



This material is part of the collection of the  
Philadelphia Water Department  
and was downloaded from the website  
[www.phillyh2o.org](http://www.phillyh2o.org)

Please contact the PhillyH2O webmaster  
for more information about this material.

## DEPARTMENT OF SURVEYS.

DEPARTMENT OF SURVEYS, }  
*Philadelphia, January 2, 1860.* }

ALEXANDER HENRY,

*Mayor of Philadelphia.*

SIR:—In reply to your circular of 8th ult., I take pleasure in laying before you an exhibit of the operations of this Department during the past year. But before entering into the detail of works in progress of construction, or those completed, will state, that the amount of appropriation made to the Department of Surveys for the year 1859, was

1859, was	\$25,400 00
Amount expended,	23,767 87
	<hr/>
Leaving balance to merge,	\$1,632 13

For the construction of the four large Culverts, viz: the Cohocksink (main and branch,) 24th street, (main and branch,) Vine street, and Moore street, an appropriation was made, payable by the Department of Highways, by a Loan entitled The Culvert Loan of \$200,000 00

The expenditures on which are as follows:

Cohocksink main,	\$34,818 08	
"    branch,	18,141 39	
Twenty-fourth street main,	37,793 01	
"    "    branch,	12,923 08	
Vine street,	15,187 75	
Moore street,	15,554 24	
	<hr/>	
Total work done,	\$134,417 55	
Less assessment bills,	15,637 58	118,779 97
	<hr/>	
Unexpended balance,		\$81,220 03
Retained per centage in hands of City,		24,663 02
		<hr/>
Amount of Loan on hand,		\$105,883 05

There have also been constructed during the year, 22,632 feet of branch culverts or drains, under the Ordinance of November 11, 1858, the aggregate cost of which has been not less than \$25,400. Those that have been built under contracts made with the Department of Highways, we have full knowledge of, and have the exact cost of each on record, but those that are constructed by, and at the cost of individuals, we get no accurate return of, in all cases. These culverts require no expenditure on the part of the City; as, by the Ordinance, the contractors receive for pay, upon estimates made out in this office, culvert assessment bills against the property lying upon the line thereof, at the rate of 75 cents per lineal foot of property fronting thereon—and as the cost of the culverts constructed seldom reach that amount, a revenue is obtained for the City which, for the year 1859, will amount to \$3,650 72; of which \$2,934 42 in assessment bills have been sent to the Department of Highways. What amount of these, due the City, have been collected, we have no means of knowing, as they are placed by us in charge of the Department of Highways for that purpose, with the final estimate of culvert, when reported as complete by the District Surveyor.

The list of such branch drains constructed is as follows :

Three feet culverts,	4,871	feet in length.
Two and one-half feet culverts,	10,892	“ “
Two feet	“ 2,006	“ “
Twenty inch	“ 595	“ “
Ten inch pipe drains,	} vit'd clay, 4,214	“ “
Eight “ “		54

The sectional surveys have been progressing at a rate that will, in a course of years, place on file a thorough and accurate record of the entire area embraced within our city limits. Those that have been entered during 1859 cover 6200 acres, with 220 miles of streets, making nineteen

separate and distinct plans, of which the following is a list  
11th section of the late Township of Blockley.

12th	“	“	“	“	“
13th	“	“	“	“	“
3d	“	“	“	“	of Bristol, 22d Ward.
2nd section of Chestnut Hill, 22d Ward.					
6th	“	21st Ward, grade regulations.			
7th	“	“	“	“	“
8th	“	“	“	“	“
5th	“	Blockley	“	“	“
4th section of West Philadelphia, revision of grades.					
Part of the 1st Ward,				“	“
6th section of Germantown,				“	“
7th	“	“	“	“	“
Portion of Blockley, South of Market street, lines and grades.					
3d section of Chestnut Hill,				“	“
4th	“	Kingsessing,	“	“	“
5th	“	“	“	“	“
4th	“	21st Ward, (Manayunk,)		“	“

The larger portion of the above plans have been examined upon the ground, by the Board of Surveyors, and the entire list will, in a short time, be presented to the Court for confirmation.

