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DEPARTMENT OF PUBLIC WORKS, Bureau of Surveys.

OFFICERS, 1888.

Chief Engineer and Surveyor,

SAMUEL L. SMEDLEY.

Principal Assistant Engineer—J. MILTON TITLOW.

Assistant Engineer—J. Kay Little.

Recording Clerk—Edward H. Thompson.

Sewer Registrar—William Calvert.

Sewer Clerk—William T. McPhail.

Draughtsmen:

George S. Connor,

Carl A. Trik,

Neville B. Craig,

Otto Riezler.

Stenographer and Type-Writer,

Joseph R. Scott,

Rodman.

Hugh Trik.

Janitor—Isaac Holland.

Registry Bureau.

Registrar,

JOHN W. FRAZIER.

Receiving Clerk—O. S. Stallman.

Draughtsmen:

Isaac E. Shallcross,

William H. Wester,

George H. Mercer,

James H. Roberts,

Robert P. Green,

S. Crawford Smith.

Charles H. Ott,

J. G. D. Craig.

Inspectors of Sewer Connections:

William S. Molineaux,

George W. Fox.

Inspectors of Sewer Construction:

John Abel, Jr.,

August Durr,

John McCormick,

Newton B. Beam,

Samuel R. Franklin,

George Moore,

Theo. A. Brackney,

Joseph Hunter,

John G. Moore,

William Penn Brown,

Thomas D. Hooper,

Abraham Ruth,

Conrad F. Brown,

Edward C. Hill,

Henry M. Smith,

Francis G. Ballantine,

William J. Little,

Emerick H. Sickels,

Salathiel Cox,

Chas. Y. Lauderbach,

Champney R. Van Horn

Samuel H. Collom,

William May,

John Vicary,

David J. Davis,

Chas. P. McCalley,

Findlay J. Watt,

James Duffy,

James McGill,

William Yetter.

ANNUAL REPORT

OF THE

BUREAU OF SURVEYS,

DEPARTMENT OF PUBLIC WORKS,

FOR THE YEAR 1888.

ANNUAL REPORT
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BUREAU OF SURVEYS,
DEPARTMENT OF PUBLIC WORKS.

For the year 1888.

Philadelphia, January 1, 1889.

GEN. LOUIS WAGNER,

Director of Department of Public Works.

DEAR SIR:—The annual report of the operations of the Bureau of Surveys for the year 1888 is herewith respectfully submitted, giving detailed accounts of receipts and expenditures, the construction of new bridges and sewers, the laying out of streets, and plans of lines and grades of streets, with topography and triangulation, the survey of building lots, and other work done by the District Surveyors and Regulators, and the operations of the Registry Bureau and sewer permit Registrar.

The appropriation of December 31, 1887, for 1888	
was	\$450,858 00
Balance of former appropriations.....	328,493 77
Additional appropriations during 1888 :	
March 20, Items 31 and 33.....	\$1,598 18
March 20, Item 4, Surplus 1887.....	23,250 00
July 2, Items 31 and 32.....	135,000 00
October 22, Item 37.....	1,185 87
November 7, Item 4.....	6,700 00
November 6, Item 33.....	10,000 00
December 24, Item 33.....	269 53
	178,003 58
	\$957,355 35
Transferred by ordinance November 6, 1888.....	15,565 12
	\$941,790 23

Expended during 1888.....		569,568 93
Balance merging.....	\$18,980 43	
Balance not merging.....	353,240 87	
		<hr/>
		372,221 30
		<hr/>
		\$941,790 23

The receipts of the bureau from all sources during the year amounted to \$26,236.45, an increase of \$3,427.72. They were derived from the following sources:

For sewer permits, \$17,058.00; for searches in Registry Bureau, \$2,617.00; for sewer bills and balances, \$5,384.24; and for copies of plans, certificates, etc., \$1,177.21.

Engineering Bureau.

The Engineering Bureau has continued the study of several principal drainage areas commenced last year; the recommendations regarding the same are given in subsequent detail; the usual routine work of approximate preliminary estimates and sketches of bridges and sewers for Councils Committees, as well as a great amount of other work, including the preparation of contracts for sewers and bridges, making estimates for payments on account of the construction of the same, and for their inspection, has exceeded by about 50 per cent. any past year.

Market Street Bridge.

The bridge proper under the principal contractor, R. A. Malone & Sons, was completed on April 20, 1888. The total cost, including engineering, incidentals, etc., being \$284,663.63, of which \$18,406.35 was paid by the Traction Company, making the cost to the city, \$266,257.28. The removal of the temporary wooden bridge erected to the north in 1884, immediately followed, under contracts with D. S. Cofrode for removal of superstructure at \$800, and with American Dredging Company for removal of the river piers at \$1,200, both of which were completed on June 21, 1888, and charged to the appropriation for the new bridge, making the total amount expended on account of same, \$268,257.28.

The portions of the iron work most exposed to the weather and smoke should be painted, and the paving on the footways overhauled during the early part of the coming year.

Proposed Bridge at Walnut Street.

The design prepared during the month of July by direction of ordinance of Councils, July 2, 1888, is now being considered by the Committee on Surveys, with the prospect of a favorable report at an early date. The elevation of the structure between the buildings of the Allison Manufacturing Company being the most difficult subject of adjustment.

