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recd from Mr W. Chaudron
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REPORT
OF THE
TOPOGRAPHICAL COMMISSIONERS,

APPOINTED BY THE

COMMITTEE ON PUBLIC HIGHWAYS,

MARCH 15, 1849,

**To Make a Survey of the Region of Dock Street,
with a view to ascertain the best system of Drainage.**

READ IN THE SELECT AND COMMON COUNCILS OF THE
CITY OF PHILADELPHIA, JULY 5TH, 1849.

1800

REPORT
OF THE
TOPOGRAPHICAL COMMISSIONERS.

To the Committee on Public Highways of the City of Philadelphia.

GENTLEMEN :—

The undersigned, Commissioners appointed under the resolution of Councils, passed on 15th of March last, directing “that a topographical survey should be made by three persons who shall explore the region of Dock street, with a view to ascertain the best system of drainage; the cause of the occasional overflows of water to the cellars on that street; and the effect, if any, of the tides from the Delaware river, and of the present culvert;—also, whether a tight and strong culvert in Dock street would be sufficient for the district drained by Dock street, with the cost thereof, and how far the evil complained of, may be remedied by a culvert down Walnut from the point of Dock street, together with the best mode of constructing the same, so as to do the least possible injury to the wharves and shipping, with an estimate of the cost of such construction,” have the honor to present the following

REPORT.

On the 23d of March, a few days after receiving the notification of their appointment, they held a preliminary meeting at the office of the City Surveyor, and continued to meet from time to time, as frequently as their other engagements allowed. After organizing by the appointment of one of their number as Chairman, they proceeded at once to the examination and consideration of various documents and maps which it was understood had been referred to them. These consisted chiefly of petitions and remonstrances, presenting the views and arguments of the advocates, and the opponents of the different schemes for the relief of Dock street, which have engaged the attention of Councils.

They subsequently explored the region of Dock street, examining several of the cellars, and hearing the statements of the occupants of the premises, and visited the wharves and docks in the vicinity of the outlets of the sewers both in the

city and adjoining districts, north and south; at several points soundings were made and information was sought and obtained from persons who have been some time familiar with the localities.

An exploration of the Dock street sewer by entering the outlet at the river, was attempted, but was frustrated by the dilapidated condition of a portion of the culvert in the wharf, the top logs of which have become so much depressed, as to touch the surface of low water. An examination of part of the sewer west of Front street, was subsequently made by Mr. Chandler, the Assistant City Surveyor, who kindly volunteered to perform the unpleasant duty, and succeeded in accomplishing it by entering at an opening in the vicinity of the Tobacco warehouse. A report by Mr. Haines, late City Surveyor, to a Committee of Councils last year, a copy of which has been placed in our hands, furnishes an estimate of the extent of sewerage emptying into that of Dock street, and a statement furnished by Mr. Kneass, the present City Surveyor, makes known the area of surface drained into this channel.

The form, dimensions, and structure of the sewer in Dock street, have been derived from a report by Mr. Haines, of an examination made in 1843, by one of the City Commissioners and the City Carpenter. The grade lines of this sewer and of the several points of the surface desirable to be known, have been ascertained by consulting the sectional sketches of them found in the Surveyor's office. As all the facts supposed to be relevant to the subject were found to be derivable from the several sources above enumerated, it was not deemed necessary to make an instrumental topographical survey, and none has been attempted. Upon collating the facts derived from these sources, and duly considering the whole subject, it is believed that the following brief summary presents most, if not all, of the important points in their proper connection.

The sewer in Dock street is composed of several sections constructed at different periods, of various materials; some of stone and brick, and others of timber; some of circular section, some semi-circular or D shaped, others rectangular. The area of cross section at the largest part being 140 square feet, and at the smallest about 45 square feet, with portions of intermediate sizes, averaging 60 square feet; the smallest discovered being within 100 feet of the outlet at the river. This irregular structure has been located in a soil that is of marshy and unstable character, replete with land springs, which have their outlet through the sewer.