The meetings of the Board of Surveyors have been held more frequently than at the stated intervals, as much of their time has been consumed in the examination of petitions for branch culverts, each of which is placed in the hands of a committee, who report from personal examination, and thus far there have been but two applications that have not been sanctioned.

Much has been written relative to the want of proper drainage of our city, showing that but few are aware of the extended lines of drains that have been under construction during the past year—not only under the Ordinance of November 11, 1858, but by authority of special Ordinances.

In compliance with the latter, exclusive of the four arterial culverts first noted, there have been constructed 5,698 feet of sewers, and inclusive of special Ordinances and applications granted under the general Ordinance, the length of culverting completed during 1859, has reached 41,377 feet, or 8 4-10 miles. There are yet several miles of arterial culverts to construct, to relieve the outer sections of our built district, some of which are essential to preserve the high standard of healthfulness which our city has enjoyed, notwithstanding our citizens have profited so largely by that most valuable Ordinance of November 11, 1858, and at their own expense extended so greatly and advantageously by lateral drains the ramification of our drainage system. For this we have great reason of congratulation, and trust that the coming year will show a still greater extension, as the value and advantage of our projects become more evident and better understood.

It has been stated that the charge for culverts, under contracts made with the City, as directed in said Ordinance, is unjust, as in many instances the cost of the culvert has been less than the amount collected on the assessment bills, which places the surplus of charge in the coffers of the City—but instead of any injustice being inflicted, it is the only way of equalizing the charges, unless a resort be had to taxation upon the entire drainage area, the City then to perform the work complete, placing a drain in every street, for the basis of charge is made as the cost of a culvert 3 feet in drain—and all culverts, whether above or below that size, have the same charge—the justice of the charge then, is, that the circumstance of a person residing upon a line of drainage, that may require a culvert of large dimensions, should not inflict upon him an expenditure greater than would be made to a person whose property may accidentally lie upon a branch line—the larger one being, in fact, necessary to the operation of the smaller, the flow from the one

passing through the other, and they each, in fact, being part of one general system. The 10 inch pipe drain is just as useful for private, and even surface drainage, in its particular locality as a lateral, as is the 10 feet culvert on its line as a main.

✧ In the construction of these drains we should have more careful supervision than they heretofore have had, and most particularly necessary is it for the pipe drains, which, 'if properly laid, are greatly superior to drains of brick, both in economy of construction and efficiency for drainage— but if laid without a due regard to the line, level, and proper joints, they become very troublesome. A general specification for each has been prepared, which, if complied with, will insure effective working. But this Department cannot be responsible for the manner of their construction; the duties of the office preclude the possibility of a personal supervision by the Chief Engineer and Surveyor, and there is no law directing such duty to be performed by the District Surveyors, they being responsible only for the lines and levels. We therefore depend upon the Department of Highways, under whose supervision the Ordinance directs that they be built. This should be arranged so that some one officer of the City may have the especial charge of the construction of branch culverts, and the connections to be made with sewers, under permits issued by the Department of Highways. This should be not only for the materials used, but that the specifications therefor be complied with. It is now customary for any one to knock a hole into a culvert, and insert a pipe, upon the granting of a permit by the Highway Department, careless whether the debris from the hole made remains in the culvert or not, or whether the pipe protrudes into the culvert, or is flush with the inner surface, as it should be; either of the first alternatives is bad enough, but in most cases I feel assured that both exist seriously, interrupting the efficacy of the sewer.

These connections from manufactories are without any restrictions as to the matter delivered into the culvert, and in many instances it is such as to entirely interrupt the ordinary flow, creating pools, from which the most offensive effluvia emanates, and which requires the full force of the storm waters to carry off. This should be prevented by Ordinance, and no material insoluble in water should be allowed to pass into the culverts.

During the past year a greater attention has been given than heretofore to the introduction of inlets for surface drainage. This is an important matter, and money so expended will give a good return in increased cleanliness of roadway and side gutters. Those built of late have had more care given them than has been usual, and by a new device which I have placed in operation, they are much increased in capacity; there need be no fear of overflows by the filling up of the sump; and if the inlet connection is properly arranged it acts as a ventilator as well for the inlet as the culvert. Had they been introduced upon the line of Reed street the late break and overflow would not have occurred. We have strong hopes that still greater improvement may result in the adoption of a patented inlet, to be constructed of cast iron, and if we are successful, the annual expenditure for repairs of inlets will be greatly reduced.