Councils having appropriated \$200,000 for commencing this work next year, it is important that the design be decided upon early in the year, so that the main piers upon which it is proposed to spend this money, can be commenced and completed in one season.

Kensington Avenue, K Street and Frankford Avenue Bridge.

The proposed bridges at Kensington avenue, K street and Frankford avenue for the purpose of avoiding grade crossings by passing these streets under the Pennsylvania Railroad, and for which an appropriation of \$65,000 was made this year, were not constructed by reason of a difference of opinion between the city authorities and the officials of the railroad company as to what part of the total cost, except land damages, of this money should be applied jointly with the company.

Cobb's Creek Bridge.

Contracts have been awarded to I. H. Hathaway for the construction of a stone and brick arched bridge over Cobb's creek on Lansdown avenue, to be paid for jointly by the city and Delaware county. Also, for the extension of the iron bridge over the West Chester Branch of the Pennsylvania Railroad at Chester avenue, for the purpose of allowing persons to pass under the avenue to reach Forty-ninth street station. The work will not be commenced until next year.

Preliminary plans have been made for bridges on Girard avenue and at Second street, over the Philadelphia & Reading Railroad; it is proposed that the railroad company contribute towards their construction, which is now being considered, with the expectation of a satisfactory conclusion at an early date.

Church Street Bridge.

Church street bridge, Frankford, the dangers attending this grade crossing have during the year been removed by the construction of a bridge 50 feet span, by the Pennsylvania Railroad Company at their cost, and the city has graded and paved this and the adjoining streets. The cutting has been from 10 to 15 feet, damaging property heavily, which will have to be paid by the city. The amount is now being determined by a Jury.

Sixth Street Bridge.

The bridge at Sixth street to pass the same under the Pennsylvania Railroad, for which a contract was made with the railroad company in August is approaching completion, both abutments being finished. The city has provided drainage under the depression by building a very deep sewer southward to Clearfield street, passing under the Philadelphia & Reading Railroad.

Main Sewers.

Nearly all the main sewers authorized to be constructed and paid for out of the appropriation of \$245,000 have been completed, or very nearly so, with the exception of the Somerset street sewer and the Bellfield avenue sewer, both of which could not be commenced for unavoidable reasons, the latter street not being dedicated to public use. Washington street sewer (Tacony) is about being commenced, and the Tasker street sewer will be at the opening of the next season. The distribution of the appropriation for main sewers was again delayed this year, not being available until June; it is very important for the interests of the city and the localities to be

benefited by the construction of these sewers that the sum for that purpose for the following year be apportioned not later than February, so that the Engineering Bureau will have sufficient time to prepare the works for contract and have them constructed in favorable weather.

Manayunk Intercepting Sewer.

During the year many of the mills and dye-houses along the line of the sewer have connected therewith, and much objectionable matter thus removed from the Schuylkill water supply.

While many of the mill owners know and appreciate and cheerfully comply with all the requirements and regulations of the bureau, others have not complied with the formal notice served upon them during November, 1887, to connect with the sewer. As soon as the new supervisors are appointed an inspection will be made, and the cases notified having objectionable drainage emptying into the river will be referred to the City Solicitor for prosecution.

The mills in Montgomery county opposite Manayunk should be required by the concentrated action of the municipal authorities and the State Board of Health to keep the objectionable matter out of the river.

From the apparent increase of the number of mills and dye-houses at this point, within the last ten years, it looks as if the production of a large part of the nuisance was being transferred from the north to the south side of the river, from the jurisdiction of the city to that of Montgomery county. It is highly important that this matter be not overlooked, but that some action be taken at once to check and eventually prevent it, or the city will still be menaced by deleterious drainage passing into the drinking water in close proximity to the points where it is pumped into the reservoirs.

Connections and Branches to the Intercepting Sewer.

This work, in order to extend the sewer ramifications to the village of the Falls of Schuylkill, Manayunk and German-

town, and to the individual houses and mills will require the attention of Councils for many years, in order that the purpose intended to be accomplished by the construction of the intercepting sewer may be fully carried out. After these branches are constructed, the property owners must be compelled to connect therewith and see that the rules established are being complied with, and that the sewage is kept out of the water course. This will require constant vigilance and attention and give ample occupation for the supervisors asked for this year.

During the year the surveys for the Wissahickon Valley sewer have been extended and located upon the ground on the northeast side of the creek to Allen's lane.

Mifflin Creek at Ridge avenue.

When the main line of the intercepting sewer was constructed in the vicinity of Falls Village in order to protect it from the scour of Mifflin creek, a storm-water conduit, 6 feet in diameter, was built to the northeast side of Ridge avenue, and connected with the old storm-water drain at that point. To continue this storm-water conduit on the projected line of Coulter street is intended in the future. It would pass under three brick houses fronting on Mifflin lane and upon the line of Coulter street. The old stone drain as now constructed is intended to take the flow of the creek, extends parallel with the lane about 220 feet beyond the end of the new conduit; a great part of it is supposed to be only two feet by four feet in cross-section, inadequate for the amount of rain water. It is out of repair and often obstructed, and is the cause of a nuisance on Ridge avenue, damaging property at this point after every heavy rain by flooding with muddy water and leaving a deposit of mud and sand on the street.

As this drain obstructs a natural water-course and is entirely upon private property, it is believed that the owners may be indicted for maintaining a nuisance, or other action at law sustained which will require them to rebuild the culvert of proper dimensions, or open the original water-course.

