



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.

# ANNUAL REPORT

OF THE

# BUREAU OF SURVEYS,

For the Year Ending December 31st, 1889,

AND

## THIRD ANNUAL MESSAGE

OF

## EDWIN H. FITLER,

Mayor of the City of Philadelphia,

WITH

## ANNUAL REPORT

OF

## LOUIS WAGNER,

Director of the Department of Public Works.

ISSUED BY THE CITY OF PHILADELPHIA.

---

---

1890.

---

---

PHILADELPHIA:

DUNLAP & CLARKE, PRINTERS AND BINDERS, 317-19-21 FILBERT STREET.

1890.

---

**ANNUAL REPORT**

OF THE

**DEPARTMENT OF PUBLIC WORKS,**

FOR THE YEAR 1889.

---

# OFFICERS

OF THE

## Department of Public Works.

---

*Director,*

LOUIS WAGNER.

*Chief Clerk,*

HARRY W. QUICK.

CLERK—WILLIS SHEBLE.

STENOGRAPHER AND CLERK—W. W. ALEXANDER.

STENOGRAPHER—ROBERT M. DOWNING.

TYPEWRITER—HARRY B. LAFFERTY.

MESSENGER—JAMES A. JUNIOR.

*Superintendent of City Ice Boats,*

H. E. MELVILLE.

*Chiefs of Bureaus :*

GAS—WILLIAM K. PARK.

HIGHWAYS—GEORGE A. BULLOCK.

LIGHTING—JOHN J. KIRK.

STREET CLEANING—SYLVESTER H. MARTIN.

SURVEYS—SAMUEL L. SMEDLEY.

WATER—JOHN L. OGDEN.

The operations of the Department were greatly hindered by the unprecedented rainfall, which not only prevented the regular and systematic prosecution of out-door work of all kinds, but also destroyed much of that partially constructed.

The damage to incomplete new structures was exceeded only by the injury done to the streets and sewers in many parts of the city, which were washed out and broken, rendering the former impassable and the latter dangerous to life and property.

These matters are set out in full detail in the reports of the bureaux having charge of this work, and are referred to here merely as a matter of public record.

The officer in charge of the signal corps stationed in Philadelphia, Sergeant T. F. Townsend, submits the following statement of the precipitation in Philadelphia during the year 1889 :

	Number of days on which .01 inch or more rain fell.	Total precipitation.
January .....	11 .....	3.75
February.....	10 .....	2.00
March .....	12 .....	2.58
April .....	14 .....	3.17
May.....	15 .....	4.32
June.....	13 .....	3.39
July.....	17 .....	8.29
August.....	12 .....	7.07
September.....	17 .....	4.66
October.....	13 .....	3.76
November.....	15 .....	6.76
December.....	10 .....	0.85
Total.....	159 .....	50.60

## Yearly average rainfall for Philadelphia :

Signal Office,	1871-89.....	41.30
Pennsylvania Hospital,	1825-88.....	44.58
Central High School,	1852-81.....	45.94

It will be seen that for nearly one-half the year, rain or snow fell in excess of .01 of an inch daily, and that the total fall was 6.02 inches, or nearly 14 per cent., greater than the average from 1825 to 1888, as reported at the Pennsylvania Hospital, and 9.30 inches, over 22 per cent., greater than the average reported by the Signal Office during the years 1871-89.

As a result new work was delayed beyond the time expected, or agreed upon in contracts; much of it had to be repeatedly renewed at a loss to the contractors; whilst the repairing of streets and the rebuilding of sewers took months instead of weeks, and the cost of such repairs was largely in excess of first estimates—in fact, estimates were useless, for when the work of repairs was nearly completed a second or a third or a fourth storm not only carried away the work already done, but extended the breaks almost indefinitely.

The officers and employés in charge of this work should be highly commended for the faithful manner in which they met the unexpected calls for their time and labor, for they worked during all hours of the day and night, often at great personal risk of death or injury, to repair the damage done by the elements, and to this statement should be added the only other pleasing recollection of this season of disaster, that but a single fatal accident occurred.

It is hoped that a similar year of storms will never again visit our city.

The regular work of the Director's office, incident to the current business and to the extensions planned and prosecuted during the year, was largely increased by the washouts and storms before referred to, and this unexpected work was promptly met by the clerks and employés in the most satisfactory manner.

Under an ordinance approved March 29, 1887, the Bureau of Surveys was authorized to revise the lines and grades of the city plans along the Philadelphia and Trenton Railroad, from Tacony street to Pennypack creek, in the Twenty-third Ward, so that all grade crossings on the line of that railroad would be removed. These plans have just been completed and the officers of the Pennsylvania Railroad Company, lessees, have approved the same and agreed to make the necessary change at their sole cost and expense, except for land damages, constructing all overhead or undergrade bridges, and all other work incident to these changes. When work under this agreement has been completed there will remain but one or two other grade crossings on the line of this railroad, between their station at Broad and Market streets and the City line, and these will no doubt have the attention of Councils and of the Railroad Company at an early day.

The total length of main sewers on the first day of January, 1887, was 56.27 miles, and of branch sewers 221.02 miles. During 1887, 1888, and 1889, the Bureau of Surveys constructed 10.25 miles of main, and 80.29 miles of branch, sewers. Not only have we built during the past three years nearly 16 per cent. of all the main sewers, and over 26 per cent. of all the branch sewers constructed since the building of the first sewer, but it is undeniable that with the practical business methods in force, the material and work now being put into sewers are of a character to justify the belief that they will not break as frequently as those heretofore constructed.

The Intercepting sewer, built for the purpose of carrying below the Fairmount Dam the sewage that formerly flowed into the Schuylkill river and mixed with the drinking water of the city, is accomplishing the work for which it is intended. Already twenty-nine factories, giving employment to 10,000 persons, and 328 other buildings have been connected, and nearly all the parties notified have taken out permits.

Five new bridges were begun during the past year, one of which was the much needed structure across the Schuylkill

river on the line of Walnut street. Four bridges were finished, three were authorized, and two more were planned.