Its imperfections are obvious; but the practicability of remedying them without encountering a very great, and at present indeterminable expenditure, is by no means so evident.

The depth of the bottom of the sewer below the street pavement, could not be ascertained by actual measurement, but is believed to vary from 12 to 15 feet: the floors of the cellars examined were represented to be so nearly level with the top of the sewer, as to be completely drained at all stages of the tide when no rain was falling; which statement is corroborated by an examination of the grades of the sewer and the street, given in the profile made by the late City Surveyor. From the report of Mr. Haines, it appears that more than four and a half miles of sewers lead into this one channel; and the statement of Mr. Kneass shows, that rather more than half a square mile, or nearly sixteen millions of square feet of surface drain into it, being somewhat more than one quarter the entire area of the city proper.

When rain falls at the rate of one inch an hour, which is an event of not unfrequent occurrence, the quantity of water draining from this surface is about twenty-two thousand cubic feet per minute, sufficient to fill the entire sewer in Dock street in about five minutes, and requiring a head of more than three feet to pass it through a clear opening equal in size to the smallest cross section of the sewer. The resistance due to its length, irregular form and tortuous direction, would probably require this head to be doubled.

During the disastrous storm on the first of July, 1842, there fell nearly six inches of rain in two hours, yielding nearly three times the quantity of water just estimated, and consequently capable of filling the entire sewer in less than one minute and a half, which is a period entirely too brief for its contents to be evacuated under any head that the situation will admit, without completely inundating the adjacent grounds to the depth of several feet; should a tide of extraordinary height concur with a heavy rain, the danger must be much increased.

Upon ascertaining these facts, there seems to be no room for doubt as to the principal cause of the inconvenience and damage occasionally suffered by the owners and occupants of property in the vicinity of Dock street. The insufficient capacity of the sewer for the effectual discharge of the surface drainage of the large area for which it has been made the only outlet, is undoubtedly the primary cause of the difficulty; and the imperfect condition of some portions of it very much aggravates the evil. The repair of these delapidated parts,

and removal of the deposits of mud lying on the bottom will, it is believed, diminish the frequency of the inundations of the vicinity; but it is not probable that a complete and reliable remedy will be obtained, without considerable addition to the capacity of the underground channel from the corner of Dock and Walnut streets to the river. To undertake an enlargement, or extensive repair of the Dock street sewer, without first making some adequate provision for the independent discharge of the large volume of water conducted to this quarter, must be considered extremely hazardous, if not entirely impracticable; and the treacherous character of the soil in Dock street, renders the attempt to construct another sewer along side the present one scarcely less hazardous; the cost of either work would undoubtedly be very great, and cannot with certainty be estimated within some tens of thousands of dollars. The cheapest, safest, and most efficient improvement of the drainage of this district will, in our opinion, be obtained by the construction of a culvert in Walnut street from the intersection of Dock street to the Delaware, pretty much in accordance with the plan drawn by the late City Surveyor, now on file in the Office. This culvert should be of circular or elliptical cross section, not less than eight feet diameter, or equivalent area, and should be extended through a pier to the verge of the Warden's wharf line, debouching in deep water entirely below the level of low tide.

The question of probable injury to the shipping interests in the vicinity of this outlet, is one that has claimed our serious consideration. Having been informed that the water has been shoaling considerably in the neighbourhood of the sewer constructed in Christian street a few years ago, we visited the place, and upon inquiry found that our information was correct; we did not, however, perceive any sufficient reason for supposing that the effect was due to the action of the culvert, but was a part of the general accumulation of sediment, which has for many years been depositing along the river shore, from the Navy Yard nearly to the City line.

The Peg's run sewer probably carries down a larger proportion of garbage and silt than any other in our vicinity; a long pier has recently been constructed on the south of its outlet, making a narrow dock of considerable length, in which the stream passes from the mouth of the sewer to the river channel; no accumulation is observable at the end of the pier, although the bed of the dock presents a very disagreeable mass of mud. Nor does there appear, so far as we have been able to learn, to be any sedimentary deposit in the river from

the sewers at Mulberry, High, or Dock streets; the large accumulation of deposit in the Spruce street dock which has sometimes been attributed to the latter, having evidently been derived from silt brought down by the surface water from Spruce street, mingled with oyster shells cast overboard from the numerous boats frequenting that locality.