Territory requiring Restricted Drainage.

Under the influence of the construction of the new branches of the Pennsylvania Railroad to Chestnut Hill and Manayunk, a large extent of territory, draining into the water supply, in the northwestern part of the city, in the Twenty-first, Twenty-second, and Twenty-fourth Wards, is being rapidly covered by suburban residences.

Possibly the intercepting sewer and its branches may in the distant future, if desired, be extended to the remote districts northwest of Chestnut Hill and Roxborough, but not probably to that northwest of West Fairmount Park and east of Belmont Mansion. For the present these districts should be prevented from demanding or anticipating the construction of sewers by a general ordinance of Councils, so that persons building there would have ample notice of the fact that sewers will not be allowed which empty into the dam. The ordinance should also provide for maintaining the water-courses free from pollution other than the wash from natural causes.

This restriction should also include a number of small areas lying along the Wissahickon creek below the level of the sewer, or better, that they may be included within the limits of Fairmount Park by slightly extending its boundaries.

There are also two small areas near Oak Lane Station, on the North Pennsylvania Railroad, adjoining the Montgomery county line, which drain naturally northward into Saw Mill creek, through the same county, which are too low to be drained by gravity within the city limits. These should also be restricted and controlled.

Frankford Creek Drainage Area.

The territory of this drainage area within the city limits is the largest and most extensive, and therefore the most important in future expenditure that we have; therefore it should have the preliminary study that the subject deserves.

To give a comprehensive idea of the extent of this area, the

Wingohocking creek, northwest branch, includes a large part of the villages of Germantown and Mt. Airy, in the Twenty-second Ward, containing 5,380 acres; the Tacony creek, north branch, 14,400 acres, 9,700 acres of which lie in Montgomery County, and includes the villages of Chelton Hills and Jenkintown; the little Tacony creek and Tackawanna run, northeast branch, 4,470 acres, includes the villages of Frankford, Volunteertown, and Oxford Church, in the Twenty-third Ward, and the area draining directly in the Frankford creek, between the villages of Frankford and Bridesburg, 670 acres, making the total area 20,220 acres, or nearly 32 square miles, one-quarter the area of the whole city.

The territory is beautiful and rolling, with some sharp spurs and knolls generally rising gradually from tide water to 360 feet above city datum. The rectangular system of streets with grades have been projected over the whole of it, irrespective of the natural drainage channels, consequently if the drainage is to follow those artificial lines the construction will be needlessly expensive. Upon a great portion of this area, the lines and grades of the streets should be revised for drainage purposes, and the regulated water-courses that are to remain should be defined, and the sizes and grades of the main sewers determined. It is of the utmost importance for the city's interest that this work be given the attention it deserves.

The north branch of the Wingohocking creek passing through the village of Somerville east of Germantown, is a fair example. Here the sides of the valley are so abrupt that the main sewer must follow the line of the creek through private property and be inaccessible in the future, unless a street following the same be laid out and opened, requiring a revision of part of the city plan.

Another important subject to be considered before the sizes of the main sewers in this drainage area can be determined, is the question whether the city will not be required in its own defense to prevent the channel of Tacony creek from becoming

a future nuisance, by providing for carrying the sewage from this area of 9,700 acres, in Montgomery county, which is now being rapidly improved and populated.

Drainage Systems in the First and Twenty-sixth Wards.

The portions of these wards lying below Snyder avenue include an area two miles long and four miles wide, generally known as the "Neck" and now used as truck farms, but which is being rapidly buried under the deposit of debris of the population at the north. The greater portion of this district is below the level of high tide and will in future be filled in some ten feet, to raise it to a suitable elevation above tide for facility of drainage by gravity.

Being bounded on the south for two miles in length by League Island Navy Yard, precludes the possibility of discharging sewers into the Delaware, within that distance. The main sewers must therefore, in general, grade downward east and west from the middle of this section to discharge at least a mile away into the Delaware and Schuylkill rivers. The extensions of the Baltimore and Ohio and Pennsylvania railroads across this territory with their branch tracks to their piers on the river fronts, add to the complication.

As the main sewers in this area must be laid at the minimum grades, their sizes and location should therefore be definitely established in advance of the improvements upon the best lines and the grades of the proposed streets, which will require general revision, should be re-established in accordance therewith. If this is done, it will procure for the city in the future more satisfactory drainage and relieve her from future damages by reason of change in the grades of the located streets. The present topographical maps only cover about one-fifth of this section; they should be extended at the earliest dates to allow these suggestions being carried out. The main sewer now built on Sixteenth street, at Snyder avenue, empties into one of the natural water courses at that point which is occasionally the subject of complaint, although provisional connection

for sewage has been made for taking it to the Delaware river ; as this sewage increases in quantity it will be necessary to extend the main sewer southwestward to the Schuylkill near Point Breeze.

Aramingo Canal Drainage.

Subsequent to the date of the appropriation of \$75,000 made June 29, for the extension of the Somerset street sewer to the Delaware river, the location through the Richmond Coal Wharves, the property of the Philadelphia and Reading Railroad Company, did not receive the sanction of that company until it was too late in the season to put the work under contract. The amount of the appropriation also was a hindrance, it not being large enough to allow all the work upon their property being done the same season, so as to given them the least inconvenience. An additional appropriation of \$100,000 having been made for next year, making the amount available \$175,000, about half the amount required, there is encouragement for early relief from the intolerable nuisance arising from the old canal.