Three years ago the storage capacity of our reservoirs was 195,000,000 gallons of water, equal only to two days supply; on the first of January last, this capacity had been increased to nearly 900,000,000 gallons, nearly eight days supply—a very satisfactory increase.

The clearness and purity of the water now distributed to a very large portion of our city proves conclusively the correctness of the policy of subsidence, and the work of building storage reservoirs should be continued until their capacity is at least doubled.

The most pressing needs of the Bureau of Water are four large reservoirs, larger distributing mains in many sections of the city for the purpose of supplying the older portions with subsided water and of giving water to the thousands of new buildings annually erected, and new pumping engines at several of the stations.

Having had interviews with many scientific men of our country respecting a purer supply of water for our city, and having given this important subject much consideration, I have reached the conclusion that any attempt at filtration upon a scale large enough to purify by that method the enormous quantity of water used is at present impracticable, and the condition of our finances for many years to come will not warrant the adoption of any of the many proposed schemes of bringing our water supply from the Delaware river, the Perkiomen, or from Lake Erie, or of any extended filtration, and all that can be done at present for a supply of purer water consists in the immediate increase of our subsiding and distributing capacity.

When in the future the water we use is brought from other sources than our present supply, it will be necessary to have storage basins, and those now constructed will be required in connection with any plan that may be hereafter adopted, and as the purification of the water by subsidence is rapid and cer-



### *Bureau of Highways.*

The report of the Chief of this Bureau shows in detail the great extent and variety of the work done on the highways and upon the bridges of the city during the past year. The actual expenditures of the year were but \$171,784.60 greater than in 1888, but the amount of work done, both new and in the way of repairs, is very much greater than these figures would indicate.

The extent of streets repaved, or newly paved with improved pavement, is 42 miles 1788.5 feet. About two-thirds of this work is first paving. In 1888 it was 28 miles 4377.11 feet, and in 1887 it was 10 miles 1039.13 feet.

The grading of streets required the handling of 323,076 cubic yards of earth, fifty per cent. more than in the previous year. 46,069 square yards of new sidewalks were laid. All this shows the rapid growth of our city, and the consequent opening of new streets.

The figures relating to the general repairs and maintenance of our highways are equally instructive, and give gratifying evidence of active work, resulting in much needed improvement of the streets. Very much more money must be expended, however, before we shall be able to boast of well paved and well kept thoroughfares in all parts of our city.

The following tables give comparative statements, in detail, of the work done during 1887, 1888 and 1889, of the paving of new streets, of the repaving of old streets, and of the receipts and expenditures of the Bureau of Highways.

*Comparative Statement of Work Done.*

	1887.	1888.	1889.	
New paving.....	45,170.13	150,750.13	192,965.5	Linear feet.
Macadamizing (new).....	8,669.00	1,466.98	30,583.00	" "
Grading.....	133,450.00	213,476.71	323,076.00	Cubic yards
New footway paving.....		28,166.8	46,069.00	Square yards.
Repairs to paved streets.....	535,703.13	573,718.64	506,786.00	" "
Footways repaved.....	3,537.42	7,978.91	15,756.96	" "
Ditches repaved.....	9,120.00	26,234.00	32,258.00	
Gutter stone laid.....	11,860.00	15,295.00	11,175.00	Linear feet.
Crossing stone laid.....	20,919.78	35,583.00	40,043.00	" "
Tramway stone laid.....	2,880.56	106.00	97.00	" "
Curbstone reset.....	7,501.00	162,793.00	283,809.00	" "
Wooden trunks.....	1,981.00	4,337.5	5,555.00	" "
Brick and stone drains.....	578.5	467.00	883.05	" "
Gutters paved.....	7,809.00	750.00	693.00	" "
Hand railings.....		1,193.00	2,776.00	" "
Broken stone used.....	8,114.64	11,649.04	23,054.14	Cubic yards.
Macadamizing (resurfaced).....		19,083.02	55,797.00	Linear feet.
Footway, curb, and railroad notices served.....	5,057.00	9,124.00	14,073.00	
Block gutters.....		1,466.98		" "

*Summary of work done in Improved Pavements. New streets.*

	1887.		1888.		1889.	
	Square yards.	Linear feet.	Square yards.	Linear feet.	Square yards.	Linear feet.
Granite blocks.	54,398.08	18,633.00	106,232.23	65,852.61	163,022.30	57,609.00
Sheet asphalt.			16,431.28	5,511.76	15,577.36	5,077.00
Vitrified brick.	8,041.00	2,841.00	75,601.00	22,542.00	88,793.48	26,986.00
Asphalt blocks.	1,587.00	1,054.00	31,464.00	16,629.00	42,779.00	24,653.00
Macadamizing	22,666.00	8,669.00	4,229.96	1,466.98	58,856.00	30,583.00
Slag blocks.					2,146.00	938.00
Total.....	86,692.08	*31,287.00	326,958.47	†112,002.35	371,171.14	†144,946.00

*Replacing Cobblestone with Improved Pavements. Old streets.*

	1887.		1888.		1889.	
	Square yards.	Linear feet.	Square yards.	Linear feet.	Square yards.	Linear feet.
Granite blocks.	29,396.86	10,596.00	65,780.85	24,689.36	127,531.37	56,373.00
Sheet asphalt.	33,813.72	10,971.83	44,354.90	13,365.40	81,848.99	21,729.5
Vitrified brick.	4,000.00	1,044.30	3,274.6	2,160.00		
Total.....	67,210.58	*22,552.13	118,410.44	†40,214.76	209,380.36	†78,602.5

\* 1887. Total amount of new paving 53,839.13 linear feet, equal to 10 miles, 1,039.13 linear feet.

† 1888. Total amount of new paving 152,217.11 linear feet, equal to 28 miles, 4,377.11 linear feet.

‡ 1889. Total amount of new paving 223,548.5 linear feet, equal to 42 miles, 1,783.5 linear feet.

