover about ten acres. We employ from one hundred and ten to fifty men. The improvements now erected have cost, approximating $500,000. Capital employed, $350,000. Annual product value about $500,000. Transportation of materials to and fro approximating 15,000 tons annually.

STATEMENT OF WILLIAM & HARVEY ROWLAND, MANUFACTURERS OF SPRINGS STEEL, REROLLED NORWAY IRON, AND NAIL-RODS.

Capital, January 1, 1881 was	$268,225 71
Gross sales in 1880 were	386,331 41
Hands employed, January 1, 1881 were	135
Total wages paid in 1880	$92,479 29

STATEMENT OF SHEBLE & FISHER, FAIRMOUNT FORK WORKS, MANUFACTURERS OF HAY, MANURE, SPADING, AND SLUICE FORKS, CAST-STEEL RAKES, &C.

We employ about one hundred hands, and have $110,000 capital invested, and our production about $200,000 a year. Our factory is on Frankford Creek.

STATEMENT OF SAVAGE & STOVELL, FRANKFORD CHEMICAL WORKS.

We have invested $100,000 in round numbers, but really more than that, and employ twenty hands.

STATEMENT OF GRANGE & CO., KEYSTONE GLASS-WORKS.

When in full blast we employ three hundred hands, requiring a capital employed of $175,000. The average annual products of our capacity is, say, $500,000. The average annual value of raw material landed at our factory on Frankford Creek, is $160,000.

STATEMENT OF B. F. PAXTON, AGENT, LUMBER MERCHANT.

I receive annually, via Frankford Creek, from 750,000 to 1,000,000 feet of lumber, and my shipments would be increased by dredging the creek.

STATEMENT OF GREEN & LINEHAN, UNION IRON FOUNDRY.

In reference to the amount of capital employed, we have $60,000. Number of hands, sixty-five. Annual production, $150,000.

STATEMENT OF FIRMS, &C., FROM MANUFACTORIES ADJACENT TO FRANKFORT CREEK.—WILLIAM WHITAKER & SONS, MANUFACTURERS OF COTTON AND WOOLEN GOODS.

Amount invested in works and business	$400,000
Annual product	$516,000
Hands employed	340
Annual wages	$100,000

R. GREENWOOD & BAULT, GLOBE DYE AND BLEACH WORKS.

Amount of capital invested in our business	$400,000
Amount of dyeing and bleaching done per year	$420,000
Amount cotton, cotton yarns, and cotton warps handled ..... pounds..	7,000,000
Amount wages paid per year	$65,000
Amount coal burned per year ..... tons..	3,500
Number of hands employed	121

CLARK & O'NEILL, PAUL AND MEADOW STREETS.

Number of hands employed	13
Amount of capital invested	$8,000
Annual sales of damask table-cloth	7,800
Carriage linings	4,000
Shirtings and ginghams	9,000

STATEMENT IN BRIEF OF THE VALUE, CAPACITY, &C., OF THE FRANKFORD ARSENAL, IN CONNECTION WITH THE PROPOSED IMPROVEMENT OF FRANKFORD CREEK, PREPARED AT THE REQUEST OF STEARNE & SON, ON THE PART OF THE APPLICANTS, AND INTENDED FOR THE INFORMATION OF THE ARMY ENGINEER IN CHARGE OF THE WORK.

THE FRANKFORD ARSENAL,
November 3, 1881.

The Frankford arsenal, a manufacturing establishment and depot of the Ordnance Department, United States Army, is situated at the confluence of the Frankford Creek and Delaware River, in the twenty-third ward of the city of Philadelphia, Pa.

The reservation comprises about 60 acres of land, upon which are situated the factories and storehouses, and the residences of the officers and enlisted men. The boundary line on Frankford Creek is about 600 yards long, and there is a good wharf on this line about 500 yards from the mouth of the creek.

The valuation of the government property, on June 30, 1880, the latest available, was as follows:

Land and buildings	$715,448 00
Public property, ordnance stores	2,314,340 56
Machinery and tools	233,425 61
Total	3,263,214 17

The principal manufactures of the arsenal, in time of peace, are cartridges for small-arms, cannon-primers, machines, tools, and instruments of precision for the inspection of ordnance stores and supplies; and in addition, experimental work on problems in ballistics connected with its products.