Inlets.

The inlets in general use are very well adapted for territory undergoing improvement around the heart of the city and the suburbs, being of moderate cost, large capacity and not easily obstructed, are objectionable in the most improved sections ; the large openings are unsightly, the iron covers are difficult to maintain in place, and become smooth and therefore dangerous when worn. Their location on the street corners, while in position best adapted for taking the largest quantity of storm water, and therefore accomplishing their object with the least number, are for this reason an objection ; the accumulated water being required to pass across the paths of pedestrians during a storm. They should be located opposite or near the house lines of street intersections, and also near the centre of the block, with small openings in the granite curb stone or

iron gratings in the gutter, or both, that would not attract notice. Being greater in number, they prevent accumulation of water and may be smaller in all parts of construction; the inlet openings would be similar to those around the City Hall, which simply show a notch in the curb stone, not observed by the people and are only found upon special examination.

Construction.

There has been a large increase in the work of construction, embraced in the following: two bridges, sixteen main sewers, one section of the intercepting sewer, two sections of Wissahickon valley sewer, two hundred and fifty branch sewers, forty sewers built at private cost, as follows:

Bridges.

Somerset street bridge, over the Richmond Branch of the Philadelphia & Reading Railroad, Twenty-fifth Ward. This bridge was completed in 1887; the final estimate was made in February, 1888.

Owing to delay in completing the work, the contractor suffered a deduction of \$540. Contractors, Boller & McGaw. Inspector, Joseph Child. The actual cost to the city for the bridge was \$23,271.25. Inspection was paid by the contractors.

Bridge over the Wissahickon creek, on the line of Ridge avenue, in the Twenty-first Ward. This work, which was partially completed in 1887, was continued and completed on August 23, 1888. The final estimate was made November 26, 1888, in which a deduction for delay of 207 days at \$10 per day was made.

Contract price.....	\$33,300 00
Deduction for delays.....	2,070 00
	<hr/>
	\$31,230 00
Cost of inspection.....	743 32
	<hr/>
Total cost of bridge.....	\$31,973.32

Contractor, James Dechan. Inspector, Thomas Cooper.

Main Sewers.

The three following main sewers were completed in December 1887, but the final estimates were not drawn until January, 1888.

Heiskel street and Bellfield avenue: John S. Dutton, contractor; final estimate, \$5,412.90.

Mill Creek sewer, between Forty-seventh and Haverford street, William H. H. Achuff, contractor; final estimate, \$5,546.66.

Willow, Price and Engel streets: William H. H. Achuff, contractor; final estimate, \$1,485.67.

The work on Mill Creek sewer, on Meadow street, between Chestnut and Market streets, Twenty-seventh Ward, was continued and completed; its length is 409 feet, costing \$24,437.75, of which \$19,734.13 was paid during 1888. Contractor, Peter Deehan; Inspector, H. M. Smith.

Bridge street sewer, between Frankford creek and Torresdale avenue, Twenty-third Ward, was built for a distance of 708 feet, 4 inches. This sewer is circular in shape, with a diameter of $4\frac{1}{2}$ feet; the cost was \$12.00 per foot, amounting to \$8,500. Assessment bills, amounting to \$904.65, were collected by the city. Contractor, William H. H. Achuff; Inspector, H. M. Smith. An additional appropriation was made for this sewer and the work was continued to a point near the Trenton Railroad, a length of 1,213 feet, 2 inches, costing \$12,050.25, of which \$2,189.20 was paid in assessment bills. Contractor, William H. H. Achuff; Inspector, H. M. Smith.

Westmoreland and Jasper street sewer was commenced at Gunner's run and Westmoreland street, and extends northwest on Westmoreland street to Jasper street, of circular shape, having a diameter of $8\frac{1}{2}$ feet, thence southwest on Jasper street to the south side of Allegheny avenue, circular in shape, diameter of $4\frac{3}{4}$ feet; a branch having a diameter of 7 feet extends northwest on Jasper street from Westmore-

land street, a length of $194\frac{4}{10}$ feet, and another branch 3 feet in diameter extends northeast from Jasper street on Westmoreland street, a distance of $63\frac{6.7}{10}$ feet.

These branches are connected with the Westmorland street sewer by means of a large chamber. Contractor, W. H. H. Achuff; Inspector, H. M. Smith.

The sewer on Jasper and Clearfield streets is a continuation of the above and extends on Jasper street from Allegheny avenue to Clearfield street, thence to Kensington avenue. This sewer has a diameter of $4\frac{3}{4}$ and 4 feet. Contractor, H. F. Sullivan; Inspector, H. M. Smith.

The sewer on Bainbridge street was built between the Schuylkill River, East Side Railroad and Schuylkill avenue, a distance of 453 feet. It is $3\frac{1}{2}$ feet in diameter and cost \$4,824.45. Contractor, H. C. Eyre; Inspector, F. J. Watt.

Powelton avenue sewer connects the Twenty-fourth street sewer and the Schuylkill river, and is intended to relieve the sewers in the vicinity of Twenty-fourth and Wood streets, which were overcharged in times of heavy rainfall, causing much damage to the surrounding property. The sewer has a diameter of 8 feet and a length of 527 feet. Contractors, R. A. Malone & Co.; Inspector, Salathiel Cox.