*Comparative Statement of Receipts.*

Year.	Receipts.	Increase.
1887.....	\$56,472 82	
1888.....	58,544 93	\$2,072 11
1889.....	70,203 53	11,658 60

*Comparative Statement of Expenditures.*

	1887.	1888.	1889.
Current Expenses.....	*\$611,725 13	\$857,695 71	\$377,290 26
For Extensions.....	399,336 81	537,744 91	690,063 69
Total.....	\$1,011,061 94	\$895,440 62	\$1,067,353 95

\* For street cleaning, \$314,672.69.

The Superintendent of Bridges reports general repairs to 42 of the 231 bridges belonging to the city, at a cost of \$26,823.49, and estimates that similar work during next year will cost about \$30,000. He also repeats the recommendation for rebuilding the bridge over the Philadelphia and Reading Railroad on the line of Girard avenue, near Thirtieth street, which is and has been for some years past in a hazardous condition, being now supported on trestles erected by the Railroad Company. To rebuild this bridge with plate girders and buckle plates at its present length would cost about \$16,000; to rebuild it to accommodate additional tracks needed for the railroad would increase this sum to \$60,000. Early action by Councils in this matter is of the utmost importance.

The License Clerk reports that the collections, by the Receiver of Taxes, for licenses issued by him, amounted to \$70,203.53, 20 per cent. more than in 1888, and 42 per cent. more than the average since 1876.

Of the amount appropriated for repaving with improved pavement streets occupied by Passenger Railway Companies, \$196,106.80 was expended in paving with Belgian blocks  $6\frac{2}{3}$  miles of streets, and the bills for the work have been sent to the City Solicitor for collection.

The streets repaved are reported in detail by the Chief of the Bureau; they are all in the business part of the city, and were selected, first, because of their bad condition; second, with a view to secure continuous stretches of good pavement by repaving adjoining and contiguous streets; and lastly to

make a distribution of the cost of the work amongst the several companies, based upon mileage of road, so that the legal question involved would affect all companies alike, and that the repayment of the sums expended would not become a hardship financially upon any one corporation.

The appearance of the streets repaved, their increased adaptability for heavy traffic, their greater comfort to those using them, whether in vehicles or as pedestrians, and the facility with which the new pavement is kept clean, speak volumes in advocacy of the continuance of this work, and with the appropriation for 1890, equally satisfactory results should be reached.

It is, of course, impossible to predict the outcome of the suits brought to recover for the city the amount expended during the past year, or the possible time when final decisions will be reached. As they affect not only the liability of the companies for the large sums already expended, but also their still greater liability to repave with improved pavement all the streets occupied by their tracks, the claim of the city will be strongly contested, and only the decision of the Supreme Court will be a final settlement of this vexed question.

If this decision is in favor of the city's claim, the companies will repay the money, which can be again used for highway work, and if adverse to the city, the city's money will have been expended for much needed work for which the city was liable; and during all this time of legal contention, the streets repaved are a comfort to the people using them, and an evidence of civilized government and not the disgrace they were in their ancient cobble stone condition.

Under the appropriation for replacing, with an improved pavement, the cobble-stones on streets not occupied by passenger railway tracks,  $2\frac{1}{2}$  miles were paved with Belgian blocks and  $3\frac{1}{2}$  miles with sheet asphalt; total,  $6\frac{1}{2}$  miles at a cost of \$285,442.61. The streets repaved are reported in detail by the Chief of the Bureau. The work was done on streets designated by Ordinance of Councils, which was prepared by

the Committee on Highways after conference with the Department for the purpose of selecting the streets, with a view to more continuous work and to remedy the difficulties incident to the manner in which work of this character had theretofore been ordered. The results are satisfactory and have been greatly commended by citizens as well as by city officials.

The paving and repaving of streets with sheet asphalt has had much consideration, officially and otherwise, during the past year, and Councils should consider whether it would not be wise, as well as profitable, for Philadelphia to avail herself of the experience of cities having done more paving of this character. This would no doubt result in a modification of the regulations established for this class of work by the ordinance passed in 1885, since which time great changes and improvements have been made in this class of work.

In addition to the large increase of work, because of the very liberal appropriation, for maintenance and for new work in 1889, the operations of private corporations of all kinds in building structures of all sorts and for all sorts of purposes, under and upon our highways, have added to the labors and anxiety of the officers of this Bureau.

It sometimes seemed as if it were a matter of deliberation to wait for the final completion of a piece of new pavement, and then to make application for some sort of underground structure or connection, and much ill feeling has been engendered by the very positive and very proper refusal of such permits except in cases of serious emergency.

It is a rule of the Department that notice be served upon all owners or occupiers of property interested, to make all necessary connections with sewers, pipes and conduits before any new paving is commenced, and if it is a hardship to do without such connections, except at the expense of the condition of a newly paved street, the sufferers need blame only themselves.

The washout of roads and streets and the breaking of sewers by the frequent and unprecedentedly heavy rainfalls of the

past year, caused much labor and expense to the Bureau of Highways. It was practically impossible to keep the country roads in even passable condition of repair, whilst the damage done and threatened by the sewer breaks caused serious alarm.

The repairs to what is known as the "Cohocksink" sewer had been commenced at Germantown avenue and Second street, and at Thompson and Third streets by the Bureau of Surveys when the floods began, and the work done there will be reported upon by that Bureau. The repairs of the breaks elsewhere were made by the Bureau of Highways.

It had been impossible, except in the First and Fifth Highway Districts, to make annual contracts for sewer repairs unless at prices deemed excessive, and when the general breaks came it was necessary to make the repairs by days' work.

The most serious of these breaks were in the sewer on Parrish street between Twenty-fifth and Twenty-seventh streets, on Twenty-seventh street from Parrish street to Brown street, and on Brown street from Twenty-seventh street to Twenty-eighth street. This sewer, known as the "Brown street extension of the Pennsylvania avenue sewer," was built many years ago, mostly on the surface and in made ground. It was not covered for many years and was finally buried by dumpage of dirt from 25 to 30 feet deep. Because of the extension of streets and the consequent construction of branch sewers it was taxed greatly beyond its capacity, and when the floods came the breaks came also.