The peculiar contour of the river shores, and the position of Windmill Island, give direction to the tidal currents which has the effect of cutting away the river bottom along the entire city front, and producing a gradual increase of depth of water at the ends of the projecting wharves; and as this operation is known to be especially effective in the vicinity of Walnut street, there does not appear to be any reason to apprehend an accumulation of deposit from a sewer emptying at that point. But as the protection of the valuable berths for large ships located in the neighbourhood, from even a remote danger of injury, should be an object of primary importance, we would recommend that every possible precaution should be taken to guard against such contingency. Not only should the sewer be located in a pier on the south side of Walnut street, extending to deep water, as before suggested, and be sunk below low tide, to prevent the exit of offensive effluvia; but care should be taken to leave unobstructed the sluice way at the head of the dock, carrying the sewer over the top of it in a trunk of timber or cast iron, and to arrange the connection with the old sewer at Dock street, in a way that may form a dirt trap, which shall prevent the entrance of the ordinary silt into the Walnut street branch, by making the level of the bottom of the new sewer, a foot or more higher than the old one at the junction.

The present sewer in Walnut street, west of Dock street, appears in the sectional draft to be slightly above that in Dock street, and it will only be necessary to start the new one on the same or a little higher level to attain this object. The connection between the Walnut street and Dock street sewers, ought to be preserved as at present, without diminution of size, so as to give the full benefit of both channels for venting heavy rains. From the general tenor of the facts and opinions above set forth, it may be inferred that we think favorably of the proposition for a culvert down Walnut street; to prevent all misapprehension on this point, it may be proper to add that we unhesitatingly recommend the adoption of this course in the first instance, and secondly, the repair of the defective portions of the old culvert; particularly that near the wharf at the foot of Dock street, as soon as practicable.

The resolution under which the commission was appointed, requires an estimate of the cost of carrying the several schemes enumerated into effect; but the time which we have been able to devote to the subject has not been sufficient, to permit us to enter sufficiently in details to form an estimate that can have any pretension to strict accuracy.

From the best information it has been in our power to obtain, respecting the character of the ground in Walnut street, we see no reason to suppose that the cost of constructing a culvert there chiefly by tunneling, will be greater than in High street; and as the one now proposed will be shorter than the one lately made in that street, in nearly the same ratio that its capacity will be greater, we shall not greatly err in estimating its cost at the same amount, say in round numbers about ten thousand dollars. To arrive at a correct idea of the cost of the wharf pier containing the extension of the sewer beyond the dock, will require a set of soundings and measurements, that can be best made by practical wharf builders; but supposing the depth of water to be about 50 feet at the outer end, and 25 feet at the head of the dock, the pier being 28 feet wide and 132 feet long, with suitable provision for the sluice way, and connection with the culvert on shore, we would consider the sum of five thousand five hundred dollars, to be a safe estimate of its cost.

Of the probable expense of repairing the dock street sewer, the first elements for an estimate have not been obtained; nor can they be had without a thorough subterranean examination, and openings at the surface of sufficient magnitude to exhibit the extent of the dilapidation. Whatever this may prove to be, there can be no doubt not only of the propriety, but also of the necessity of taking it in hand at an early day, as the present condition of this important work subjects a number of our fellow citizens to continued hazard of serious loss of property, and the public at large to risk of disease, arising from the occasional overflow of the noxious and filthy stream for which the sewer has been made the channel of discharge.

All of which is respectfully submitted.

JOHN C. CRESSON,
PHILIP M. PRICE,
SOLOMON W. ROBERTS,
Topographical Commissioners.

Phila., June 13th, 1849.

MARINE T. W. CHANDLER,
Secretary of Topographical Commission.