Clearfield street, from Fifteenth street to Woodpecker lane, is almost completed. It has a diameter of 7 feet. The old portion of the sewer between Fifteenth and Sixteenth street was taken out in order to secure greater depth and increased size. Payments during 1888 were \$10,584.00. Contractors, R. A. Malone & Co.; Inspector, John Abel, Jr.

The Centre and Engel streets sewer has been completed. It consists of 256 feet of circular sewer, 4 feet in diameter, and 106 feet of 3 feet in diameter, costing \$4,871.50. Contractor, Chas. J. Kennedy; Inspector, S. H. Collom.

The Reed street sewer is circular, with a diameter $4\frac{1}{2}$ feet, and extends from the Schuylkill river to the Baltimore & Ohio Railroad. Its cost was \$9,587.70. Contractor, T. P. Smart; Inspector, F. J. Watt.

The sewer on Aramingo street from Ann street southward, consists of a wooden trunk, 6 feet high and 12 feet 4 inches wide; its length is 465 feet, cost \$4,636.05. Contractor, D. A. Kennedy; Inspector, H. M. Smith.

Lombard street sewer was extended from 122 feet west of Eighth street to 247 feet west of Ninth street, a total distance of 571 feet, costing \$10,278.00. It is egg-shaped 4' 6" x 6' in diameter. Contractor, James Deehan; Inspector, E. H. Sickels.

Fifty-second street sewer from Monroe to Lancaster avenue is rapidly approaching completion; it has a diameter of 7 feet 3 inches. The payments during 1888 were \$17,604.00. Contractor, H. F. Sullivan; Inspector, H. M. Smith.

Snyder avenue sewer from Commercial avenue eastward is nearly completed; it is 8 feet in diameter. Payments during 1888, \$6461.60. Contractor, John S. Dutton; Inspector, Abraham Ruth.

Clearfield street sewer from Ninth street to Connecting railway has been completed from Ninth street to a point near Germantown avenue. This sewer has diameters of 8' 6", 8' 3" and 8 feet. Payments during 1888, \$6,624.00. Contractor, W. H. H. Achuff; Inspector, C. R. Van Horn.

Intercepting Sewer.

SECTION 13, extending from Leverington street northward, was constructed and completed. It consists of 2,315 feet of egg-shaped sewer (3' 7" x 2' 10") and one flushing chamber, altogether costing \$32,479.

This completes the intercepting sewer, proper. We have now a continuous sewer from a point in the Schuylkill river below Fairmount dam to the American Pulp Works, Manayunk. Contractor, James Sullivan; Inspector, C. Y. Lauderbach.

Wissahickon Valley Sewer.

This is one of the branches of the intercepting sewer, projected for the drainage of the western portion of Germantown and vicinity.

SECTION 2. Work was commenced on this section during the winter and completed in April. It has a length of 2,555 feet of sewer (2' 4" x 3½') and cost \$23,100.00. Contractor, W. H. H. Achuff; Inspector, C. R. Van Horn.

SECTION 3. This section was awarded to H. Eyre. Work was begun in November, and at the close of the year 140 feet of sewer, size 2' 4" x 3' 6" had been completed. Work on the sewer will be continued during the winter. Inspector, F. J. Watt.

Flushing Chamber.

The final estimate for flushing chamber and connections with intercepting sewer along the Wissahickon creek, north of Ridge avenue, was made February 14, 1888, amount \$2,356.86.

Branch Sewers.

During the year 149,765.83 linear feet of branch sewers were constructed, as follows:

Egg-shaped sewers of brick.....	129,358.98 lin. feet.
Circular sewers of brick.	5,937.13 "
Terra-cotta pipe sewers.....	14,469.72 "

a detailed account of which is appended to this report.

Man-holes.

In connection with these sewers, 1,014 manholes were built, an average of one man-hole for every 147 feet of sewer.

Inlets.

In addition to the man-holes, 446 inlets were built for the disposal of storm-water, as follows:

Size No. 1.....	3
Size No. 2.....	141
Size No. 3.....	302

Well-holes.

When necessary to connect sewer of different depths, well-holes were constructed.

Number built, 13, representing 334 vertical feet.

Expenditures.

The actual expenditures for the construction of branch sewers, inlets, man-holes, well-holes and inspection was \$498,553.95, as follows:

To contractors in assessment bills.....	\$329,561 93
To contractors in cash.....	148,767 40
	\$478,329 33
For inspection.....	20,224 62
Total.....	\$498 553 95

The amount retained from contractors for damages for delays was \$340; for repaving over sewer ditches (work done by Bureau of Highways), \$448.34; total, \$788.34.

The amount paid by contractors to balance accounts was \$554.04.

Repairs to Cohocksink Sewer.

The work of repairing Cohocksink sewer, between Broad and Dauphin streets, and Second street and Germantown avenue, was continued under John S. Dutton's contract.

The amount expended was \$4,471.22. A further inspection of the sewer showed that additional repairs were necessary, and on October 30, 1888, a contract limited to \$4,400 was made with H. S. Hong for a continuation of this work. Up to the end of the year estimates have been made on account of this contract, amounting to \$1,302.40.