The annual disbursements of public money, for material and labor, amount to about $150,000, and the force of hired men, women, and boys employed averages about one hundred.

This, however, does not represent the capacity of the arsenal as a manufactory. In the emergency of war the force could be increased tenfold, and the range of products greatly extended. The present machinery and other plant for the manufacture of small-arm cartridges alone, has a capacity of 100,000 rounds per diem, while the present product is less than 10,000 per diem.

Owing to lack of suitable water transportation, the whole outgoing and incoming freight business of the arsenal is effected by rail and by wagons to and from the freight depots in Philadelphia.

About 1,000,000 pounds of freight are now received and issued annually in the form of raw material for the various products and supplies for the Army, a large part of which might be effected by water transportation if available.

The importance of this arsenal and its products, in peace as well as in war, might be still further dwelt upon, but it is believed this brief *résumé* will be sufficient to impress upon the proper authorities the necessity for an early and thorough improvement of the navigation of the Frankford Creek, not only as a measure of convenience, but of absolute economy to the public service.

To properly prepare the creek for the prospective wants of this arsenal, and the immediate needs of the large manufacturing interests upon its banks, it should be widened and deepened so as to secure a sufficient channel for vessels to pass each other, or for a vessel of moderate length, as a tug, to readily turn around. In front of the arsenal such a width can easily be obtained by dredging within the bank limits of the creek, and rebuilding the present insufficient and unsubstantial retaining-wall along our boundary.

Respectfully submitted.

S. C LYFORD,
Major of Ordnance, Commanding.

STATEMENT OF STEARNE & SON, CONVEYANCERS AND AGENTS FOR THE PURCHASE AND SALE OF REAL ESTATE, &C., IN CHARGE OF THE COLLECTION OF STATISTICS TO BE USED IN CONNECTION WITH THE APPLICATION TO HAVE FRANKFORD CREEK DREDGED AND IMPROVED.

There are many other manufactories and manufacturing enterprises other than those above mentioned, immediately on the Frankford Creek and adjacent thereto, and also in and about Frankford and Bridesburg, from which we were unable to procure statements similar to the above within the time allotted us, that are engaged in the manufacture of nearly all kinds of manufactured goods.

Frankford Creek is a tide-water stream which might, with proper attention, be made a very valuable commercial highway to the various manufacturing establishments in and about Frankford, Bridesburg, Whitehall, Aramingo, and, in fact, nearly the whole of the lower part of the twenty-third and a great portion of the twenty-fifth wards.

Nearly all of the fixtures and supplies to said factories, establishments, &c. (outside of what is furnished to one another), must necessarily be transported to Frankford by means of railroad, and by hauling with teams from the city of Philadelphia, the center of which said city is about 7 miles away.

The only railroad which leads directly to and from Frankford, &c., is the Philadelphia and Trenton branch of the Pennsylvania Railroad. Since Frankford commenced so rapidly to grow into importance as a manufacturing and business center, it is surprising to notice the rapid increase of the freight business of the said railroad at Frankford Station, more especially so, as the facilities for handling freight at this point are very limited, to the great inconvenience and expense of the shippers. Much of this freight traffic would, no doubt, be transferred to the said creek if it was in a

proper condition to be used for such purpose. It would also have a tendency to induce manufacturers to locate there and use said creek for the transportation of their supplies, as transportation by water in nearly all cases is cheaper than by rail. The Delaware River, at a point where freight could be landed, is about 2½ miles from Frankford, and it would cost as much, if not more, after paying all expenses, as it would do to ship direct to Philadelphia, and then haul by team from there.

There are many acres of land bounding directly on the said creek, and many more lying adjacent thereto, which could and would immediately become available for manufacturing establishments, if the said creek was placed in a condition for the proper transportation of freight.

This cost of dredging, &c., in comparison to the benefit which would accrue, not only to this part of the city of Philadelphia, and the whole city itself, but to the whole country at large, would be certainly very small.

STEARNE & SON.

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