It is with great pleasure, Sir, that I am enabled to report, that the work upon the large culverts under construction, directed by Ordinance of February 27, 1858, has progressed with all energy, notwithstanding the many difficulties that have been met with. They were commenced early in the present year, and prosecuted through the most unfavorable season for such work ever known in Philadelphia, with close attention and unwearied energy. I say the *most unfavorable* season, on account of the unprecedented amount of rain fall that has occurred this year. The usual mea-

sure of a year's fall is a trifle over 40 inches, while during 1859, up to the 28th of December, it had reached 57 inches or more than was ever known in our City.

On the culverts for Vine and Moore streets, this excess of rain has effected the work most seriously, not only in delaying the progress of construction, but burdening us with expenditures, no human agency could foresee. The excavation upon these lines we found to be, for an extended distance, in material that with ordinary moisture became a lively quicksand so soon as disturbed, and the excess over the ordinary rain fall immeasurably augmented our troubles, and it has only been the determined energy of the contractors that has brought us safely through, *i. e.*, within any reasonable expenditure. This has not only increased the quantity and cost of material excavated, which could not be estimated by means of cubic yards taken out, but it has rendered necessary an enlargement in proportions of arch for culvert, to resist the different character of forces such material creates. On Vine street it forced us to abandon the ovi-form culvert with light arch, and substitute a circle with a corresponding increase of proportions—this was a matter of great regret, but deemed advisable for safety—it is now complete and in successful working order.

On Moore street the line was finished to a point 120 feet west of Seventh street, in August last, and would have been entirely finished several months since, had we not been compelled to cease operations from the circumstance of 627 feet of the line lying upon ground that had not been opened for public use. The slow course of law is in operation, and we hope now that at an early day we may be enabled to resume the work and hasten it to final completion.

This delay has been a matter of serious import, as one of the particular necessities of this culvert, is to relieve a locality from which this difficulty cuts us off.

Upon the Twenty-fourth street culvert a great amount of



work has been done. The principal difficulty here, has been the long rock cut required upon a closely built and narrow street, yet it is with pleasure I state that it has been successfully completed without injury to either person or property. At the intersection of Twenty fourth street and Pennsylvania Avenue, we have our deepest excavation, and it became necessary for economy, and to prevent the liability of interrupting the passage of trains upon the Reading road, to resort to tunnelling, notwithstanding the material is a clean gravel; it has been carried on with care, and would have been finished had we not have been flooded by the breaking of a large water main overlaying the tunnel, which filled a large extent of completed culvert with surface material. It has now progressed sufficiently to be free from danger, and a small heading driven to the line of open cut, has enabled us to commence work upon the Pennsylvania Avenue, west of Twenty-fourth street, as by this heading the water in the cut is permitted to flow off. The line on the Avenue is now completed to within 300 feet of Coates street, which when reached will divert the drainage now flowing into the forebay at Fairmount, into the new culvert line to be delivered into the Schuylkill at Wood street, some distance below the dam. North of Coates street, the rock excavation extends to Twenty-eighth street, and much work has been necessarily performed, to prepare for our culvert trench, which properly belongs to grading of highways, for we have taken out the easterly side of the Avenue to the confirmed grade. Immediately north of Coates street there is 250 feet of the culvert complete in the rock cut, and it will be pushed forward during the winter, so that a connection will be made with the line above Twenty-eighth street, now finished to Thirtieth street, early in the spring, and the branch running up to and draining the Girard College and the House of Refuge, now ready for use, will be brought into full operation. The extension on the line of the

Avenue, north of Thirtieth street, will be of small dimensions, and is intended only to drain the Lager Beer establishments near the Spring Garden Water Works, this can be built in a few weeks after the connection on the main line is made. This line in working order, the entire eastern shore of the Dam from Fairmount to the Girard Avenue Bridge, will be protected from City drainage, and the system carried out as the built district extends, will protect the entire shore to South Laurel Hill Cemetry.