A large and dangerous break having occurred at Second street and Germantown avenue, requiring a speedy remedy and a large expenditure of money, a supplemental contract was made with H. S. Hong, amounting to \$4,600, which was the unexpended balance of the item for repairs to main sewers.

Sewers Built at Private Expense.

Three thousand nine hundred and fifty-seven (3,957) feet of egg-shaped sewers of brick, and 6,167 feet of terra-cotta pipe were built at private cost during the year.

Inlets.

Inlets built in connection with old sewers.

The final estimate under M. C. Hong's contract of 1887, amounting to \$1,265.13, was paid.

To H. C. Eyre was awarded the contract for Shedaker trap inlets. He constructed the following :

16 No. 2 Shedaker traps, at \$77.50.....\$1,240 00

W. P. Clements was awarded the contract for brick and stone inlets as follows :

1 No. 1 brick and stone inlet at \$98.00.....	\$98 00
22 No. 2 brick and stone inlets at \$88.00.....	1,936 00
32 No. 3 brick and stone inlets at \$82.00.....	2,624 00
293 feet 12-inch terra cotta pipe at \$1.10.....	322 00
	<hr/>
	\$4,980 00

Under contract with D. M. Smart, the following brick and stone inlets were constructed :

6 No. 2 brick and stone inlets at \$84.00.....	\$504 00
17 No. 3 brick and stone inlets at \$81.00.....	1,377 00
45 feet 15-inch terra-cotta pipe at \$1.35.....	60 75
	<hr/>
	\$1,941 75
Payments during 1888.....	641 40
	<hr/>
Balance due.....	\$1,300 35

The total length of sewers built and inspected during the year was $32\frac{879}{1000}$ miles, divided as follows: Main sewers, $2\frac{190}{1000}$ miles; intercepting sewer and connections $\frac{407}{1000}$ miles; branch sewers, $28\frac{365}{1000}$ miles; branch sewers, at private expense, $1\frac{917}{1000}$ miles.

The whole number of inlets constructed, including those built in connection with old sewers, was 540, as follows :

Shedaker traps.....	16
No. 1 brick and stone.....	4
No. 2 brick and stone.....	169
No. 3 brick and stone.....	351

Office Work.

The work required to be done in the office was augmented over that of former years, owing to the greater number of sewers authorized and built, for which contracts have been made. Over three hundred contracts were prepared, requiring three hundred letters in duplicate for the use of the Director and City Solicitor. Each contract also requires two letters to be written to the contractor, one to execute the contract, the other to commence work. Thirteen thousand sewer bills have been examined, stamped, and signed. Three hundred estimates for sewers were made.

The usual routine of the office, keeping the records, preparing the schedules, giving information to the public and contractors, advertising, etc., received prompt attention.

Sewer Connections.

Permits for the connection of 4,264 buildings were authorized during the year, each and every building being separately connected with the sewer (an important regulation of the Board of Health). This involved the issuing of 2,758 permits, with their corresponding inspection, draughting, and return of the reports as required by the ordinance of April 3, 1883.

The Bureaus of Water and Highways, and the Board of Health have been furnished daily with a list of all permits issued.

Two hundred and fifty (250) plans of main and branch sewers were received from the District Surveyors, and duly entered in the sewer reference book, and have been carefully plotted on the drainage maps.

Forty (40) sewers authorized by the Board of Surveyors and Committee on Surveys were constructed at private expense.

The indexing of the inspectors' books has been continued, the number received during the year was 237, making the total number now in constant use 912.

The work of inspecting the connections of drains with the sewers has greatly increased, and it has taxed to the utmost the vigilance and efficiency of the inspectors. They have been continuously on duty during the year, and it has been impossible for them to inspect the connections made in the outlying districts, viz: Frankford, Germantown, etc. Sixty-three (63) connections were made with the Manayunk intercepting sewer, all of which were under the supervision of the inspector on that sewer.

The returns of sewer connections have been received, but remain as turned in by the inspectors, there being no opportunity to properly index or even arrange them.

All moneys for permits, balances, etc., were collected in this office and returned to the City Treasurer daily, taking his receipt therefor, previous to June 1, 1888; on and after which date the arrangements of the new charter were put into operation, and the payments have all been made in the office of the Receiver of Taxes. The applicant for a permit now takes a memorandum of the amount to be paid to the Receiver of Taxes, who receives the money and returns the receipt to this office by the party paying.

Board of Surveyors and Regulators.

The District Surveyors now serving under the provisions of the new charter are

Thomas Daly, First District, appointed April 4, 1887.

C. A. Sundstrom, Eighth District, appointed September 1, 1888.

Joseph Johnson, Eleventh District, appointed April 1, 1888.

H. M. Fuller, Thirteenth District, appointed February 1, 1888.

Under the conditions of the appropriation, the fees, including work done for any department, bureau, board or commission of the city, must amount to the salaries, over and above

the expenses of the office. How far these conditions are admissible, can only be determined after longer experience than has hitherto been afforded.

An appended table exhibits the relative earnings and expenses for the year 1888; and, also, the number of lots surveyed and other work performed in each district, for the city, by the District Surveyor.