The work of repairs was greatly hindered by repeated rain-falls and by consequent new breaks, and it was only by establishing a "pumping station" at Parrish and Twenty-seventh streets, and by running day and night, for several weeks, three pumps with a capacity of 6,000 gallons per minute, which kept the broken portions of the sewer nearly free from water, that it was finally possible to complete the rebuilding of the broken work. The water pumped flowed down Parrish street and Twenty-eighth street, to Brown street and Pennsylvania avenue, into the sewer on the latter street.

The officers of the Bureau of Water rendered invaluable service in the work of repairs.

The total cost of this work was \$53,000.

The Bureau of Surveys is now building a new sewer on Twenty-fifth street, from Parrish street to Pennsylvania avenue, which will it is believed, make a similar disaster impossible.

To secure early and frequent knowledge of the condition of our sewers, plans have been perfected for their systematic inspection under the supervision of the Inspector of Sewer Repairs. These plans contemplate the thorough interior examination of all sewers over three feet in diameter at least once in three months, and it is believed that this will lead to the discovery and prompt repair of weak and dangerous places, and result in the saving of much money to the city.

The question of the kind of pavement best adapted for the highways of a city like ours, which has within its 129 square miles of territory streets used for the heaviest business traffic, thoroughfares which should be adapted to driving for pleasure in light carriages, and roads used only for farm purposes, is one of serious concern.

Under the laws governing this matter the first cost only can be charged against the property abutting on the streets to be paved, and the future maintenance of these streets must be defrayed out of general taxation. As a result, the average property owner is always anxious for a first pavement that costs little, because he must pay for it, not caring for the fact that cheap pavements soon wear out and become a source of endless annoyance and expense. When repairs or repaving become necessary, the same average property owner will be satisfied with nothing less than the best, no matter at what price, and whilst doing both these things he imagines that his course is one of good financiering, when, in fact, the first saving causes increased expense to all tax-payers, himself included, in the form of continued, but always unsatisfactory, repairs.



The question becomes still more complicated because of the decisions of the Supreme Court, that no charge for paving of streets can be made against properties in those portions of the city not assessed for taxation at "full city rates," and as a result, in many portions of the city, people have all the advantages of city conveniences and improvements except paved streets, and not these latter, only because they cannot be compelled under the law to pay for them, for the reason that they pay one-third or one-half less taxes than other properties; and then, of course, they complain of the wretched condition of their streets for which they only are responsible. Surely some remedy for this anomalous condition of affairs should be found.

In view of all this, and because of the persistent pressure, on the part of the property owners, for a street pavement that does not cost them much, and of the continued introduction of all sorts of materials which experience elsewhere, or common judgment anywhere, has condemned, or should condemn, as unfit for the making of good and durable roads, would it not be well for Councils to consider, in their many ordinances directing the paving and repaving of streets, the question whether, in a few years, our streets will not be in the same deplorable condition as now, notwithstanding the large amounts of money spent, for what inventors and manufacturers of paving material are pleased to call "improved" pavements.

All writers upon this subject agree that a pavement of stone blocks, such as is known in our city as "Belgian" block pavement, laid upon a proper foundation and not disturbed, except as public travel may disturb it, is the best for the purposes of a large city.

During the past few years paving with sheet asphalt has been introduced, with satisfactory results in this country and abroad, and when such a pavement is laid upon a proper concrete or broken stone base, with the asphalt covering of good quality well laid, it furnishes a surface adapted to light driving, easily kept clean and which does not rapidly wear out.

The pavement next most popular in our city is of a material called "vitrified brick" which, we are told, shows great wearing qualities in cities in the west. The Chief of the Bureau of Highways reports that "the first pavement of this material was put down in this city in 1887, and already shows signs of wear that does not give much promise of its lasting qualities." This report, unfortunately for this class of pavement, is founded upon fact.

What is generally known as "asphalt" blocks, composed of a mixture of bituminous materials such as tar and pitch, and sand and gravel, pressed by heavy machinery into bricks about twice the size of the ordinary brick, was formerly largely used in paving our streets, and it continues to be used to some extent under what is called "contracts for paving private streets" by the owners of properties fronting upon said streets. The results have been uniformly so unsatisfactory that the use of this pavement should be prohibited.

Macadam, or Telford pavement should be laid only in the country districts, and not where it is expected to be the permanent pavement. It is always muddy in wet weather, and dusty in dry weather, and, unless it is regularly and carefully sprinkled and rolled, it wears out more rapidly than any other kind of pavement.

"Slag" blocks, which are made of the refuse of iron furnaces, run in its fluid state into brick moulds, and with which 2,146 square yards of pavement were laid last year, have not been in use long enough to test their wearing qualities. Their condition after even the short time in which they have been used, does not give promise of durability.

The different kinds of pavement, considering all the purposes for which pavements are laid in populous business communities, in connection with their first cost and subsequent expense for maintenance, should be classified as follows :

*First*, "Belgian" block of good granite.

*Second*, Sheet asphalt.

*Third*, "Vitrified brick."

*Fourth*, "Asphalt" blocks.

*Fifth*, Macadam or Telford.

Not sufficiently tested: "Slag" block.

No pavements of classes 4 and 5 should be laid in our city at all, and of class 3 only where it is certain that little driving will be done over the streets so paved, and then the joints in the paving should be filled with pitch or paving cement.

### *Board of Highway Supervisors.*

The transactions of this Board and of its employees are fully set out in the reports of the secretary and of the chief draughtsman.

The increased receipts and the number of permits authorized issued show the continued disturbance of our highways, and the outlook for a cessation of such work at an early date is very unpromising.

Underground companies are being organized and are asking Councils for privileges which will, if granted, continue indefinitely the tearing up of street pavements and the interference with the transaction of business by the general public.

In addition to the money expended by the city to make good the damage done, these private companies come into direct competition with the interests of the city in the consumption of gas, and some sufficient return should be exacted for the valuable privileges granted them.