The branch alluded to, is not only a part of the system for the protection of Fairmount, but it occupies ground that could not be brought into use for building purposes without it, and its completion prepares the valley of the "Dark Woods Creek" for the opening and filling in of streets, which will, at an early day, be sought as valuable building sites, thus giving a return to the City in increased taxation more than the interest of the cost for construction.

The most difficult work that we have had to perform, and which has occasioned the greatest anxiety, was the culverting of the Cohocksink Creek. From Germantown Road to Front Street there was much to contend with in the repeated freshets, that invariably broke away the protecting dams and required several days to place the work in the same condition it was prior to the storm; yet, notwithstanding this was so very discouraging to the contractor, it was driven forward with all energy, and every difficulty, as it occurred, successfully surmounted, and now presents for public use a fine, wide avenue, all trace of the former disgusting channel for sewerage having been entirely removed. The contractor, Daniel Stone, Esq., deserves at my hands, all encomium for the manner in which he has carried on this work, as well as for the character of the work now completed; and it has been a matter of great regret that he, by a serious accident, should have been compelled to yield his work into other hands. The contractors now in

charge—Messrs. G. & J. Clark—there is every reason to believe will prosecute the remaining portion of the work with the same energy and in an equally satisfactory manner; they are contractors of large experience, having constructed some of the heaviest work within our State, and in our own City have just finished the culvert on Vine street, built under the same authority as the work now in their charge. This culvert is now finished to a point 140 feet northward of Second street, with 2013 feet on Germantown road and Thompson street yet to build.

The branch culvert lying upon the line of the Cohocksink Creek, from Germantown road to Culvert street, is in charge of Messrs. D. & C. Kennedy, who have also the Twenty-fourth street main. This work has also suffered greatly from the frequent freshets, but it has progressed energetically, having received that attention and watchfulness which in this instance has been peculiarly requisite.

This work cannot be entirely finished until a connection is made upon the main line at Fifth and Thompson streets, thus enabling us to direct the drainage coming from Thompson and Mifflin streets to the channel projected for it on Thompson street and Germantown avenue. This is now carried in the old creek bed alongside of the new culvert, which is so guarded with piling as to protect it from injury, and at the same time give as much capacity as the creek had as an open channel, the flow in the culvert being more than equal that due the portion of original water course occupied.

Upon the completion of these lines we will ask for authority to complete the system by the construction of a four feet culvert on the creek from Culvert street to Apple street, the cost of which will not exceed \$11,000, and will be more than covered by the unexpended balance of the Culvert Loan. The amount of the culvert assessment will be \$2,015 00.

In connection with this branch culvert was a piece of work that deserves especial reference; that is, the alteration of the sewer on Culvert street, from the creek to Fourth street.

The old sewer on this line fell at so rapid a rate as to throw the mouth about four feet below the level of the bottom of the creek, and the same distance below the level we would require in bringing the new culvert up the creek from Germantown Road. This so contracted the opening of the old culvert at the creek as to occasion the repeated overflows at Fifth and Poplar streets, which, in many instances, has resulted so disastrously to the stores and dwellings in that neighborhood. This culvert it became necessary for us to raise to correspond with the new construction, and although located upon a closely built alley, of only 16 feet in width, and subject to the continued flow of drainage coming from 248 acres, as also the unusually frequent storms that occurred during the progress of the work: yet it has been completed in a satisfactory manner, without any injury whatever to the adjacent houses, though in some instances the cellar walls were bared to the foundation. The ordinary drainage carried off by this sewer is of the most offensive character, and it became necessary to employ a double set of hands for the purpose of relief, and thus expediting the work. It was necessary here to exercise the most watchful care to guard against the effect of a sudden storm, as a few minutes would change the flow from that of a rivulet to a mountain torrent, and in such cases it was imperative that all the obstructions to the free flow should be removed to prevent accident. Thus was it required that trunks, dams, and centering a part of the work, and in constant use, should be frequently removed, to be replaced when the storm had passed off. It is now entirely complete, and has been tested with as heavy storms perhaps as have ever visited the locality, such as have heretofore in-

variably flooded the valley at Fifth and Poplar and Parrish streets; yet it has carried it off entire, with only two-thirds capacity in use.