The Board of Surveyors held twenty-seven meetings, five of which were road days, set apart for the hearing of parties interested in revision of plans. Fifty-two (52) plans were so heard during the year. The Recording Clerk keeps the minutes of this body, which now comprises several volumes, and their value to the public can hardly be over-estimated. A fair copy made to date, and a complete index, are greatly needed. He also attends on and keeps the minutes of the Committee on Surveys, which, during the year, held 31 meetings, when 637 ordinances, petitions and communications were considered, and 126 reports were prepared for Councils, as follows: For sewers, 248; new streets, 54; revisions of plan, 32; bridges, 3; miscellaneous, 19. Eighty-five (85) complaints of objectionable footway gutters were received, and owners of property notified. Of these, 49 complied, 31 are now pending, and 5 were dismissed as not coming under the law.

Topographical surveys have been made east of Broad street, in the Twenty-second Ward, to the extent of 372 acres; in the Twenty-third and Twenty-fifth Wards, 1,710 acres, and in the Twenty-seventh Ward, 385 acres. These includes the territory along the line of the Aramingo canal, and will enable the Board of Surveyors to proceed with the revision of grades authorized there by ordinance of Councils.

Eight thousand and three (8,003) lots have been surveyed by the District Surveyors.

Standard Measures.

A permanent station has been established in the centre of City Hall tower, and very accurate triangulations made in

connection with the United States Coast and Geodetic Survey, by which its latitude is found to be $39^{\circ} 57' .09.768''$ north, and longitude $75^{\circ} 09' 49.916''$ west. From stations in the middle of Broad street, 30,575.71 feet, north, and at the Navy Yard, 24,779.24 feet, south, and another station at Sixty-fifth street, in the middle of Market street, distance 24,779.24 feet; the true angle of Broad and Market streets on the northwest is found to be $90^{\circ} 19' 48.56''$. These streets were intended by the original laying out of the city to be at right angles, but the variation above noted by measures of extreme accuracy, show that at Sixty-fifth street, Market street is 142.8 feet more south than if the right angles had been properly laid off; and all the other city streets are out of right angles in the same proportion. The angles of other important stations in the city have been accurately determined, and the centre lines of the east and west streets, between Market street and South street, because of the obstructions and hindrances of daylight, have been run out at night for the purpose of more definitely and permanently securing the true location of the streets in the "Old City Proper," where land has become so immensely valuable as to make the minutest accuracy imperative.

Registry Bureau.

More work has been done in the Registrar's Department of the Bureau of Surveys during the year just ended than during any single year since the Registry office was established. This was made necessary for several reasons, the chief of which were:

First. Because of the rule established by Director of Department of Public Works that no municipal improvements should be made in any street until the same had been legally opened to public use.

Second. Because of the opinion of the Supreme Court of Pennsylvania in the Brooklyn street case, deciding that the sale of lots fronting on a street did not constitute a dedication.

Third. Because of the absolute necessity for the renewal of the worn-out city plans, and the demand made upon the Registrar by heads of Bureaus for plans, tracings, etc.

Previous to the year 1888 it was the custom of the Bureau of Water to lay water-pipe in any street where the applicant made pre-payment of the amount fixed by law for laying such pipe, but that rule having been abrogated by reason of the decision in the Brooklyn street case, the Chief of the Bureau of Water made it imperative that no water-pipe should be laid in any street until a certificate was first furnished by the Registrar of the Bureau of Surveys that the street had been legally opened to public use, and the Director of Public Works having applied the same rule to the laying of gas-pipe and all other street improvements, you will therefore observe that while 879 certificates of the legal opening of streets were issued during the year 1887—by far the largest number ever issued in a single year up to that time—by reason of this new departure, 2,739 certificates of street openings were executed during the year 1888, or three times as many as were issued during the year 1887.

Under date of February 21, 1888, the City Solicitor wrote to the Director of Public Works, as follows, respecting the dedication of streets to the public use :

“ In re-opening of Brooklyn street, the Supreme Court has just decided that where a street is plotted on the public plan, but not opened or in use, that the mere sale of lots bounded by the street calling for such plotted street as a front or boundary does not work a dedication to public use, and that in such case, when the street is opened by law, the original grantor of the property, so described, is not stopped from claiming damages from the city, if he has suffered any.

“ In view of this decision, which reverses the decisions of the lower Courts in Berks and Story streets, we think it is proper to suggest to you that no municipal work be done until the streets are legally opened under an ordinance of Councils, or proceedings in Courts, or by deeds of dedication delivered to the city and recorded.”

Since that time the Department and Bureaus have only issued certificates in accordance therewith.

Certificates of the legal opening of streets, up to that time, were based upon the coloring in reference atlases, which was the result of twenty-five years labor. By that system the work of certification could be done quickly and accurately; but as fully one-third of the streets indicated in these atlases as legally opened, were by virtue of sales of lots bounded by the streets, these reference atlases became entirely worthless for the certification of streets legally opened to public use, and the Registrar was therefore compelled to make a careful examination of the "Road Docket Record Book," copied from the Quarter Sessions records, and the public plan, covering the street, in every case where a certificate was called for, respecting the opening of streets.

The work of preparing new reference or index atlases was begun soon after the promulgation of the Brooklyn street decision, and at the close of the year, fully one half of all the streets in the city were properly indexed as regards their dedication to public use; this required a most careful examination of all the deeds of dedication, orders of Court, of Governors of the Commonwealth, agreements, releases on file in the Bureau, and of plans recorded in the Recorder of Deeds office, etc., covering a period of 150 years and upwards, and the work of indexing is still being pushed forward as rapidly as possible.