The following is a statement of the number of permits authorized to be issued to the several underground companies during the year 1889:

Penn Electric Light Company .....	22
Edison Electric Light Company.....	2
Frankford Avenue Merchants' Electric Light Company.....	15
Front Street Merchants' Electric Light Company.....	13
American Telegraph and Telephone Company.....	19
Bell Telephone Company.....	36
<b>Total.....</b>	<b>107</b>

Why should not the companies which have received or shall hereafter receive the right to occupy the city's streets with their wires, whether overhead or underground, be required to light these streets free of cost? If the company furnishes arc lights, one such light should be maintained at each street intersection, and additional lights at distances not more than 200 feet apart; and if incandescent lights are furnished, a light of not less than twenty candle power should be placed in every lamp-post erected. If the company only owns the conduits and rents them to companies furnishing power for lights, these latter companies should furnish the lights.

At present the city receives no adequate return for the opportunities afforded these corporations to make profits at the expense and to the injury of the city's property.

The recommendation of the executive officers of the Board for an increase in the staff of draughtsmen is worthy of favorable consideration. The year's receipts for work done for parties desiring plans for structures to be built under permission of the Board exceed the expenditures by \$987, very nearly double the profits for the year 1888.

The plans made of underground works, especially in the older portions of our city, are extremely valuable. When pipes were laid and sewers built many years ago the importance of records of the work done was not realized as it is at the present time, and the important information now being gathered should be plotted as rapidly as it is secured.

The appropriation already made is insufficient to employ additional help, and the expenditure of the present income in the employment of competent assistants should be authorized.

The following is a summary of the transactions of the Board, of the labors of the draughting department and of the receipts and expenditures for the years 1887, 1888 and 1889:

*Transactions of the Board of Highway Supervisors.*

	1887.	1888.	1889.
Permits authorized to be issued for vaults.....	8	8	9
Permits authorized to be issued for railroad tracks, curves and turnouts.....	27	10	51
Permits authorized to be issued for underground pipes.....	2	3	7
Permits authorized to be issued for electrical conduits.....	46	108	107

*Work done by the Draughtsmen of the Board of Highway Supervisors.*

	1887.	1888.	1889.
Street record plans corrected.....	32	38	32
New street record plans prepared.....	49	65	39
Blue print plans placed on file.....	90	110	190

*Receipts and Expenditures.*

	* 1887.	1888.	1889.
Receipts.....		\$2,811 00	\$3,837 00
Expenditures.....		2,349 89	2,920 00
Profit to the city.....		\$461 11	\$917 00

\* No receipts in 1887. Remunerative work not done until 1888.

*Bureau of Street Cleaning.*

This Bureau continued during 1889 the good work so satisfactorily done in the previous year. The streets are cleaner than they have been for many years past, and the garbage and other offal have been removed promptly. The number of complaints for the non-removal of garbage was 3,237 for nine months in 1887, 1,162 in 1888, and 763 in 1889. The total complaints, of all kinds, has been reduced from 4,539 in 1887, and 3,395 in 1888, to 1,937 in 1889; a gratifying improvement attributable partly to the prompt enforcements of the penalties named in the contracts, but still more to a conscientious endeavor for honest service by the contractors, who, with a single exception, and that exception relating only to the non-collection of garbage, did their work well.

The very large amount of repaving of streets with improved pavement, the laying of gas and water pipes, the building of sewers; and the construction of conduits for telegraph, telephone, and electric wires, together with the erection of nearly 12,000 new buildings, has rendered the work of keeping the streets clean more difficult than usual.

The expenditures for salaries remain as during the preceding year, whilst the actual expenditures for cleaning, etc., was \$422,147.00—\$10,169.58 less than during the year 1888, notwithstanding the fact that the territory within which the streets should be cleaned at least daily was largely increased.

The number of squares cleaned has increased from 320,455 in 1888, to 473,829 in 1889, but the number of loads of dirt and offal of all kinds removed has decreased from 894,861 in 1888, to 729,796 in 1889, the result of the many heavy rains which reduced the labors of the street cleaners to the extent noted.

The number of crossings cleaned has decreased from 205,043 in 1888, to 27,161 in 1889, because of the absence of snow and ice during the winter of 1888-89.

The total Work done during the Year 1889, is as follows:

DISTRICTS.	CLEANED.					REMOVED.			Number of Complaints of all kinds.	
	Squares	Inlets.	Crossings.	Market Houses.	Snow from Fire Plugs.	No. of Dead Animals.	NUMBER OF LOADS.			
							Dirt.	Ashes.		Garbage.
First.....	92,295	30,377	5,591	537	.....	982	52,713	72,088	8,222	187
Second.....	96,325	43,547	7,372	553	386	1,980	35,748	68,327	8,280	488
Third.....	73,983	45,170	2,297	1,281	.....	1,717	81,436	72,810	11,863	313
Fourth.....	153,165	41,746	4,526	.....	.....	6,404	169,541	154,457	19,761	452
Fifth.....	58,961	19,924	7,375	.....	.....	410	27,134	45,954	11,467	547
Total.....	473,829	180,764	27,161	2,471	386	11,896	256,572	415,631	59,993	1,937
Total, 1888.....	320,455	195,132	205,043	2,218	2,598	16,355	306,722	499,479	88,660	3,395

*The following is a comparative summary of the expenditures for street cleaning for the years 1887, 1888, and 1889.*

Years.	Amount.	Decrease.	Increase.
1887.....	\$304,021 00		
1888.....	441,514 50		\$137,493 50
1889.....	434,067 00	\$7,447 50	
1890 (appropriation).....	\$444,137 00		

The specifications for 1890 have been modified and improved as was deemed wise by the experience gained by the past year's work ; the territory to be cleaned at least daily has again been increased ; more frequent cleaning of portions of the city not so cleaned is prescribed, and all contracts provide that this work shall be done by machinery.

The required removals of garbage have been increased, and the Department has reason to expect that the Bureau will render satisfactory service to the public during the year 1890.

The appropriations for the ensuing year are :

For salaries.....	\$11,920 00
For cleaning, etc.....	432,217 00
Total.....	<u>\$444,137 00</u>

Tabular statements of work done in 1889, and the specifications under which the work is to be done during 1890, are printed with the report of the Chief of the Bureau.