What effect the completion of these culverts will have upon the assessed value of property, may be estimated by comparing the condition of Thompson street from Fifth to Sixth, and Canal street from Germantown road to Front street, with what it was prior to the commencement of our work. But, in point of hygiene, no estimate can be made of the suffering by disease and loss of life that these constructions will be the means of averting. Now, there need be no fear attached to that particular locality, should an epidemic again visit us, as was the case some years since, when the line of the Cobocksink was marked by its ravages. This is its great value, and its success in consummating this much-desired end is by no one deemed problematical. Thus, the value of property on the line of the culvert is not alone enhanced, but the entire area over which the polluted atmosphere floated will feel the advantageous influence; and I cannot give a better idea of this than by repeating what has been previously stated by me, that in a similar case of improved drainage in a portion of the city of Manchester, England, the bills of mortality were reduced one-fifth, thus showing tangibly that the benefits from these constructions are not confined to a very limited area.

There has been but little work done the past year upon bridges, the only renewal being the construction of a spring draw-bridge over Frankford Creek at Bridesburg. This is of iron, and has applied to it the patent anti-attrition box of Parry. It is a permanent and secure structure, with greater facilities for the passage of vessels than was offered by the old bridge.

The Market Street Bridge, though without doubt one of the best wooden bridges that has ever been built, both in general plan and the proportion of its parts, and although

the material of which it is constructed was subjected to close inspection, yet it gives evidence of decay, and it has been requisite to replace a main brace and post. This has been caused, it is believed, by exposure from the want of outside boarding. I would therefore recommend that the entire structure be closed from the weather, by which further decay may be retarded.

The Girard Avenue Bridge, has been open for public use during the past year, and being upon the line that is used by drovers for large cattle, it has been severely tested and has proved to be as we have previously reported it to be.

The Wire Bridge at Fairmount, we believe to be in good order, but it is impossible to so assert unconditionally, as the parts are not so situated as to admit an examination. The western approach is in bad condition since the construction of the Passenger Railroad upon it. Great improvement might be made to this bridge, by re-arranging the bearing plates upon the towers, and closing in the shore cables, inside the anchor pits; this would prevent the continued vibration of the shore cables, and reduce that of the bridge proper.

The Surveys of the outer districts have been progressing during the past year, as rapidly as the amount appropriated therefor would warrant. Those that are conducted under contracts, made by the Commissioners of Districts appointed prior to Consolidation, are drawing to a close. One of them (the contract) is now completed with the plans on file, and covers that portion of the 24th Ward, north of Market street, and west of the line of Fisher's Avenue. The other, east of Fisher's Avenue, will be completed, it is supposed, during the year 1860. There is but one other section of the City that is in charge of Commissioners of Survey, Passyunk Township, comprising a portion of the First Ward, of this we can offer no report, having been unsuccessful in obtaining the information sought.

The current business of the Department is steadily on the increase, requiring the constant attention of its officers, to keep pace with the requirements. The operation of the Branch Culvert Ordinance, has occupied much time, in preparing the estimates and arrainging the bills of assessment, all of which are recorded and on file. I would again call to your attention the necessity for an Ordinance specifying the course to be pursued, by parties who may desire to dedicate streets to public use, and guarding it, if possible, with such restrictions as will prevent the location of streets that may conflict with the proper planning of the City, there is now neither form nor law regulating this, and in some instances, the interest of the City suffers for the want of it. At present the filing of a recorded deed of dedication in this office, is all that is called for, to make a public street, no one being clothed with the authority to either accept or reject. An Ordinance now before Councils may correct this, which confides this duty to the Board of Surveyors, who probably are the only officers of the City who can, from a knowledge of the general plan, from a correct judgment, as to the advantages or disadvantages that may result from an acceptance.

The sectional plans of the City on file in this office, are so far as they extend into the rural district complete, except that portion of the old City east of Fifth Street. For this area, which is one of the most valuable in the Consolidated City, we have no plans whatever on record, and it is very important for the interest of our citizens, that a correct map thereof should be prepared, including the 5th and 6th Wards. We shall lay the matter before Councils at an early day, and trust that it may meet your approval.

Respectfully submitted,

STRICKLAND KNEASS,

*Chief Engineer and Surveyor.*