The constant use of street plans for 30 years and upwards, their being used so much in Court, and before Road Juries, as evidence, have had the effect of completely destroying some of them so that they could be used no longer, and copies have been prepared.

The Registrar soon after entering on his duties, reached the conclusion that plans made at the cost of Telephone, Electric, and other companies for submission for the action of the Board of Highway Supervisors, should be made by city draughtsmen, and thus yield a constant and considerable revenue to the city.

This was approved by the Director of the Department, and in one month the Registrar was enabled to make report that "During the month of February, 1888, draughtsmen in the Registrar's office of the Bureau of Surveys were employed 148 hours in making copies of underground plans for the Bell Telephone Company, and in view of the recent re-organization of the Highway Board of Supervisors, and its purpose to earn money for the public treasury, I respectfully suggest that all orders for copies of plans and payment for the same be made to your Board of Highway Supervisors, or the draughtsmen of your Board.

"And in conformity with that suggestion I herewith hand you a check, drawn to your order as President of the Board of Highway Supervisors for \$148, being the legal fee of \$1.00 per hour consumed in the preparation of said plans, and also an application for more copies of plans of a similar character, made by the Bell Telephone Company of Philadelphia."

The following shows the work of the office for the years

	1888.	1887.
Number of certificates of registered owners issued...	10,375	11,175
Number of certificates of registered owners issued for use of City Solicitor.....	209	400
Money earned, registry certificates.....	\$2,617 00	\$2,803 25
Money earned, miscellaneous.....	\$800 20	\$661 90
Original lots platted.....	8,503	9,039
Transfers platted.....	19,564	19,974
Number of plans made for departments and bureaus.	52	
Number of deeds registered.....	18,717	21,944
Number of registry books examined by public.....	18,203	
Examination and correction of titles and cancellation of errors in deeds handed in to be registered....	1,665	1,512
Certificates, legal opening of streets.....	2,739	879
Municipal liens examined and names of registered owners furnished Law Department.....	412	526
Number of worn out plans renewed and not heretofore reported.....	3	

Previous to last year, no record was kept of the number of registry plans books examined, nor of plans made for departments and bureaus.

The vastly increased work of the Bureau, as shown by the statistics, has been performed without increase in the force of the office, and has been accomplished through the systematic and unremitting attention of the men employed.

This is highly gratifying, but has been so general on the part of all in the office that I am impelled to refrain from specific commendations, the list at beginning of report showing the names of all officers and employees.

Respectfully submitted,

SAM. L. SMEDLEY,

Chief, Bureau of Surveys.

Statement of Receipts, Earnings, and Expenses in the First, Eighth, Eleventh, and Thirteenth Survey Districts.

	FIRST DISTRICT.				EIGHTH DISTRICT.			
	Cash.	Fees.	Total.	Expenses.	Cash.	Fees.	Total.	Expenses.
1888.								
January	\$133 00	.....	\$133 00	\$453 71				
February	388 81	\$119 00	507 81	475 36				
March	401 50	.....	401 50	480 52				
April.....	618 83	51 50	670 33	448 16				
May.....	1,083 77	116 23	1,199 00	436 06				
June.....	1,298 26	5 00	1,303 26	459 28				
July.....	1,504 86	30 00	1,534 86	588 66				
August.....	874 77	58 88	933 15	462 76				
September.....	761 56	15 84	777 42	474 33	\$409 67	\$149 04	\$558 71	\$481 06
October.....	403 92	.....	403 92	459 41	497 36	105 57	602 93	493 96
November.....	317 20	148 88	466 08	458 66	385 45	140 82	526 27	601 46
December.....	952 82	.....	952 82	616 68	159 60	38 45	198 03	319 46
	\$8,789 32	\$543 83	\$9,233 15	\$5,761 19	\$1,462 08	\$433 86	\$1,895 94	\$1,895 94

Statement of Receipts, Earnings, and Expenses, etc.—Continued.

	ELEVENTH DISTRICT.				THIRTEENTH DISTRICT.			
	Cash.	Fees.	Total.	Expenses.	Cash.	Fees.	Total.	Expenses.
1888								
January.....					\$749 90		\$749 90	\$467 64
February.....					980 24		980 24	528 11
March.....					1,538 01	76 20	1,614 21	788 28
April.....	\$701 23	\$79 16	\$780 49	\$512 68	1,623 70	32 14	1,655 84	815 33
May.....	679 18	260 79	939 97	595 10	1,615 81	685 27	2,301 08	912 61
June.....	593 31	177 51	770 82	502 14	1,215 88	56 06	1,271 88	883 71
July.....	716 40	137 17	853 57	516 50	1,663 97	236 03	1,900 00	880 82
August.....	788 24	99 72	887 96	534 92	1,074 28	131 06	1,205 28	764 50
September.....	792 38	98 74	891 72	468 97	984 31	56 00	1,019 31	1,315 41
October.....	473 30	165 74	639 04	546 70	499 27	25 00	524 29	748 16
November.....	408 94	136 52	544 45	525 55	514 54	404 40	918 94	779 59
December.....	555 87	167 02	722 89	830 94				
	\$5,709 55	\$1,321 37	\$7,030 92	\$4,973 50	\$12,439 86	\$1,701 10	\$14,140 98	\$8,874 11