#### *Bureau of Surveys.*

This Bureau built more lineal feet of branch and of main sewers during the year 1889 than in any previous year, and the sum of money expended for the work by the city, and by the property owners through assessment bills, was greater than



in any one year, except for branch sewers in 1888, and for main sewers in 1876. The following is a summary of the work :

YEARS.	BRANCH SEWERS.		MAIN SEWERS.	
	Feet.	Cost.	Feet.	Cost.
1876 .....	43,560	\$199,336 99	9,714	\$491,365 94
1887 .....	101,999	235,674 01	13,750	235,753 16
1888 .....	159,890	498,553 95	14,705	215,920 42
1889 .....	162,037	432,414 91	25,640	348,206 49

YEARS.	BRANCH SEWERS.		MAIN SEWERS.	
	Miles.	Cost.	Miles.	Cost.
Total sewers built to 1890.....	301.31	\$3,755,163 67	66.59	\$4,301,371 50
Built in 1887, 1888, and 1889...	80.29	1,186,642 87	10.25	799,880 01

or over 26 per cent. of all the branch sewers, and nearly 16 per cent. of all the main sewers in the city.

Work of greater or less extent, as the appropriation made by Councils for the purpose permitted, was done upon the following main sewers, but only the sewer on Lombard street, from Ninth street to Thirteenth street and on Thirteenth street to South street, was finished to the full extent of the work needed and planned.

#### LIST OF SEWERS ON WHICH WORK WAS DONE DURING THE YEAR 1889.

Allegheny avenue, from Seventeenth street to west of Twenty-third street.

Bainbridge street, west to Port Warden's line on the Schuylkill river.

Bridge street, from east of Pennsylvania Railroad west to Torresdale avenue.

Clearfield street, from Ninth street west to the Connecting Railroad.

Gunner's Run, northwest from D and Rosehill streets.

Lombard street, from Ninth street to Thirteenth street; and on Thirteenth street, from Lombard street to South street.

Reed street, from the Schuylkill River East Side Railroad east to Patton street.

Somerset street, from the foot of Williams street, through the Richmond coal wharves, west to Spring street.

Seventeenth street, from Clearfield street to Allegheny avenue.

Tasker street, from the River Delaware to Front street.

Tasker street, from Front street to west of Fifth street.

Twenty-fourth street, north from Clarence to above Lehigh avenue.

Twenty-fifth street, from Pennsylvania avenue to Parrish street.

Washington street, in the Twenty-third Ward.

Wingohocking sewer, in the Twenty-second Ward.

All of these, and many others not yet begun, are of vital importance to the health and cleanliness of our city, and large appropriations are desirable for their immediate extension and speedy completion.

In addition to completing the contracts for work on the above sewers, the following contracts, all of them for the extension of main sewers heretofore partly built, except the one on Norris street and on Susquehanna avenue, are authorized and some of them executed. Work under many of them is begun, and it is expected that all will be finished during the year 1890:

Clearfield street, from Thirteenth street east to the Connecting Railroad.

Norris street, from Ninth street east to Susquehanna avenue (three contracts).

East Susquehanna avenue, from East Norris street to the Delaware river (two contracts).

Somerset street, from Spring street west to the Aramingo canal.

Wingohocking sewer, eastward from Penn street, Twenty-second Ward.

Extensions of the connections of the intercepting sewer, in the Twenty-first Ward.

The above exhaust the appropriation made for this class of work, and the many other pressing demands for main sewers elsewhere must be held in abeyance until additional funds are placed at our disposal.

The early passage of the ordinance authorizing the expenditure of the amount set apart in the annual appropriation for main sewers, enabled this Bureau to begin operations in the spring, and most of the work was done during that season of the year in which the weather was favorable for operations of this kind. The work authorized for 1890 is in still greater state of advancement, the distribution of the money having been made in the appropriation ordinance itself.

The building of connections with the Intercepting sewer is being steadily pushed; the amount appropriated and expended during 1889 being \$25,000.

The advantages of this work are becoming more and more apparent, no less than 29 mills, with over 10,000 employés, and 328 other buildings having already made connections with this sewer, as required by law. 629 original notices to make connections have been served, and permits have been taken out by nearly all the parties notified.

The arrest of two men dumping refuse into the river from one of the mills, and of the owner of 27 dwelling houses in the lower part of the Twenty-first Ward, who failed to make connections with the sewer when notified to do so, and the expressed determination to press for the conviction of these and of all others similarly offending, has satisfied the owners of property on the line of the sewer that violations of law in this respect will be no longer tolerated, and as a result

plumbers and bricklayers have been kept busy making the connections ordered.

One hundred and ninety-eight connections were made with the intercepting sewer and 5,075 with other sewers during the year 1889.

Many specific complaints of drainage running over footways into gutters and thence to the nearest inlet, creating nuisances in winter by the accumulation of ice, and in summer by foul stenches, have been made to the Department, and a great many charges of neglect of duty on the part of the officers of the Bureau of Surveys have been made because these nuisances were not abated.

Under the ordinances governing this matter, these officers can only report on the necessity for carrying this waste and foul water by underground drains into the public sewers, but they cannot compel such connections except after the approval of their reports by the Committee on Surveys of City Councils. The details of the present ordinance cause so much delay that it is respectfully suggested that it be amended and the responsibility for the work be placed where it properly belongs.

During the year 297 "gutter" complaints were received and disposed of as follows :

Connections made.....	103
Sent to the City Solicitor for prosecution.....	24
Dismissed.....	11
Held.....	2
Pending.....	157
<b>Total.....</b>	<b>297</b>

The work upon new bridges has been as follows :

Finished.....	4
Begun.....	5
Authorized.....	3
Planned.....	2

Those finished were :

One on Lansdowne avenue over Cobb's creek.

One on Chester avenue across the West Chester Railroad.

One across Sixth street on the line of the Connecting Railroad (all referred to in the report for 1888), and

One across Willow avenue on the line of the Chestnut Hill branch of the Philadelphia and Reading Railroad, in the Twenty-second Ward.

Those begun were :

Three on the line of the Connecting Railroad, across K street, Kensington avenue and Frankford avenue, all of them structures of great importance to the safety of travellers upon both the railroad and upon the streets crossed. They will be finished early in the spring and will cost the city \$85,750. The cost to the railroad company, which is responsible for the completion of the work, for actual construction of bridges and for the consequent changes of grade of tracks and streets, will very largely exceed this sum.

One on Poplar street, across the main line of the Philadelphia and Reading Railroad Company, is being built by the Union Passenger Railway Company to enable its cars to enter Fairmount Park at that point, as well as for general travel, and

One across the River Schuylkill on the line of Walnut street.

Work on this long-discussed and much-desired structure has been begun under plans approved by Councils and with sufficient appropriation to construct the necessary piers.

The river piers, two in the river making three spans, the one in the center 100 feet wide and the two on the east and west of somewhat less width, all of them giving clear passage for navigation of twenty-one feet at mean high tide in their center, and one each on the east and west shores of the river, are under contract to be completed by September next at a cost of \$120,000.

The trestle piers on the line of Walnut street, 111 in number, are under contract to be completed on April 2, 1890, for the sum of \$55,000.

The superstructure will be of iron, and the bridge and approaches will be 3,215 feet long, extending from sixty feet east of Twenty-third street to about 140 feet east of Thirty-third street, and the estimated cost of the whole structure is \$900,000.

No appropriation except for the construction of the piers has been made.

The report of the Chief Engineer and Surveyor gives detailed and interesting descriptions of the work planned, and of its progress under the contracts already made.

Those authorized to be built are :

One on Second street across the Richmond branch of the Philadelphia and Reading Railroad.

One across Twenty-second street on the line of the Connecting Railroad, and

One on Thirty-fourth street across the many tracks of the Pennsylvania Railroad.

When this latter structure is completed the undergrade crossing at Thirty-fifth street will be abandoned, and the railroad company will be able to make important changes in the, at present, very dangerous arrangement of tracks and cross-overs at this point.

The cost of these bridges will be largely in excess of the amounts appropriated by Councils for their construction, but the Pennsylvania Railroad Company has already contracted with the city for the erection of those at Twenty-second street and at Thirty-fourth street, and it is expected that the Philadelphia and Reading Railroad Company will do likewise for the one on the line of Second street.

Those planned are :

One for the cable cars on Columbia avenue near Ninth street, across the tracks of the Philadelphia, Germantown and Norristown Branch of the Philadelphia and Reading Railroad.

One on the line of the Connecting Railroad at Broad street.

The latter is to be a stone structure of four arches, and its erection will add greatly to the appearance of the street and the safety of the crossing. The proposed plans contemplate more headway than is given by the present bridge, and also some important changes of the grades of adjoining streets.

The following is a comparative statement of the operations of this Bureau in the active construction of the work during the years 1887, 1888 and 1889.

*Summary of Bridges, Main, Branch, and Private Sewers, built during the years 1887, 1888, and 1889.*

	1887.		1888.		1889.	
	No.	Linear feet.	No.	Linear feet.	No.	Linear feet.
Bridges.....	9		2		4	
Intercepting sewer (section).....	2		1			
Intercepting sewer connections.....					5	
Wissahickon Valley sewer (section).....	2	17,213.62	2	13,710.28	2	25,640.53
Storm water conduit, Falls Village.....	1					
Main Sewers.....	6		16		15	
Branch sewers.....	130	84,709.00	250	149,765.83	254	151,732.00
Private sewers.....	63	17,290.00	40	10,124.00	51	10,285.00
Total.....	204	*119,212.62	309	†173,600.11	327	‡187,677.53

\* 1887, equal to 22.578 miles. † 1888, equal to 32.879 miles. ‡ 1889, equal to 35.544 miles.

Much of the time the officers of this Bureau, during the latter portion of the year, was taken up in the work of sewer repairs, or rather of sewer reconstruction.

Under the item of appropriation "for the examination and reconstruction of old sewers," contracts had been made for work on the sewer on Willow street, at St. John street and at Eighth street, and for the "Cohocksink" sewer on

Germantown avenue near Second street, and on Thompson street near Third street, with the intention of continuing the work on other portions of these sewers if the amount appropriated would permit.

Work was progressing satisfactorily when the heavy rain-falls, for which the year 1889 will be noted in history, came, destroying the new and literally tearing the old work to pieces, justifying the several reports of the condition of these sewers made to Councils.

The work of repairs was prosecuted with all the despatch possible under such adverse circumstances. It was practically a building of a new sewer on Germantown avenue, from Van Horn street to west of Second street, on Thompson street from east of Third street to Charlotte street, and on Willow street from St. John street to Second street, and on Willow street for several hundred feet east and west of Eighth street.

This work cost over \$75,000, and a large portion of the sum is still unpaid, awaiting an appropriation by Councils for its settlement.

A contract for continuing the repairs on the Cohocksink sewer has been made and work resumed on Thompson street, west of Charlotte street.

The permanent remedy for all these difficulties was named in last year's report: "The building of other main sewers on lines parallel with those already built," so that the old structures might be relieved from the great flow of waters for which they were not originally planned.

This remedy is now being applied for the relief of the "Cohocksink" sewer, by the construction of a large sewer beginning at the foot of Susquehanna avenue (Otis street), thence on Susquehanna avenue to East Norris street, and on Norris street to Ninth street, tapping the old sewer at the latter point. This work is under contract to be finished in 1890 at a cost of \$305,000. It will be a relief to the entire drainage system of the north-eastern part of the city, and in addition to this, will be a great benefit to the people of the old



Kensington and the adjoining districts, by compelling the abandonment of the Kensington Pumping Station of the Bureau of Water.

The building of the large twin sewer through the Richmond coal wharves, from the foot of William street and thence west on Somerset street to Spring street, is rapidly approaching completion. The extension of this sewer to the Aramingo Canal, and to a junction with a sewer built from the west to that point many years ago, will give to the people living in this portion of our city a partial relief from the dangers and nuisances resulting from the present insufficient drainage.

The condition of this whole territory, known as the Aramingo Canal District, demands large and immediate expenditures for the construction of other main sewers emptying direct into the Delaware river, so that the open ditch, dignified with the name of "canal," may be filled up and obliterated, thus removing an ever-present menace to public health and a barrier to public improvement. The sewer on Westmoreland street, at present discharging its foul contents into the open air west of Frankford avenue, should have early attention.

The construction of these sewers would also permit a physical change of grades planned for the improvement of the low lands of this vicinity.

The work of the Registry Bureau, attached to the Bureau of Surveys, has largely increased during the past year, as shown by the following summary of its operations:

	1887.	1888.	1889.
Number of certificates registered owners issued.....	11,175	10,375	8,168
Number issued for use of the law department.....	400	209	337
Receipts from certificates of registered owners.....	\$2,803.25	\$2,617.00	\$2,039.50
Number of original lots plotted.....	9,039	8,503	11,868
Number of transfers registered.....	19,774	19,564	21,370
Number of plans made for use of city departments, bureaus, etc.....		57	157
Number of examinations of registry plan books made by the public.....		18,717	19,547
Number of descriptions of property filed for registry.....	21,944	18,717	22,034
Number of titles perfected.....	1,512	1,665	2,091
Number of certificates of legal opening of streets, issued to bureaus, etc.....	879	2,739	3,465
Number of certificates of registered owners in municipal lien cases for law department.....	526	412	1,383

The Chief Engineer and Surveyor refers fully to these matters, and it is merely necessary to name here, the completion of the records of the legal opening of streets from the year 1695 to date, covering 6,218 entries, and making two large volumes of important information, heretofore obtainable only by long searching of the records of the Court of Quarter Sessions.

The completion of the Index of streets opened, is a work of great advantage to those interested in the transfer of real estate and in building operations.

Reference is also made to the fact that Land Title Companies reduce the receipts of this branch of the Bureau of Surveys, by issuing "certificates of registered owners," making the city's record the basis of their certificates.

The Board of Surveyors is gradually coming under the immediate control of this Department by the appointment of the District Surveyors composing this body, as the terms of those elected by the people expire, or as those elected die or resign.

The First, Fourth, Eighth, Eleventh, and Thirteenth Districts have already been so filled, and the Second, Third, and Sixth Districts will be on April 1st, next. The remaining five

districts will not become vacant by expiration of term of service by election, until April 1, 1891.

The financial results of these changes are of advantage to the city, the fees received and earned in the districts already affected (four during the whole year and one during four months of 1889), exceeding the salaries and expenses, \$14,639.07.

The following statements show the receipts and expenditures by districts for 1889, and also, comparatively, for the years 1887, 1888, and 1889:

	1887.	1888.	1889.
The total receipts of the districts working under the new law were.....	\$5,229 46	\$33,350 99	\$48,480 04
The total expenses were.....	4,290 00	21,504 74	33,840 97
Profit to the city.....	\$939 46	\$10,846 25	\$14,639 07

\* 1887. 1 District.

† 1888. 4 Districts.

‡ 1889. 5 Districts.

# Summary of Receipts and Expenses of District Surveyors paid fixed Salaries.

DISTRICT.	Surveyor.	Cash Receipts.	Credit for work done for the City.	Total Credit.	EXPENSES.			Total.	Balance Profit to the City.	Receipts in 1888.	Increase.
					Salary.	Pay of Assistants.	Miscellaneous.				
First.....	Thomas Daly.....	\$9,710 19	\$698 42	\$10,408 61	\$3,090 00	\$1,856 52	\$1,051 44	\$5,997 96	\$4,509 65	\$8,521 96	\$978 69
Fourth.....	Wm. W. Thayer....	635 58	105 00	740 58	491 66	339 98	77 85	909 49	*		
Eighth.....	C. A. Sundstrom....	4,817 44	2,216 31	7,033 75	3,000 00	2,624 75	1,216 80	6,841 55	192 20		192 20
Eleventh.....	Joseph Johns D....	8,750 01	1,567 01	10,317 02	3,000 00	2,420 00	1,295 56	6,715 56	3,601 46	2,657 42	1,544 04
Thirteenth...	H. M. Fuller.....	18,147 22	1,832 80	19,980 08	3,000 00	7,129 51	3,336 90	13,466 41	6,513 67	5,266 87	1,246 80
		\$42,060 44	\$6,419 00	\$48,480 04	\$12,491 66	\$14,370 76	\$6,978 55	\$33,840 97	\$14,807 98	\$10,846 25	\$3,961 73
									168 91		168 91
									\$14,638 07		\$3,792 82

\* Deficit in Fourth District, September to December, 1889.

The amount and the importance of the work of the Bureau of Surveys can be gathered from the report of the Chief Engineer and Surveyor, of which the foregoing is necessarily a brief extract.

The following comparative summaries of the receipts and expenditures for the years 1887, 1888 and 1889 show that the former have steadily increased, and that the increase in the latter is not so great as the increase in the work for which they were incurred:

*Comparative Statement of Receipts.*

Year.	Receipts of Bureau.	Receipts of District Surveyors.	Total.	Increase.
1887.....	\$22,808 78	\$4,891 46	\$27,700 19	
1888.....	26,236 45	28,350 88	54,587 28	\$26,887 09
1889.....	29,914 32	42,050 44	71,974 76	17,387 48

*Comparative Statement of Expenditures.*

	1887.	1888.	1889.
Current expenses.....	\$63,704 05	\$86,658 23	\$132,289 61
For extensions.....	569,428 11	482,910 70	560,649 36
Total.....	\$633,132 16	\$569,568 93	\$692,938 97

*Bureau of Water.*

In view of the continued agitation of the question of the city's water supply, it is difficult to make an abstract of the many interesting and important facts contained in the report of the Chief of that Bureau.

The points first to be considered are the totals of the work done, of the cost of doing the same and of the income derived by the city through the operation of this branch of her service.

All this is shown in the following comparative summary of the operations for the years 1887, 1888 and 1889: