ONE HUNDRED AND SEVENTH ANNUAL REPORT

OF THE

BUREAU OF WATER

FOR THE

YEAR ENDING DECEMBER 31, 1908

AND

ANNUAL REPORT

OF

GEORGE R. STEARNS

Director of the Department of Public Works

ISSUED BY THE CITY OF PHILADELPHIA, 1909

PHILADELPHIA
DUNLAP PRINTING CO., 1332-38 CHERRY STREET
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ANNUAL REPORT

OF THE

DEPARTMENT OF PUBLIC WORKS

FOR THE

YEAR ENDING DECEMBER 31, 1908

OFFICERS

OF THE

DEPARTMENT OF PUBLIC WORKS

Director
GEORGE R. STEARNS.

Assistant Director,
WILLIAM R. KNIGHT, JR.

Chief Clerk—Willis Sheble.
Clerk— Ernest T. Hanefeld.
Assistant Clerk—Andrew L. Teamer.
Stenographer and Clerk—Harry A. Stoy.
Stenographer and Typewriter—Joseph B. Smarr.
Special Inspector—Elvin S. Rodgers.
General Inspector—Robert C. Hicks.
Official Photographer—Lewis R. Snow.
Assistant Official Photographer—William Shane.
Chauffeur—Edward P. Van Deusen.
Chauffeur—Thomas McKeever.
Office Boy—Archibald Frederick.
Messenger—J. Jarriatte Johnsonton.

CHIEFS OF BUREAUS.

Gas—Dr. N. Wiley Thomas.
Highways—Street Cleaning—William R. Benson.
Lighting—John J. Kirk.
Surveys—George S. Webster.
Water—Filtration—Fred. C. Dunlap.

C WORKS DURING THE YEAR 1908,

RAWN. Total.	Balance Available for 1909.	Amount merging.	Receipts.	Number of Employes Dec. 3 1908.
$41,350 93	----------	$529 07	----------	15
10,000 00	----------	----------	$38 00	6
5,312,584 26	$3,403,601 70	6,665 91	79,961 72	213
----------	----------	----------	8,736 87	12
432,680 41	----------	334 59	----------	7
2,884,676 45	4,858,273 82	1,013 44	36,216 56	332
----------	----------	----------	151,159 36	14
4,161,091 40	1,443,956 40	7,347 58	4,233,045 49	2,057
$12,842,383 45	$9,700,831 92	$15,890 59	$4,509,158 00	2,657
$9,813,093 49	$7,552,017 64	$69,141 84	$1,403,929 86	2,754

the expenditures of Bureau of Surveys.

TWENTY-SECOND ANNUAL REPORT

OF THE

DEPARTMENT OF PUBLIC WORKS

GEORGE R. STEARNS, Director

Philadelphia, January 2, 1909.

HON. JOHN E. REYBURN,
Mayor of Philadelphia.

In accordance with the provisions of the Act of Assembly, approved June 1, 1885, I have the honor to submit herewith the report of the operations of the Department of Public Works for the year ending December 31, 1908—the Twenty-second Annual Report.

The details of operation may be found in the reports of the Chiefs of the several Bureaus of the Department, which are attached hereto.

Appropriations and Expenditures

The total amount of money available during the year was $22,559,105.96, of which $16,821,113.74 was obtained from loans and $5,737,992.22 from direct taxation. There was expended during the year $12,842,383.45, of which $5,304,058.39 was for current expenses and $7,538,325.06 for permanent improvements and extensions. The total receipts were $1,509,158.00— an excess over the previous year of $105,228.14.

Bureau of Gas.

This Bureau continued to render the same satisfactory service as in former years, and the City's interests are

closely watched by a force of trained and intelligent inspectors.

Complaints. The complaints against the service rendered by the United Gas Improvement Company are comparatively few, but each complaint is promptly and thoroughly investigated and the proper remedy applied.

Photometrical Tests. During the year, daily photometrical tests were made of the gas furnished at the Gas Testing Stations, with the following results:

Month	Candle Power
January	22.55
February	22.58
March	22.68
April	22.69
May	22.85
June	22.74
July	22.72
August	22.72
September	22.72
October	22.62
November	22.70
December	22.48
Maximum monthly average	22.85
Minimum monthly average	22.48

Chemical Tests. The chemical tests for impurities, such as sulphuretted hydrogen, tarry matter, etc., resulted as follows:

Carbon dioxide	2.50%
Illuminants	10.10
Oxygen	1.00
Hydrogen	35.50
Carbon monoxide	25.10
Methane	23.10
Nitrogen	2.70
	100.00%

Bureau of Lighting.

The appropriation to this Bureau during 1908 was $433,015.00, of which $432,680,41 was expended and the balance, $334.00 merged and reverted into the City Treasury.

Lamps Maintained.

The following table shows the total number of lamps maintained and under the supervision of the Bureau during 1908; also, statement of expenditures:

	1907.		1908.	
	Number of Lamps.	Cost during the year.	Number of Lamps.	Cost during the year.
Gas lamps maintained by the United Gas Improvement Company	22,343		22,913	
Gasoline lamps	14,432	$380,053 25	16,017	$420,806 81
Gas lamps supplied by the Northern Liberties Gas Company	73	1,474 56	73	1,474 56
Gas lamps maintained by the Bureau of Correction	231		231	
Salaries and office expenses		10,267 38		10,399 04
Total	37,079	$391,795 19	39,234	$432,680 41

	1907.	1908.
Of the gas lamps maintained by the United Gas Improvement Company there were not lighted, because of their proximity to electric lights	121	121
Of the gas lamps maintained by the Department of Charities and Correction there were not lighted, because of their proximity to electric lights	108	108
	229	229

Annual Allotment of Gas Lamps.

I would again call your attention to the fact that the three hundred new lamps which the United Gas Improvement Company is required to erect annually under the terms of the lease of the Philadelphia Gas Works, is totally insufficient to light the newly laid out streets upon which operative builders are erecting houses. During the past year this condition became so tense, that arrangements had to be made with the United Gas Improvement Company to erect the three hundred lamps for 1909, practically one year in advance of what said Company was required. This partly helped the Bureau out of its embarrassment, but it was not until Councils had passed a resolution authorizing the Director of the Department of Public Works to locate gasoline lamps in the outlying sections of the City where he may deem necessary, in streets where gas mains have been laid, that the difficulty was overcome. Under this resolution, five hundred and sixty-six gasoline lamps were erected.

Contract for Gasoline Lamps.

On November 11, 1908, proposals were received for furnishing and lighting naphtha lamps of 60 candle power, for the year 1909, and the contract again awarded to the Welsbach Street Lighting Company, at the same price as charged during 1908, viz.: $29.00 per lamp per year, and for furnishing all additional posts, $9.50 per post. The work perfomed by this company during the past year has been extremely satisfactory and efficient, the complaints from their service being few and far between.

Bureau of Surveys.

General.

The expenditures of the Bureau of Surveys during the year 1908, were $2,884,676.45, of which $318,656.19 were for current expenses and $2,566,020.26 for improvements and extensions. The total receipts were $187,375.92, an increase over 1907 of $18,965.85.

Sewers.

There was available for main sewers $805,500.00, which enabled the Department to proceed with a large quantity of work in the way of providing proper drainage facilities in different sections of the City in process of development by real estate operators.

There were constructed during the year, 22.120 miles of branch sewers, at a cost of $608,017.35. This expenditure included the construction of inlets, curved curbing, laterals, manholes, etc., at a cost of $15,000.00; also, the reconstruction of inlets at a cost of $13,000.00.

The total length of all sewers constructed during 1908, was 35.432 miles, divided as follows:

Main sewers	5.623 miles
Branch sewers	22.120
Private sewers	5.630
Market Street Subway sewers	403
Grade crossing sewers	1,656
	35.432 Miles

The total length of all sewers built to January 1, 1909, is as follows:

Main sewers	177.619 miles
Branch sewers	832.853
Boulevard (branch) sewers	4,388
Private sewers	122.011
Market Street Subway sewers	4.414
Grade crossing sewers	1.955
	1,143,240 miles

All the sewers have been subject to strict inspection during construction, both as to workmanship and character of materials used and the requirements of the specifications of each contract have been rigidly adhered to in every particular.

The wisdom of making liberal appropriations for the construction of sewers cannot be too forcibly impressed

upon Councils, as for every dollar expended the City derives a return in the way of increased taxation due to the development of new territory.

Drainage, South Philadelphia.

Satisfactory progress has been made in the matter of providing drainage facilities for the Southern section of the City, but much work remains to be done; as, in the near future, that portion of the City composed mostly of low lands, lying south of Oregon avenue and between the Delaware and Schuylkill rivers, is bound to expand, particularly in view of the construction of the Southern Boulevard on the line of Broad street, and the intention of this administration to improve the river embankments in the Southern section of the City.

In order to keep pace with these improvements, sewers must be started at the rivers. These are costly operations and liberal appropriations should be provided for several years before they can be completed and be of practical benefit in the development of the territory.

As noted in my last annual report, one of the most important of these sewers it is proposed to construct is in Shunk street, from Front to Broad street, which, when completed, will give relief to a large growing territory.

Intercepting Sewer Systems.

The work on the intercepting sewer systems has been proceeded with vigorously and the work accomplished has done much towards preserving the purity of streams which formerly were polluted by sewage emptying into them, although there are still some miles of stream such as Frankford creek and Cobb's creek, receiving sewage in such large quantities as to make them a menace to the health of the districts through which they flow and for which interceptions are urgently needed.

Extensions, Main Sewer Systems.

The extension of the main sewer systems during the past year has included not only those due to normal

growth, but those contingent on the construction of the Northeast Boulevard, the Market Street Subway and the changes in the system due to the work of abolishing grade crossings.

Bridges.

On January 1, 1908, there were twelve bridges under contract from the previous year, and during 1908, fourteen additional bridges were advertised for and placed under contract. This number does not include the bridges in the course of construction in the elimination of grade crossings on Ninth street and on Trenton avenue, of which nineteen have progressed sufficiently to be in use and remove dangerous railroad crossings from as many streets.

The construction of bridges is of inestimable value and convenience to the public; as, in a number of instances, they not only abolish grade crossings which have heretofore been a menace to life and limb, but they bring into immediate connection, territories which previously had been accessible only by the most circuitous routes.

Walnut Lane Bridge.

The most notable instance of this is the completion of the Walnut Lane Bridge over the Wissahickon creek and valley, which was formally dedicated and turned over to the City on December 16, 1908. The completion of this bridge—a magnificent concrete structure—has opened up a direct route for travel between Germantown and Roxborough and is a splendid testimonial to the officials of the Bureau of Surveys, under whose supervision the bridge was designed and constructed.

Passyunk Avenue Bridge.

Another structure of great importance is the bridge on the line of Passyunk avenue, over the Schuylkill river. This will be a steel bridge of the trunnion-bascule type, with a movable span of two hundred feet. The concrete piers for the central span, built in caissons and extending

to a depth of eighty-five feet below water level, are now approaching completion.

Concrete Bridges.

The use of concrete in many of our recent bridge structures, has had the very desirable effect of practically eliminating maintenance costs on bridges in which this material is used alone; it has given us structures pleasing in outline, monumental in character, a surface texture which under the skilful supervision of the City engineers is scarcely second to dressed stone and a durability that will outlast generations. These results, combined with great economy of construction, unite in making these structures an entire success.

Parks, Etc.

Gratifying results have been accomplished during the year in placing parks and parkways upon the City plan. The total area of parks actually acquired, exclusive of the extensions to Fairmount Park, was 30.48 acres, and 328 acres additional were placed on the City plan for further taking.

Market street Subway.

August 3, 1908, witnessed the opening to traffic of the Market street subway, from City Hall to Front street; and early in September the extension of the service along the elevated structure on Delaware avenue to South street. This Department wishes to commend both the officials of the street railway company and its contractor for the energy displayed and the completion of this difficult piece of engineering work in less time than it was anticipated would be required. With the completion of this overhead and underground railway system, the congested conditions of the surface cars along Market street, as well as travel in general, has been vastly relieved.

It is to be hoped that in the near future, financial conditions may be such as to permit other sections of the City

to enjoy the same facilities for travel, thereby increasing the development of real estate and adding to the wealth and comfort of the community.

Sewage Disposal.

The Act of Assembly approved April 22, 1905, creating the State Department of Health, requires that the City of Philadelphia shall prepare and submit to the State Department of Health by January 1, 1912, a comprehensive plan for the collection, purification and disposal of the sewage for the entire City and that some progress shall be made during each year towards this end.

In order that the Department may be fitted to comply with the requirements of this Act of Assembly, Mr. George S. Webster, Chief Engineer of the Bureau of Surveys and myself, have visited all the important sewage disposal and purification plants in the eastern part of the United States, and during last winter, examined the methods of sewage disposal in the principal cities of England, Germany and France.

We have obtained valuable data and plans in relation to this subject, which will greatly aid us in the formulation of comprehensive plans for the collection, purification and disposal of the City's sewage.

Experimental Testing Stations

The importance of this subject may be easily realized when it is taken into consideration that for more than twenty-five years European cities have expended millions of dollars for experimenting and for complete disposal, and yet the problem is not fully solved. The problem in this City is one which deals with sewage of varied composition and it has been deemed necessary to carry on experiments prior to fixing definitely on any method. To this end an experimental testing station has been established and fitted up with facilities for carrying on a thorough and scientific investigation.

Pollution of Waterways.

Unless some measures are adopted to thus protect our natural waterways from pollution, with the increase in population dependent on them for drainage, all will become, as many are now, a source of danger to the health of the communities through which they flow, a detriment to improvement and to property values and an offense to the senses instead of the things of beauty which nature made them. The question of the effects of this pollution on the fish life within these streams is also a question of much importance to a city situated like Philadelphia.

I would suggest that the importance of this work be urged upon the members of Councils, so that the necessary appropriations will be provided to carry on the actual work for which preliminary arrangements have been completed.

Grade Crossings.

During the year just ended, a vast amount of work has been accomplished in the abolishment of grade crossings, particularly on the line of the Philadelphia, Germantown and Norristown Railroad on Ninth street, and the Richmond Branch of the Philadelphia & Reading Railway. In the case of the first mentioned railway, rapid progress has been made and at the time of writing this report, trains are being operated on two tracks of the elevated structure between Columbia avenue and Broad street, thus abolishing twelve grade crossings which have hitherto been a source of great danger to pedestrians and vehicular traffic.

Considerable work has also been performed in the abolishment of grade crossings on the line of the Philadelphia & Trenton R. R. (P. R. R)., between Norris and Butler streets, in the Twenty-fifth and Thirty-first Wards.

The officials of the Philadelphia & Reading Railway Company and Pennsylvania Railroad Company have worked in perfect harmony with the officials of this De-

partment, and the completion of these gigantic enterprises, involving the expenditure of millions of dollars, will result in the saving of many lives each year and be a monument to the progress of the City of Philadelphia.

Channel Dredging.

The close of the year 1908 witnessed the completion of a practicable ship channel thirty feet deep at mean low water in the upper portion of the Delaware river, from Pennsylvania-Delaware State line to Christian street, Philadelphia, with the exception of the Schooner Ledge Rock near Chester, now being removed by the United States Government.

Testing Laboratory.

The Testing Laboratory of this Bureau, which is excelled by but few institutions of its kind in equipment and by none in the application of intelligent methods to obtain results of practical value, continues to be a valuable adjunct to the City's service, and the work performed therein demonstrates more each year, the wisdom of having established this special corps of men who apply all the modern and scientifice methods to determine the quality of materials entering into municipal construction. A high standard was established many years ago, from which there is no deviation.

Board of Surveyors.

The Board of Surveyors and Regulators during the year 1908, held twenty-three stated meetings for the transaction of general business, seventeen special meetings and several road day meetings. The combined cash receipts and credits for work done for the various Departments and Bureaus of the City, amounted to $333,098.07, being $119,643.51 in excess of the total expenses of the fourteen districts.

The following is a summary of the receipts and expenditures of the District Surveyors for the year 1908:

eipts and Expenses of District Surveyors for the year 1908, and totals for the year 1907.

Cash teceipts.	Credit for Work done for the City.	Total Credit.	Expenses.				Balance Profit to the City.	Profit to the City in 1907.	Increase.	Decrease.
			Salaries.	Pay of Assistants.	Miscellaneous.	Total.				
$7,845 78	$11,844 95	$19,690 73	$4,000 00	$8,640 00	$1,349 59	$13,989 59	$5,701 14	$4,140 89	$1,560 25	
8,752 74	9,091 69	17,844 43	4,000 00	6,311 61	1,315 81	11,627 42	6,217 01	3,872 73	2,344 28	
7,140 89	13,497 35	20,638 14	4,000 00	9,417 00	1,578 28	14,995 28	5,642 86	4,065 89	1,576 97	
7,323 58	8,679 25	16,002 93	4,000 00	6,881 82	1,227 01	12,108 83	3,894 10	3,304 54	589 56	
15,079 99	13,792 00	28,871 99	4,000 00	11,331 65	1,691 65	17,023 30	11,848 69	13,597 90		$1,749 21
22,229 20	15,825 79	38,054 99	4,000 00	10,605 55	2,087 74	16,693 29	21,361 70	12,327 91	9,033 79	
8,287 14	7,771 99	16,059 13	4,000 00	4,240 00	1,444 10	9,684 10	6,375 03	3,551 91	2,823 12	
5,403 00	15,026 14	20,429 14	4,000 00	12,645 39	1,848 10	18,493 49	1,935 65	1,051 80	883 85	
2,297 81	13,517 59	25,815 40	4,000 00	11,041 97	1,861 21	16,903 18	8,912 22	11,243 53		2,331 31
9,954 54	14,706 93	24,661 47	4,000 00	10,492 52	1,752 59	16,245 11	8,416 36	6,614 15	1,802 21	
3,306 59	9,748 05	23,054 64	4,000 00	10,440 00	2,084 53	16,524 53	6,530 11	7,340 98		810 87
9,519 83	16,573 92	36,093 75	4,000 00	12,904 52	1,962 74	18,867 26	17,226 49	19,614 21		2,387 72
2,208 26	13,650 30	25,858 56	4,000 00	9,738 27	1,787 31	15,525 58	10,332 98	9,263 10	1,069 88	
1,810 01	18,212 76	20,022 77	4,000 00	8,946 56	1,827 04	14,773 60	5,249 17	5,626 62		377 45
1,159 36	$181,938 71	$333,098 07	$56,000 00	$133,636 86	$23,817 70	$213,454 56	$119,643 51	$105,616 16	$21,683 91	$7,656 56
),570 08	$170,416 14	$299,986 22	$49,000 00	$123,539 90	$21,830 16	$194,370 06	$105,615 16	$98,397 37	$25,539 36	$18,320 57

The following is a statement of the operations of the Registry Division of the Bureau of Surveys during the years 1907 and 1908.

Registry Division.

	1907.	1908.
Number of certificates of registered owners issued	5,010	4,502
Number issued for use of Law Department	463	299
Receipts from certificates of registered owners	$1,251 25	$1,130 50
Receipts from miscellaneous sources	$273 10	$252 50
Number of original lots plotted	11,520	9,760
Number of transfers registered	47,559	37,911
Number of plans made for use of City Departments, Bureaus, etc	702	936
Number of examinations of registry plan books made by the public	71,056	72,426
Number of descriptions of property filed for registry	70,346	47,671
Number of titles perfected	2,715	2,496
Number of certificates of legal opening of streets issued to Bureaus, etc	2,778	2,655
Number of certificates of registered owners in municipal lien cases for Law Department	686	860
Number of certificates of registered owners in municipal lien cases for Receiver of Taxes	343	665

Statement of Main, Branch and Private Sewers Built during the years 1907 and 1908.

	1907.		1908.	
	No.	Linear feet.	No.	Linear feet.
Intercepting sewer extensions	5	3,460	11	7,981
Main sewers	19	11,119	25	21,714
Branch sewers	147	112,463	185	116,790
Private sewers	75	46,445	50	29,724
Market street subway sewers	2	8,162	2	2,127
Grade crossing sewers	7	1,578	7	8,744
Totals	255	*183,227	280	†187,080

* Equal to 34.701 miles. † Equal to 35.432 miles.

Statement of work upon Bridges.

	1907.	1908.
Finished	9	6
Begun	7	16
Authorized	5	1
Planned	10	15

Statement of Receipts.

Years.	Receipts of Bureau.	Receipts of District Surveyors.	Total.
1907	$38,839 99	$129,570 08	$168,410 07
1908	36,216 56	151,159 36	187,375 92

Statement of Expenditures.

	1907.	1908.
Current expenses	$280,926 62	$335,566 64
For extensions	1,807,557 64	2,549,109 81
Total	$2,088,484 26	$2,884,676 45

Bureau of Highways—Street Cleaning.

Expenditures.

The expenditures of this Bureau during the year were $5,312,584.26, of which $2,945,515,05 was for current expenses and $2,367,069.21 for improvements and extensions.

Receipts.

The receipts were $79,961.72. The reduction in receipts is due largely to the fact that no license fees were received from the Philadelphia Rapid Transit Company for cars because of the agreement entered into between the said railway company and the City, under authority of the ordinance of Councils approved July 1, 1907.

Summary of Work Done.

During the year 1908, 37 miles of new streets were opened and graded to the established City grade, an increase over 1907 of 5 miles. Nearly 23 miles of new streets were paved with asphalt, vitrified fire clay or shale blocks and granite blocks upon a six-inch cement concrete foundation, at an approximate cost of $750,000.00, of which $122,451.44 was paid by the Citv for paving intersections and in front of unassessable property. Nearly six miles of new macadamizing was completed during the year.

More than 31 miles of streets were repaved with new and improved pavements in lieu of the old cobble and rubble paving, an increase over 1907 of 27.90 miles. A greater number of streets could have been repaved had it not been that the Bureaus of Surveys and Water were handicapped by lack of sufficient funds to place the necessary underground structures required before the repaving could be done.

Country Roads.

The new specifications for the work of maintaining unpaved and macadamized public highways secured the gratifying results which the Department anticipated at the time they were prepared. The roads were put in a first class condition early in the year and kept in good repair throughout the entire year, and over ten miles of old macadam roads were resurfaced, making practically new roads with a three year guarantee for maintenance. Work to be done during 1909 will be conducted under the same specifications.

The inadequacy of the appropriation for sprinkling macadam roads has caused the Department to incorporate in the specifications for resurfacing roads of this character, a clause asking for bids on the basis of using an oil mixture in connection with the stone. Liberal appropriations should be provided by Councils to enable us to experiment and determine the very best method to be adop-

ted, so that the life of macadam roads within the confines of the City of Philadelphia may be lengthened.

Street Repairs.

Work under the contract for repairs to paved streets was performed in an efficient manner to the extent of our limited appropriation. It would seem that the policy of reducing the appropriations for this class of work is poor economy. The Department has insistently called the attention of Councils to the absolute necessity for making liberal appropriations for this kind of work. Good business methods would indicate that were we able to make repairs to breaks in street paving in their incipiency, much money would be saved the City not only by avoiding damage suits for accidents but in the amount of work that had to be performed.

Bridge and Sewer Repairs.

During the year just closed, work under the contracts for repairs to sewers was performed in a very creditable manner, not a single complaint of inattention or poor workmanship having been received during the entire year. The same conditions prevailed in the work of repairing bridges.

Railroad Streets

Under the terms of the agreement between the City of Philadelphia and the Philadelphia Rapid Transit Company, which was ratified by ordinance of Councils approved July 1, 1907, the work or repairing streets occupied by the tracks of the Transit Company was proceeded with to the full extent of the $500,000 which the said company is required to pay into the City Treasury for this purpose.

Northeast Boulevard.

The Northeast Boulevard has been completed from Broad to Second streets and turned over to the Bureau of City Property for care and maintenance. The balance of the work is progressing satisfactorily and as each sec-

tion of the Boulevard is completed it will be placed under the supervision of the Bureau of City Property, as is required by ordinance of Councils approved December 31, 1908.

The present condition of this work is not such as to give to the public a proper conception of its real worth, as it does not, as yet, connect any centre of population or any of the principal highways with Broad street. But with its extension, which it is hoped will be accomplished during the coming year, it will reach Second street turnpike and the population dependant on that thoroughfare, Asylum road, giving an outlet to Frankford and vicinity, and ultimately, Holmesburg, Tacony, Torresdale and the whole northeast section of the City will be brought in closer touch with the City's centre. The tremendous influence of this great thoroughfare as a developer and consequent source of income to the City, especially if it should be used in the future for improved transit facilities to the country through which it passes, cannot as yet be measured.

Hunting Park Avenue.

An important piece of work now in progress, consists of the widening and repaving of Hunting Park avenue, from Germantown avenue to Wissahickon avenue. This much needed improvement should be carried westward to Fairmount Park, which, if done, would give a beautiful driveway via the Northeast Boulevard, from the Park to Torresdale.

Southern Boulevard.

Work on the Southern Boulevard has been enjoined by the courts by reason of suits instituted to test the validity of the contract, and final decision has not yet been given.

Parkway.

The benefits to be accrued by the opening of the Parkway have been shown by the temporary driveway which was constructed from Logan Square to Spring Garden

street. The work cannot be fully completed until the lines of the Parkway are revised, which question is now under consideration.

When this important improvement is completed, it is confidently believed this City will possess one of the most imposing thoroughfares in this country. The present conception is to have the Parkway lined with beautiful structures, such as art galleries, museums of various kinds, technical and educational institutions and possibly a municipal building to contain the Courts of Justice that are now housed in the City Hall.

The history of all municipalities has proven the value of constructing parkways and wide boulevards. The money expended for such purposes is always well invested, as beautiful avenues of this character bring in not only a splendid revenue but have a tendency to promote the trtistic temperament of the community at large.

Comparative Data.

I would call your attention to the fact that the total amount of repaving and new paving during 1908 was 53.76 miles, which is 1.5 miles more than the work done during the years 1904-05-06 combined; and that the paving and repaving done during the first two years of your administration was five miles more than the entire work performed during the years 1903-04-05-06 combined.

The following statement is a classification of the street pavements laid during the year, and their mileage; also, the total mileage of street pavements to December 31, 1908:

KINDS OF PAVEMENTS.	LAID DURING 1908.		MAKING TOTAL IN CITY, DEC. 31, 1908.	
	Sq. Yards.	Miles.	Sq. Yards.	Miles.
Sheet asphalt	706,965	40.13	6,795,878	431.05
Asphalt block	----------	----------	178,238	19.
Granite block	94,550	5.09	6,461,552	388.28
Cobble or rubble	----------	----------	351,074	34.
Vitrified brick	123,524	8.54	2,500,957	159.44
Granolithic	----------	----------	72,726	12.77
Slag block	----------	----------	71,280	9.82
Macadam	93,093	5.71	3,070,872	289.39
Total	1,018,132	59.47	19,503,477	1343.75

Summary of work done in Improved Pavements—New Streets.

	1907.		1908.	
	Square Yards.	Linear Feet.	Square Yards.	Linear Feet.
Granite blocks	12,760	4,300	30,025	7,990
Asphalt	335,531	98,456	325,120	87,691
Vitrified bricks	50,943	15,260	70,667	23,578
Macadam	118,221	40,268	93,093	30,173
Total	517,455	*158,284	518,905	†149,432

Replacing Cobble and Other Pavements With Improved Pavements—Old Streets.

	1907.		1908.	
	Square Yards.	Linear Feet.	Square Yards.	Linear Feet.
Granite blocks	41,107	15,702	64,525	18,896
Asphalt	3,484	1,272	381,845	124,193
Vitrified bricks	450	300	52,857	21,515
Total	45,041	*17,274	499,227	†164,604

* 1907—Total amount of new pavements, 175,558 linear feet, equal to 33.25 miles.
† 1908—Total amount of new pavements, 314,036 linear feet, equal to 59.47 miles.

Statement of Work Done.

	1907.	1908.
New paving	118,016	119,259 linear feet
Repaving with improved pavement	17,274	164,604 linear feet
New macadamizing	40,268	30,173 linear feet
Grading	1,062,949	1,177,236 cubic yards
New footway paving	88,786	169,379 square yards
Repairs to paved streets	311,009	325,924 square yards
Footways repaved	22,636	49,627 square yards
Crossing stone laid	6,239	15,966 linear feet
Curbstone reset	79,863	210,165 linear feet
Wooden trunks	9,148	8,702 linear feet
Hand railings	4,958	9,638 linear feet
Curved curb corners	8,114	15,377 linear feet
New curbstone set	143,138	168,327 linear feet
Vitrified brick and stone gutters	53,720	42,764 linear feet
Resurfacing, sheet asphalt	56,599	13,581 square yards
Resurfacing, broken stone	61,949	117,189 square yards
Repairs to passenger railway streets	149,790	1,404,501 square yards
Footways, curb, railroad notices served	22,235	37,210

Street Cleaning Division. The consolidation of the Bureaus of Highways and Street Cleaning has, undoubtedly, been of great benefit to the City and a careful perusal of the report of the Assistant Chief of the Bureau indicates the close supervision that has been given the work of cleaning streets, removal of ashes, garbage, etc.

Recommendations. If the recommendations made by the Assistant Chief in his report could be carried out, the unsightly conditions which our streets sometimes present would be avoided. The co-operation of the Department of Public Safety and the householders must first be secured, before these recommendations can be realized.

Snow Removal. It is to be regretted that the appropriation for the removal of snow only permits the work to be done in a very limited area in the centre of the City. Funds should be provided to enable us to remove snow from all streets where traffic is heavy and much local business is done. This applies particularly to highways running diagonally.

Garbage. The contract for the removal of garbage, etc., for the year 1909, has been awarded to the same contractor as last year, Penn Reduction Company, at the same figures as for 1908, namely, $488,988,00, notwithstanding the fact that several thousand new dwellings have been erected from which daily collections of garbage will be made.

Street Cleaning and Ashes. On December 1, 1908, proposals were received for cleaning streets, alleys, etc., and removing ashes, etc., for the year 1909, and the contract awarded to Edwin H. Vare for the entire City at his bid—$1,199,000.00. Under his contract he will be required to clean every street in the City six times each week. Considering the vast amount of additional work that will be required the increase over 1908 ($112,000.00) is merely nominal.

The experiment of having the ashes, street dirt and waste taken to a central station in the Second District proved so successful that the plan has been extended to cover the territory bounded by Poplar street and Lehigh avenue, Broad street and the Schuylkill river.

Sprinkling.

The small appropriation for sprinkling enabled us only to sprinkle during the summer months the streets in the territory bounded by Race and Walnut streets, and from Twentieth street to the Delaware river. It would add much to the comfort of our citizens were we able to extend this service.

Total Amount of Work Done During the Years 1907 and 1908.

	CLEANED.						REMOVED.					Number of Complaints of all kinds.
	Squares.*	Alleys.	Inlets.	Crossings.	Market Houses.	Snow from Fire Plugs.	Number of Dead Animals.	NUMBER OF LOADS.†				
								Dirt.	Ashes.	Dry Waste.	Garbage.	
Total, 1907.....	2,630,359	242,367	734,481	534,924	1,343	63,245	17,640	197,039	874,398	53,403	378,964	6,585
Total, 1908.....	3,736,255	310,692	854,518	824,258	1,153	59,705	12,027	248,167	797,226	67,991	363,716	5,093

*A square covers about 500 feet in length with an average width of roadway of 26 feet.

†A cartload of ashes and of street dirt is equal to one cubic yard; a cartload of garbage is equal to one ton.

Board of Highway Supervisors.

The expenses of the Board of Highway Supervisors during the year amounted to $11,960.34, and there was received and deposited with the Receiver of Taxes by franchise companies for plans prepared for underground privileges, the sum of $8,736.87. Receipts and Expenses.

There have been added to our plans during the year two hundred and seven plans, making two thousand and seven plans now on file, covering 423 miles of streets. These records are consulted daily as to underground conditions of our streets and their value cannot be estimated in dollars and cents. Plans.

The Chief Draughtsman and his assistants continue to perform their work in a very efficient manner, and this branch of the City Government demonstrates each year the wisdom of its establishment.

Transactions of the Board of Highway Supervisors, 1907.

	1908.
Pneumatic tubes	3
For vaults	3
For railroad tracks, curves and turnouts	29
For underground pipes	444
For electrical conduits	999
For drinking fountain	1
For subway	8
STATEMENT OF WORK DONE.	
New street record plans prepared	207
Blue print plans placed on file	246
RECEIPTS AND EXPENDITURES.	
Receipts	$8,736 87
Expenditures	11,960 34
Deficit of receipts	$3,223 47

Transactions of the Board of Highway Supervisors, 1907—Continued.

	1908.
RECAPITULATION.	
Amount of earnings	$3,570 50
Amount outstanding from previous years	2,522 42
	$11,092 92
Amount received and deposited with City Treasurer	8,736 87
Amount outstanding	$2,356 05

Bureau of Water.

Expenditures

The expenditures of the Bureau during 1908 were $4,161,091.40, of which $1,555,855.81 was for current expenses and $2,605,235.59 for improvements and extensions.

Receipts.

The receipts of the Bureau were $4,233,045.49, an excess over 1907 of $212,226.13; and I desire to express my sincere appreciation of the business like methods adopted by Mr. Fred C. Dunlap, Chief of the Bureau of Water, in obtaining such a decided benefit for the City of Philadelphia.

Water Consumption.

There were consumed during 1908, 117,868,099,840 gallons of water, an average of 322,043,989 gallons daily; an increase over the previous year of 19,607,348 gallons daily. The per capita consumption was 210.24 gallons per day, an increase over 1907 of 8.54 gallons.

Filtered Water.

During the first half of the year 53 per cent. of the supply was filtered water, which was later increased to 56 per cent. This furnished filtered water to all of the City west of the Schuylkill river and east of the Schuylkill river as follows:

North of Allegheny avenue, from Schuylkill to Delaware rivers.

East of Broad street, from Allegheny avenue to Spring Garden street.

East of Sixth street, from Spring Garden to Vine street.

North of Vine street, from Sixth street to Delaware river.

The results of the operation of the several filter stations have been very gratifying, as at all times we were able to supply the full quantity of water required within the several filtered water districts. The water has been of acceptable purity and clearness.

Typhoid Reduction.

The benefit of filtered water is amply demonstrated by the marked decrease of typhoid fever, which in 1907 reached 6,712 cases, and in 1908, 3,562, a decrease of 47 per cent. The deaths from typhoid fever in the same period were 890 and 533 for the respective years, a decrease of 40 per cent.

Future Extension.

With the completion of the work now in progress, it is confidently expected that our capacity will be increased one hundred million gallons daily by March 1st of the current year, thus enabling us to supply the entire City with filtered water with the exception of a very limited territory in the Queen Lane District.

The contract for the construction of the preliminary filters at Torresdale, which received mention in my last annual report is, at the time of this writing, practically completed, thereby adding much to the efficiency and capacity of the plant—the largest of its kind in the world and which has received the commendation of eminent engineers and experts.

Queen Lane Filters.

Plans for the Queen Lane Filters which, when completed, will enable the Department to supply those high levels of the City not included in the filtered water districts, have been prepared and it is our intention to advertise for proposals for this work at an early date. The construction of a filter plant in this location has many points in its favor, as its height will permit the supplying of any portion of the City except Manayunk and Germantown and will not necessitate the purchase of any additional ground or pumping machinery or the laying of new mains. Economy would dictate that the plant should be constructed on the site laid out by the Bureau of Water, in preference to any other location.

While a plant at this location would not fully supply the Torresdale district, its situation would be such that it would be of inestimable help in case of a temporary shortage or in the event of an extensive break-down of the Torresdale system and would preclude the possibility of an absolute water famine or the recourse of using raw water. At the present time there is $800,000 standing to the credit of the item for the improvement, extension and filtration of the water supply, which should be made available immediately and applied towards the construction of the Queen Lane Filters, which will cost approximately, $2,500,000.

Coal Consumption.

The coal consumed at the several pumping stations aggregated 231,775 tons, an increase over 1907 of 23,193 tons, due mainly to the increased pumpage and the installation of additional pumping machinery.

Pumping Machinery.

The pumping machinery at the several stations has been brought to a high state of efficiency and the officials of the Bureau of Water are to be congratulated on the results accomplished with the limited appropriations at their disposal, for this purpose.

Boiler Repairs.

The results obtained by having the work of repairs to boilers performed by the employees of the Bureau instead of by annual contract as was the custom heretofore, proved very gratifying and highly economical.

Distribution.

During 1908 there were 150,835 feet of pipe laid for distribution purposes, etc., making the total quantity now in use 1,586.51 miles. The demands made upon the Department for water pipe by operative builders during 1908, were extraordinary and it is a fact that we should be provided with ample funds for the purchase of water mains and employment of labor to lay the pipe. The City derives an ample return for every dollar invested in work of this character, as the laying of water pipe, construction of sewers and erection of bridges go to make up the development of our urban property, all of which increases the revenues received by the City, as well as raise the values of real estate.

General.

Many interesting facts are presented in the report of the Chief of Bureau of Water, to which I call the attention of anyone interested in the problem of municipal ownership.

Statement of Receipts and Expenditures for the years 1907 and 1908.

	Receipts 1907.	Receipts 1908.
Receipts from water rents	$3,710,187 53	$3,873,179 02
Receipts from fractional rent	92,649 45	95,556 28
Receipts from water pipes	107,071 85	127,955 41
Receipts from City Solicitor's office	89,176 74	87,848,22
Receipts from penalties	30,160 39	34,999 93
Receipts from delinquent rent	28,721 55	36,036 92
Receipts, miscellaneous	8,917 72	19,628 81
Receipts from searches	3,996 00	2,573 75
Receipts from delinquent penalties	4,938 13	5,267 05
Total	$4,020,819 36	$4,233,045 49

	Expenditures 1907.	Expenditures 1908.
Current expenses	$1,358,934 15	$1,555,855 81
For extensions	938,672 29	2,605,235 59
Total	$2,297,606 44	$4,161,091 40

Statement Relating to Pipe Laying and Fire Hydrants Placed.

YEAR.	PIPE LAID			*PIPE RELAID.	FIRE HYDRANTS PLACED IN POSITION.			SUBSTITUTED FOR DEFECTIVE HYDRANTS.			Fire Hydrants in Use.	New Water Attachments.
	Feet,	EQUAL TO			New Style.	Old Style.	Total.	New Style.	Old Style.	Total.		
		Miles.	Feet.	Feet.								
1907	151,900	28	4,060	†5,910	308	.....	308	316	.....	316	14,852	9,167
1908	149,187	28	1,347	‡22,214	407	.....	407	493	.....	493	15,168	7,757

Total pipe laid, 1586.51 miles.

*Adds nothing to feet in ground,

†Pipe taken up exceeds quantity relaid 720 feet.

‡Pipe taken up exceeds quantity relaid 1,648 feet.

Statement of the Number and Type of Engines and Their Several Aggregate Capacities, at the Various Stations.

Pumping Stations.	Designated Number of Engine or Turbine.	Type of Engine.	Designed Capacity in Million Gallons per Day.	Total.
Spring Garden — Old Station	5	Compound Rotary	20,000,000	
Spring Garden — Old Station	6	Simpson Compound Rotary	10,000,000	
Spring Garden — Old Station	7	Marine Compound Rotary	20,000,000	
Spring Garden — Old Station	8	Worthington Duplex	10,000,000	
Spring Garden — New Station	9	Worthington Duplex	15,000,000	
Spring Garden — New Station	10	Worthington Duplex	15,000,000	
Spring Garden — New Station	2	Holly	30,000,000	
Spring Garden — New Station	3	Holly	30,000,000	150,000,000
Queen Lane	1	Southwark	20,000,000	
Queen Lane	2	Southwark	20,000,000	
Queen Lane	3	Southwark	20,000,000	
Queen Lane	4	Southwark	20,000,000	80,000,000
Belmont	3	Worthington Duplex	6,500,000	
Belmont	4	Worthington Duplex	17,000,000	
Belmont	5	Holly Horizontal Compound	10,000,000	
Belmont	6	Holly Horizontal Compound	10,000,000	
Belmont	7	Holly Horizontal Compound	10,000,000	53,500,000

Statement of the Number and Type of Engines and their several Aggregate Capacities—Continued.

Pumping Stations.	Designated Number of Engine or Turbine.	Type of Engine.	Designed Capacity in Million Gallons per Day.	Total.
Belmont High Service	1	Allis Chalmers Co	6,000,000	
Belmont High Service	1	Worthington	5,000,000	11,000,000
Roxborough, Old House	1	Gaskill	10,000,000	
Roxborough, Old House	2	Worthington Duplex	5,000,000	
Roxborough, Old House	3	Worthington Duplex	6,500,000	
Roxborough, New House	4	Worthington Horizontal Compound	5,000,000	
Roxborough, New House	5	Worthington Horizontal Compound	5,000,000	
Roxborough, New House	6	Worthington Horizontal Compound	5,000,000	
Roxborough, New House	7	Worthington Horizontal Compound	5,000,000	41,500,000
Roxborough High Service	1	Worthington	5,000,000	
Roxborough High Service	2	Worthington	5,000,000	
Roxborough High Service	3	Worthington Centrifugal	10,000,000	
Roxborough High Service	4	Worthington Centrifugal	10,000,000	
Roxborough High Service	5	Worthington Centrifugal	10,000,000	40,000,000
Mt. Airy	1	Davidson	1,000,000	
Mt. Airy	2	Davidson	1,000,000	
Mt. Airy	3	Knowles	1,000,000	3,000,000
Chestnut Hill	1	Knowles	250,000	
Chestnut Hill	2	Worthington Duplex	500,000	750,000

Statement of the Number and Type of Engines and their several Aggregate Capacities—Continued.

Pumping Stations.	Designated Number of Engine or Turbine.	Type of Engine.	Designed Capacity in Million Gallons per Day.	Total.
Frankford	1	Marine Compound Rotary	10,000,000	
Frankford	2	Corliss Compound Rotary	10,000,000	
Frankford	3	Southwark Rotary	22,000,000	
Frankford	4	Southwark Foundry Quarter Crank Flywheel	15,000,000	
Frankford	5	Holly Vertical Triple Expansion	20,000,000	
Frankford	6	Holly Vertical Triple Expansion	20,000,000	
Frankford	7	Holly Vertical Triple Expansion	20,000,000	
Frankford	8	Holly Vertical Triple Expansion	20,000,000	
Frankford	9	Holly Vertical Triple Expansion	20,000,000	
Frankford	10	Holly Vertical Triple Expansion	20,000,000	
Frankford	11	Holly Vertical Triple Expansion	20,000,000	
Frankford	12	Holly Vertical Triple Expansion	20,000,000	
Frankford	13	Holly Vertical Triple Expansion	20,000,000	
Frankford	16	Holly Vertical Triple Expansion	20,000,000	257,000,000
Frankford High Service	1	Holly Horizontal Compound	3,000,000	
Frankford High Service	2	D'Auria Compound Duplex	4,000,000	7,000,000
Fairmount (New House)	1	Turbine Wheels	2,000,000	
Fairmount (New House)	3	Turbine Wheels	5,330,000	
Fairmount (New House)	4	Turbine Wheels	5,330,000	
Fairmount (New House)	5	Turbine Wheels	5,330,000	
Fairmount (Old House)	7	Turbine Wheels	5,100,000	
Fairmount (Old House)	8	Turbine Wheels	5,100,000	
Fairmount (Old House)	9	Turbine Wheels	5,100,000	33,290,000

Statement of the Number and Type of Engines and their several Aggregate Capacities—Continued.

Pumping Stations.	Designated Number of Engine or Turbine.	Type of Engine.	Designed Capacity in Million Gallons per Day.	Total.
Torresdale	1	R. D. Wood Centrifugal	40,000,000	
Torresdale	2	R. D. Wood Centrifugal	40,000,000	
Torresdale	3	Allis Chalmers Co. Centrifugal	40,000,000	
Torresdale	4	R. D. Wood Centrifugal	40,000,000	
Torresdale	5	R. D. Wood Centrifugal	40,000,000	
Torresdale	6	R. D. Wood Centrifugal	40,000,000	
Torresdale	7	R. D. Wood Centrifugal	40,000,000	280,000,000
Total				957,040,000

Statement of the Location, Date of Completion, Elevation and Capacity of the City's Reservoirs.

Name of Reservoir.	Location.	Date of Completion.	Height ab've City Datum.	Capacity in Gallons.
Fairmount—Reservoir No. 1	East Fairmount Park	1815	94 feet	26,261,000
Fairmount—Reservoir No. 2		1821		
Fairmount—Reservoir No. 3		1827		
Fairmount—Reservoir No. 4, Section 1		1835		
Fairmount—Reservoir No. 4, Section 2		1836		
Fairmount—Reservoir No. 4, Section 3		1836		
Spring Garden	Twenty-sixth and Master streets	1844	120 "	12,950,000
Corinthian	Corinthian avenue and Poplar street	1852	120 "	37,341,000
Section 1	East Fairmount Park	1887	133 "	62,738,000
Section 2		1888		306,400,000
Section 3		1889		319,480,000
Queen Lane—North Basin	Thirty-third street and Queen Lane	1894	238 "	205,620,000
Queen Lane—South Basin				177,480,000
Frankford	Oxford turnpike and Comly street	1877	167 "	36,946,000
Belmont	West Fairmount Park	1870	212 "	40,000,000
Belmont	Belmont and City avenues	1903	279 "	72,000,000
Belmont Clear Water Basin	Monument avenue and Ford Road	1903	239 "	16,500,000
Mount Airy	Allen's Lane and Mower street, Germantown	1851	363 "	4,546,000
Roxborough	Ridge and Shawmont avenues	1866	366 "	12,838,000
Roxborough Clear Water Basin	Dearnley and Fowler streets	1903	325.75"	3,000,000
New Roxborough—North Basin	Port Royal avenue and Ann street	1893	414 "	71,594,000
New Roxborough—South Basin				75,438,000
New Roxborough Clear Water	Port Royal avenue and Hagy street	1903	410 "	8,000,000
Belmont Stand Pipe	West Fairmount Park	1895	364 "	106,000
Roxborough Stand Pipe	Port Royal avenue and Ann street	1895	491 "	106,000
Frankford Stand Pipe	Oxford turnpike and Comly street	1900	300 "	106,000
*Oak Lane	Fifth and Medary avenue	1904	210 "	70,000,000
Torresdale Clear Water Basin	State Road and Pennypack street	1905	7 "	50,000,000
Total				1,609,450,000

* Not in service.

Statement of Pumpage for the Years 1907 and 1908.

	1907. Gallons.	1908. Gallons.
Pumped to reservoirs	116,882,212,622	160,264,695,178
Equal to gallons pumped 100 feet high	242,285,589,708	278,534,592,507

NOTE.—"The pumped to reservoirs" includes 42,379,033,156 gallons' repumpage to higher levels at Belmont, Roxborough, Mt. Airy and Frankford high service stations, and also the low service pumpage to filter beds at the Roxborough and Torresdale filter plants, which, deducted from the total pumped, gives a total pumped from rivers of 117,885,662,022 gallons.

The quantity stored in reservoirs on December 31, 1908, was 17,562,180 gallons more than that stored on December 31, 1907. This quantity deducted from the total pumpage from the rivers makes the total consumption for 1908, 117,868,099,840 gallons. The cost of pumpage is based on the total pumpage. The consumption per capita is computed from the average consumption during 1908 of 322,043,989 gallons per day.

	1907. Gallons.	1908. Gallons.
Pumped by water power	8,133,114,825	5,369,821,111
Pumped by steam power	108,749,097,797	154,894,374,067
Largest quantity pumped in 24 hours	368,585,438	508,764,869
Smallest quantity pumped in 24 hours	199,486,931	329,016,621

Year.	Average daily consumption. Gallons.	Average consumption in gallons per capita per day.* Gallons.	Cost of one million gallons pumped 100 feet high.
1907	302,436,641	201.7	$5 68
1908	322,043,989	210.2	5 58

*1907. Estimating the population at 1,499,747
*1908. Estimating the population at 1,531,752

The decreased cost of pumpage per million gallons raised 100 feet high is 10 cents less than that of the preceding year.

Director's Office.

The work of this office continues to increase from year to year, and it is only by the close application of the employees that each day's business is closed without delay and to the satisfaction of the public.

The Official Photographer, who is connected with the Director's Office, performs his work with commendable skill and obtains splendid results for the City. His report, which is attached hereto, shows the volume of work performed and the saving effected by his employment instead of having the work done under contract.

The following is a summary of the expenditures of the Director's Office, for the year 1908:

Item.		1907.	1908.
1	Salaries	$25,369 96	$29,280 00
2	Horsekeep	400 00	400 00
3	Incidentals	1,726 24	1,679 50
4	Purchase and maintenance of two automobiles		9,991 43
	Total	$27,496 20	$41,350 93

Official Photographer.

In submitting this report, permit me to express my appreciation of the consideration you have shown me in my efforts to conduct the affairs of this Department in the interests of the public and also to thank the Chiefs and employees of the several Bureaus for their co-operation.

Respectfully submitted,

GEO. R. STEARNS,

Director.

ANNUAL REPORT

OF THE

BUREAU OF WATER

FOR THE

YEAR ENDING DECEMBER 31, 1908

OFFICERS

OF THE

BUREAU OF WATER

Chief,
FREDERICK C. DUNLAP.

General Superintendent,
ALLEN J. FULLER.

Assistants to Chief,
WILLIAM WHITBY, H. J. JOHNSON,
LA MONTE LLOYD.

Chief Clerk,
J. T. HICKMAN.

Assistants to Chief Clerk,
Thomas Spence, James F. McCrudden.

Chief Draughtsman,
JOHN E. CODMAN.

Assistant Engineers,
John A. Vogleson, Seth M. Van Loan,
T. Nelson Spencer, John S. Ely.

Mechanical Engineers,
Charles B. Buerger, Francis L. Head.

Chemists,
George Edward Thomas, Belmont. Francis D. West, Torresdale.

Charge of Belmont and Roxborough Filters—Frank McHugh.
Charge of Torresdale Filters—Jos. S. V. Siddons.
Search Clerk—John S. Todd.
Pipe Inspector—Max M. Segl.
Messenger—Haines Lewis.
Superintendent of Shop—James H. Dean.
Chief Inspector—Edward Harshaw.

PURVEYORS' DISTRICTS.

FIRST DISTRICT OFFICE, 1120 Wharton Street.
Purveyor—Charles T. Erichson.
General Foreman—Harry Mintzer.

SECOND DISTRICT OFFICE, 918 Cherry Street.
Purveyor—J. H. Bilyeu.
General Foreman—Fred J. Gheen.

THIRD DISTRICT OFFICE, Beach Street and Susquehanna Avenue.
Purveyor—Charles J. Lowry.
General Foreman—Robert Glenn.

FOURTH DISTRICT OFFICE, Twenty-sixth and Master Streets.
Purveyor—Chas. T. Moore.
General Foreman—George W. Showaker.

FIFTH DISTRICT OFFICE, 4377 Manayunk Avenue.
Purveyor—H. A. Markley.
General Foreman—W. H. Dawson.

SIXTH DISTRICT OFFICE, Town Hall, Germantown.
Purveyor—George W. Bardens.
General Foreman—Joseph B. Fowler.

SEVENTH DISTRICT OFFICE, Thirtieth and South Streets.
Purveyor—Michael Young.
General Foreman—James H. Tawney.

Telephone Operators.

Jennie M. Hannings. Calvin Craner.

WORKS—GENERAL.

Assistant to General Superintendent—John F. Collins.
Paymaster—A. I. Flomerfelt.
Foreman Machinist—James Barbour.
Foreman Bricklayer—Jos. F. Ogden.
Foreman Carpenter—Henry Guest.
Foreman Plumber—Chas. H. Green.
Foreman Stonemason—Joseph Conner.
Foreman Painter—Christian Steube.
Foreman Rigger—Lewis Pederson.
General Storekeeper—Theo. Homan.
Foreman Laborer—Wm. Calhoun.
Electrician—Henry F. Morgan.
Lineman—Edw. J. Cavanaugh.

ANNUAL REPORT

OF THE

BUREAU OF WATER

FOR THE YEAR 1908

TWENTY-SECOND ANNUAL REPORT

OF THE

BUREAU OF WATER

ONE HUNDRED AND SEVENTH ANNUAL REPORT

OF

OPERATIONS CONNECTED WITH THE CITY WATER SUPPLY

Philadelphia, January 1, 1909.

GEORGE R. STEARNS, ESQ.,
Director, Department Public Works.

DEAR SIR:—I respectfully submit the following report of the work performed by the Bureau of Water during the year ending December 31, 1908:

Consumption.

The consumption of water during 1908, computed from plunger displacements, was 117,868,099,840 gallons, or at an average rate of 322,043,989 gallons per day; an in-

crease, as compared with that of the preceding year, of 19,607,348 gallons daily.

The per capita rate was 210.24 gallons per day; an increase, as compared with that of 1907, of 8.54 gallons.

The above named quantities, as stated, are computed from plunger displacements, but a more accurate result could be obtained by taking the pumpage at the Belmont, Queen Lane and Roxborough works as measured by the Venturi meters, and estimating or making allowance for slip, at the Fairmount, Spring Garden and Lardner's Point Works, which would give:

Estimated Average Daily Consumption.

	Gallons.
Belmont Works	36,952,137
Queen Lane Works	49,449,973
Roxborough Works	23,802,362
Fairmount and Spring Garden Works	84,388,399
Lardner's Point Works	90,413,625
	285,006,496

Of the above, 151,168,124 gallons, or 53 per cent. of the total daily supply, was filtered water, and during the last half of the year about 56 per cent. of the total quantity of water supplied was filtered water, which was furnished to all the area within the City limits west of the Schuylkill river, and east of the Schuylkill river as follows:

North of Allegheny avenue, from Schuylkill river to Delaware river.

East of Broad street, from Allegheny avenue to Spring Garden street.

North of Spring Garden street, from Broad to Sixth street.

East of Sixth street, from Spring Garden to Vine street.

North of Vine street, from Sixth street to Delaware river.

The results from the operation of the several filter stations during the past year have been very good.

The filters were at all times able to supply the full quantity of water required within the respective filtered water districts, of acceptable purity and clearness, the benefit of which is highly demonstrated in the marked decrease in the number of typhoid fever cases and deaths, although only about five-eighths of the City was thus supplied.

The typhoid fever cases in 1907 were 6,712, and in 1908 3,562, a decrease of 47 per cent. The typhoid fever deaths in 1907 were 890 and in 1908, 533, a decrease of 40 per cent.

From the progress being made in the completion of the work it is expected that the quantity filtered can be increased 100,000,000 gallons per day by March 1, which will supply the entire City with the exception of a small territory in the Queen Lane District.

The total quantity filtered during the year was 56,176,778,000 gallons, divided as follows:

	Gallons.
Lower Roxborough	3,550,858,000
Upper Roxborough	4,797,140,000
Belmont	13,253,580,000
Torresdale	34,575,200,000

The water at Lower Roxborough and Belmont were subjected to preliminary filtration before being applied to the final sand filters. The average reduction in turbidity by this preliminary treatment was 45.5 per cent. at Lower Roxborough and 70 per cent. at the Belmont Station. The bacterial reduction by the same treatment was 60 per cent. at Lower Roxborough and 65 per cent, at Belmont.

In addition to lessening the work on the final filters, the preliminary filters also permits the use of higher rates of filtration, thereby increasing the output, as was well illustrated at the Belmont Filters during the past summer

when the consumption for days was over 41,000,000 gallons. No difficulty was experienced in filtering this amount, and from observations made on two beds it was demonstrated that good results could be obtained from rates of six million gallons per acre per day, or twice the amount possible without preliminary treatment.

The preliminary plant at Belmont was built with a guaranteed capacity of 40,000,000 gallons per day, and it has, as before stated, exceeded this amount. I believe that with the washing machine made by the Blaisdell Filtration Company, and just put in operation, this amount can be greatly increased. By remodeling one-half of the tanks, the output may be raised to 60,000,000 gallons per twenty-four hours, which will no doubt prove to be the maximum amount it is possible to filter through the present slow sand filters.

At the Torresdale Station, a plant for the preliminary treatment of 240,000,000 gallons of water per day is being constructed, and will be ready for service the latter part of January, 1909. The design is somewhat after the mechanical system of filtration, except that no coagulent will be used, and consists of 120 concrete tanks, 60 feet by 20 feet in area, grouped into four batteries of 30 filters each. The rate of filtration will be 80,000,000 gallons per acre per day, with sand of an effective size of 0.8 m. m. and uniformity co-efficient of 1.7. Washing will be accomplished by reverse flow of water under about twenty pounds pressure, assisted by air under four pounds pressure.

It is expected that by this preliminary treatment the present sixty-five three quarters acre slow sand filters will filter from 200,000,000 to 240,000,000 gallons of water per day.

Mention was made in my report of last year of the Brooklyn method of washing slow sand filters, which at that time had been in use for some seven months.

Owing to very short runs, or the time between cleanings, obtained from the use of that method at Torresdale, it was abandoned at that station and the regular method of scraping and removal of the sand by ejectors has been employed.

The Brooklyn method of washing was continued on the twelve filters at Belmont, which last year gave good results after the applied water had been subjected to preliminary treatment, with equally satisfactory results this year. The runs were not as long as those cleaned by the usual scraping method but the cost was very much reduced as was also the time the filters were out of service.

It has also proved successful on one filter that was operated at a six million gallon rate. It was expected that the plan could not continue indefinitely, and from indications it is probable that in the immediate future it will be necessary to remove and wash the upper four to six inches of sand from some of the beds, but even with this additional expense it will prove to be an economical proposition.

The effluent—both for bacterial and turbidity count—has at all times been satisfactory.

The eighteen beds at Belmont are now being washed by this method, as well as the five at Lower Roxborough, also two filters at Upper Roxborough are being so washed in order to demonstrate its adaptability to applied water of about ten days' sedimentation.

The cost of water and labor required to clean one of the filters at Belmont by this method averages about $30.00 per cleaning, and the amount filtered between cleanings varies from 50,000,000 to 260,000,000 gallons. The average cost was twenty-three cents per million gallons, to which should be added the additional cost of removing and replacing say, five inches of sand once in eighteen

months, as in the case of the Belmont filters, if the present rate of deterioration continues.

The chemical and biological laboratories of this Bureau have been engaged in making examinations of the waters from the Schuylkill and Delaware rivers, and the filtrates from the filters. Generally speaking, the results of these examinations are reported as a part of the operation of the filters.

In connection with this work, it may be noted that during the year at the Belmont Laboratory 15,000 samples were examined for turbidity, and 3,300 individual examinations were made for color, total solids, suspended matter, nitrogen in different forms, etc. At the Torresdale Laboratory approximately 32,000 examinations were made for bacteria, with a corresponding number of turbidity tests.

It is to be noted that very many tests were made in both laboratories for the determination of the Bacillus Coli Communis in the waters of both rivers, the applied waters to filters, in the filtrate, and in the district supplied from each source. It is gratifying to note from the reports of the Bacteriologists that it is rare, if ever, that this type of Bacilli, whose presence has generally been regarded as a menace to the health of the water consumers, is found in the districts.

There has been a great deal of work carried on in the investigations with reference to ascertaining the effect of the filter beds caused by different types of micro-organisms. It is not possible at this time to give the results of these examinations, but, nevertheless, they have involved a great deal of study and investigation on the part of the laboratories.

The cost of operation of the Torresdale Laboratory for wages and supplies for the past year was $9,638.94, or

$0.282 per million gallons of water filtered. The cost per million gallons for next year will be considerably less than this amount, due to the increased amount of water it is proposed to filter, which will not call for any increase either in the laboratory force or supplies.

The cost of operating the Belmont Laboratory, which examines the water from the two Roxborough Filter Stations, in addition to that at the Belmont, was $9,378.14 for the year, of $0.435 per million gallons filtered. The cost of the two laboratories for the year was $19,017.08, or an average cost of $0.338 per million gallons of water filtered.

In order to supply the higher portion of Philadelphia now included in the Queen Lane District, plans have been prepared for the construction of filters in the Queen Lane Reservoir. The plant is to have a capacity of some 70,000,000 gallons daily and to consist to twenty-two ½ acre slow sand filters to be operated at a rate of six million gallons per acre per day, with forty preliminary filter tanks, the necessary buildings and accessories.

To supply the City with filtered water at all times it is imperative that another plant be built, or that the one at Torresdale be enlarged. There are many points in favor of the construction of another station, and the Queen Lane Reservoir is an ideal site for its location. Its height permits supplying any portion of the City except Manayunk and Germantown, and it will not be necessary to purchase any additional ground, pumping machinery, or lay any new mains, as one-half of the reservoir furnishes sufficient area, leaving the other half to be used as a sedimentation basin. The present pumping station contains four twenty million vertical triple expansion engines which are being remodeled, after which they should give good service for many years; the pipes or mains already laid

are ample for the above quantity and are so situated as to be available for use to supplement the Torresdale supply.

With the increased use of water and lack of storage to tide over the high points in the consumption, the City now requires all the water it will be possible to supply from the Torresdale Station, and it will be both expensive and consume much time to enlarge the Torresdale plant; also, it places too much dependence on one source of supply. While the Torresdale Filter Station, the Conduit, the Lardner's Point Pumping Station and the Distribution System have been built with great care, yet they are large, in fact, the largest of their kind in existence, and it has been impracticable to duplicate many parts. It is to be expected that at some time some vital portion will break, and owing to the size of the members of this system, it will require considerable time to make repairs.

While the Queen Lane plant will not be able to supply the Torresdale district, yet its situation is such that it would tide over any temporary shortage, and in case of an extensive breakdown keep the City from an absolute water famine or the resource of using raw water.

The above plant will not cost over $2,500,000. There is at present $800,000 available that can be used for this work if Councils should see fit to authorize its construction. Plans and specifications will be completed early in January, 1909, and if it is approved, construction could be started this coming season and funds provided above the amount now available as the work progresses.

Revenue Collected.

The revenue collected from all sources amounted to $4,233,009.51, exceeding that of the preceding year by $212,190.15.

The total collections during 1908 and the amounts for

the several items, as compared with those of the preceding year, were as follows:

	1907.	1908.	Increase.	Decrease.
Water rents	$3,496,430 00	$3,643,377 58	$147,247 58	
Meter rents	323,890 53	348,479 64	24,589 11	
Frontage	107,071 85	127,955 41	20,883 56	
Amount collected by City Solicitor	39,771 06	38,672 26		$1,098 80
Penalties	34,504 20	40,266 98	5,762 78	
New connections	11,238 00	12,615 00	1,377 00	
Searches	3,996 00	2,537 75		1,458 25
Miscellaneous	3,917 72	18,804 89	14,887 17	
Totals	$4,020,819 36	$4,233,009 51	$214,749 20	$2,557 05
			2,557 05	
Net increased collections, 1908			$212,190 15	

Expenditures.

The expenditures for maintenance, service mains, etc., from appropriation to Bureau of Water were $1,555,855 81

The expenditures for maintenance, service mains, etc., from appropriation to Department of Supplies were 925,231 14

Expenditures for improvements and extensions were 2,605,235 59

Total expenditures $5,086,322 54

Total Expenditures.

Total expenditures for maintenance and construction, including amounts expended for improvements, and the extension and filtration of the water supply, from 1799 to December 31, 1908.. $86,840,842 22

Total Earnings of the Bureau of Water.

Total revenue from water rents, etc., from the installation of the Water Works in 1799 to December 31, 1908 ..... $103,507,101 95

Net Profit Earned by the Bureau of Water.

Net profit earned by the Bureau of Water from the installation of the works in 1799 to December 31, 1908	$16,666,259 73

This is exclusive of cost of collection.

Coal.

The consumption of coal at the several pumping stations aggregated 231,775 tons, an increase as compared with that of 1907 of 23,193 tons.

The increase and decrease at the main pumping stations, as compared with the preceding year was as follows:

Stations.	Increase, Tons.	Decrease. Tons.
Spring Garden (Pumping raw water)		12,194
Queen Lane (Pumping raw water)		8,078
Belmont (Pumping filtered water)	5,606	
Roxborough (Pumping filtered water)	7,190	
Frankford (Pumping filtered water)	10,852	
Totals	23,648	20,272

The decrease in the quantity of coal consumed at the Spring Garden Works was due to the large reduction in the area supplied with water from this station, and that at Queen Lane was due not only to a reduction in the area supplied, but also, to a very large extent, to the improvements made in the pumping machinery.

The increased consumption of coal at the Belmont, Roxborough and Frankford Stations is properly chargeable to the additional work performed at these places, which increased work was respectively 14, 16 and 111 per cent.

The total cost of the coal consumed was $730,020.59, an increase over that of 1907 of $104,617.60.

The average price per ton was $3.15, or 15 cents per ton in excess of that during 1907, making the increased cost:

Additional cost of coal per ton, 15 cents.....	$34,766 25
Additional coal consumed, Main Stations.....	15,444 31
Additional coal consumed, High Service Stations....	6,443 00
Total coal consumed, Torresdale, less additional price (not included in last year's report).....	47,864 04
	$104,617 60

PUMPING STATIONS.

Fairmount.

Only minor repairs were required to the machinery at this station.

The quantity of water pumped was 5,369,821,111 gallons, a decrease of 2,763,293,714 gallons, or thirty-four per cent. less than that of the preceding year.

The deficiency in this respect was caused by drought—the most severe recorded since the construction of the works, in 1823. The dry season continued with the exception of a few very short intervals throughout the last seven months of the year, and during those seven months there was pumped less than twenty-five per cent. of the total pumpage at this station. The lowest level of the water in the Fairmount pool was +3.42 feet City datum, or 1.33 feet below the "legal comb" of the dam, and 3.17 feet below the top of the flash boards.

Spring Garden.

As stated in my last report, it is proposed to abandon this station as soon as the necessary supply of filtered water can be obtained from the Lardner's Point Works, which has partly been accomplished, resulting in about twenty-three per cent. less pumpage than was required at this station during 1907, and a reduction of 12,194 tons of coal consumed, amounting to $38,776.92.

The total pumpage was 33,237,871,480 gallons, averaging 90,813,856 per day, or, as estimated, to allow for "slip," 72,651,085 gallons.

Belmont.

The demands for water from this station necessitated an increase of about fourteen per cent. in the pumpage as compared with that of 1907, approximating between six and seven million gallons daily. This additional pumpage increased the difficulty of making repairs to the machinery, particularly to engines Nos. 5, 6 and 7, which have badly cracked pump chambers and will require new ones. The latter have been made and are ready to be put in place as soon as an opportunity presents.

In the meantime, the old Worthington engines Nos. 1 and 2, erected in 1869, have been removed and a new horizontal 10,000,000 gallon compound engine is being erected in their place. The foundations are built and the engine partly erected, and upon the completion of this work the repairs to engines Nos. 5, 6 and 7 will proceed.

The new 10,000,000 gallon engine was built by the Bethlehem Steel Company, who have also contracted to furnish a second engine of similar pattern, the materials for which are on the ground ready for erection immediately upon the completion of the first engine. When this work is finished the station will then contain five 10,000,000 and one 17,000,000 gallon pumping engines, which will provide ample pumping capacity to meet the demands for water from this station for some few years to come.

The total pumpage was 15,921,886,032 gallons, equal to 43,502,421 gallons per day, or by meter measurement 36,952,137 gallons.

The total quantity of coal consumed was 41,186 tons, which was 5,606 tons in excess of that consumed during

the preceding year, due to the increase in amount of work performed. If the latter be considered in comparison with the coal burned it would mean a reduction or saving of over 2.5 per cent as compared with that used in 1907, which would equal 1,030 tons, or $3,275.40.

Queen Lane.

Early in the season extensive repairs were made to engines Nos. 1, 3 and 4, since which time, notwithstanding their structural defects, they have run quite satisfactorily.

No. 2 engine is being repaired and the pump end reconstructed in accordance with designs made in this Bureau, the completion of which will no doubt remedy the defects referred to above and result in a first-class, up-to-date engine. As soon as this engine is placed in service again it is proposed to rebuild No. 1 engine in the same manner, and for which new pumps are now being constructed by the Cramp & Sons' Ship & Engine Building Company.

The total pumpage at this station was 19,630,903,000 gallons, averaging 53,636,347 gallons per day, or by meter measurement 49,449,973 gallons per day. The average "slip" throughout the year was 7.8 per cent. The quantity of coal consumed was 8,078 tons, or over nineteen per cent. less than during the preceding year; ten per cent. of which was due to less pumpage or work performed, and nine per cent. to improvement in the boilers, engines and the general management of all matters pertaining to this station.

Roxborough.

Owing to the extension of the area supplied with water from this station, the average pumpage increased sixteen per cent. over that of 1907.

The total pumpage was 9,958,477,407 gallons, averaging 27,208,955 gallons per day, or 23,802,362 gallons by meter measurement.

The quantity of coal consumed was 45,737 tons, or 7,190 tons in excess of the quantity used during the preceding year; this quantity, however, for both years being about the same per million gallons pumped.

In order to meet the immediate demands for water from this station, No. 11 (20-million gallon engine) was moved from Spring Garden Station to these works by the Holly Mfg. Company, who, by the terms of their contract, furnished new pump chambers, plungers, etc., and re-erected the engine on new foundations. The capacity of the engine was reduced to 10,000,000 gallons per day in order to pump against the greater head at this station. The engine is numbered numerically No. 1.

The Snow Pump Company are under contract to furnish and are erecting at this station two 5,000,000 horizontal, cross compound pumping engines, both of which will probably be in service early in the coming season, which will permit shutting down engines Nos. 4, 5, 6 and 7, in order to give them a thorough overhauling.

Two new 500 H. P. Edgemoor water tube boilers have been erected, and two more are under construction. These will take the place of the thirteen old boilers, Nos 1 to 13, inclusive. The new boilers will be provided with forced draught appurtenances for burning rice coal if desired.

Lardner's Point.

At this station during the past year a large amount of construction work has been in progress. In Engine House No. 1 the intake has been reconstructed in order that filtered water can be pumped and it is now possible to use this station as a reserve.

In Engine House No. 2 the six Holly vertical triple expansion pumping engines have been in service during the entire year and on many days the pumpage has ex-

ceeded 115,000,000 gallons. Many minor improvements have been made and the House as a whole is in excellent condition. Engine House No. 3, which is a duplicate of the No. 2 House, and in which six Holly twenty million gallon vertical triple expansion engines are being erected, is almost complete. Four of the engines have been completed and have been run as the occasion required, and the remaining two engines will be completed before February 1, 1909. In this case I would remark that the contract date of completion for the pumping machinery is March 23, 1909, and it is one of the few cases in which the manufacturers have completed their work within the time specified. As the supplying of the major portion of the filtered water is contingent upon the completion of this machinery, the Holly Manufacturing Company deserves the thanks of the City for its promptness in completing the work.

The six 500 H. P. Edge Moor boilers placed in Boiler House No. 2 last year have been in use during the past year with satisfactory results.

In Boiler House No. 3, eight 500 H. P. Edge Moor boilers with Wetzel Stokers and Green Economizers have been installed and have been in service to a limited extent. A report of the test of one of the boilers is appended.

A coal and ash handling system, including a new concrete wharf, coal and ash tower and overhead bunkers, is being constructed and will be completed about May 1, 1909. This will greatly reduce the cost of hauling the large amount of coal used and at the same time improve the general operation of the station.

The pumpage at this station was 33,766,720,992 gallons; an increase of over 18,000,000,000 gallons, or more than double the quantity pumped during the preceding year.

The quantity of water pumped 100 feet high per pound of coal was 1,000 gallons.

The Torresdale Pumping Station, containing six 40,000,000 gallon R. D. Wood and Company's centrifugal pumps and one (just installed), same capacity, Allis-Chalmers Company pump; nine 350 horse power Heine boilers with Murphy Stokers and Sturtevant Economizers; three 75 K. W. generators; five sand washer pumps and necessary accessories, during the past year pumped 34,575,197,000 gallons of water, an average of 94,468,000 gallons per day, with an average lift of 24 feet.

The amount of coal consumed was 17,231 tons, and the total cost of operation was $99,247.00, or $2.87 per million gallons of water pumped to the filters.

The above cost includes the cost of electric lighting for the plant, the pumping of water for filter washing and a certain amount of construction work done by the station mechanics.

The cost of operation for the next year per million gallons raised one foot high, should be less than the figures above given, as the pumping machinery was designed to pump on to the preliminary filters, requiring a head, including suction of forty-five feet.

It is expected by January 20, 1909, that one-half of the preliminary filters will be put in operation, and that by February 15, 1909, all the preliminary filters will be completed, after which date the daily pumpage should be from 200,000,000 to 240,000,000 gallons per day.

The large centrifugal pumps are still in the hands of the contractor and are being operated under their direction by the Bureau employees.

During the past year there was installed in the station the following machinery, etc.:

Coal handling plant—including wharf, track, coal storage bin, coal and ash tower, with machinery, etc.

Three 350 horse power Heine boilers, with Murphy Stokers and Economizers.

Three DeLaval Turbines, direct connected to 75 K. W. generators.

Two DeLaval Turbines, driving centrifugal filter wash pumps of one and two-and-one-half million gallons daily capacity.

Two DeLaval Turbines, driving centrifugal pre-filter sand washer pumps of five million gallon daily capacity each.

One Deane Motor Driven Triplex Pump.

One 40,000,000 gallon Allis-Chalmers Company engine driven centrifugal pump.

The intake was completed and water has been taken from the river, through Gate House No. 1, since April 9, 1908.

High Service Stations.

The total pumpage at the High Service Stations was 3,008,496,156 gallons, averaging 8,219,936 gallons per day, an increase compared with that of the preceding year of approximately 10 per cent.

The following table shows the pumpage at the several High Service Stations:

Stations.	Pumpage, Gallons.	Increase, Gallons.	Decrease, Gallons.
Belmont	785,603,165		115,175,020
Roxborough	1,673,483,865	475,026,556	
Mt. Airy	44,472,500	7,862,500	
Chestnut Hill	355,570	355,570	
Frankford	504,581,056		40,730,015
Totals	3,008,496,156	496,244,526	155,905,035

A new Allis-Chalmers cross compound, horizontal, 6,000,000 gallon pump has been erected at the Belmont High Service Station in place of the old No. 1 pump and the Worthington No. 2 pump is now receiving a much needed overhauling.

Financial Statement.

Improvement, Extension and Filtration of the Water Supply.

The total fund appropriated by Councils for the improvement, extension and filtration of the water supply is as follows:

By ordinance of June 17 and July 12, 1898	$ 500,000 00
By ordinance of January 12, 1900	3,200,000 00
By ordinance of March 23, 1900	12,000,000 00
By ordinance of June 30, 1902	1,300,000 00
By ordinance of December 29, 1902	500,000 00
By ordinance of June 27, 1904	5,000,000 00
By ordinance of September 22, 1906	1,200,000 00
By ordinance of May 10, 1907	2,800,000 00
By ordinance of June 20, 1908	800,000 00
	$27,300,000 00

Of the fund provided there has been paid out and charged off on account of contracts, to December 31, 1908, the following amounts:

Paid on completed contracts	$18,518,038 12
Paid on uncompleted contracts	3,006,781 10
Limits of uncompleted contracts, less payments	992,293 12
Land Damages	876,485 55
Expenses, supplies, advertisements, etc	406,609 16
Inspections	22,897 04
Salaries and wages	1,421,102 00
Expended by Bureau of Water	1,013,149 89
Damages to property on account of pipe laying	18,451 55
Repaving over pipe trenches	100,053 99
Available balances, cash on hand	124,138 48
Balance available from ordinance June 20, 1908	800,000 00
Total	$27,300,000 00

Land Appropriated.

Up to date the total land taken for this work amounts to 471.7 acres, costing $876,485.55, including all expenses.

List of Contracts for Improvement, Extension and Filtration of the Water Supply.

No.	Description.	Contractor.	Limit.	Amount Paid to Dec. 31, '08.	Bids Opened.	Work Begun.	Work Completed.	Percentage of Work Done.
1	A Testing Station	Thos. Parker	$9,000 00		Feb. 27, 1900	Mch. 13, 1900	July 1, 1900.	
1 Sup.	Extension to Testing Station	Thos. Parker	5,000 00	$11,653 54				
2	Ice refrigerating machine	Newburg Ice Machine & Engine Co	800 00	768 56	July 20, 1900	Aug. 1, 1900	Oct. 15, 1900.	
3	Filter gravel and sand for Testing Station	Noreross & Edmunds	2,500 00	1,016 54	July 20, 1900	Aug. 1, 1900	Nov. 1, 1900.	
4	Platinum ware for Testing Station	Chas. Lentz & Sons	674 50	649 50	July 20, 1900		Oct. 31, 1900.	
5	Test borings	Flaghouse & Beeson	9,750 00	8,833 30	Aug. 7, 1900	Sept. 18, 1900	Feb. 27, 1901.	
6	Platinum ware for Testing Station	Arthur H. Thomas Co	444 95	444 95	Dec. 12, 1900		Feb. 6, 1901.	
7	Lower Roxboro Filters	(No award. Readvertised as Contract No. 10			Dec. 12, 1900.			
8	Sand ejector for Lower Roxboro	Patrick Gormley	1,800 00	1,712 03	April 17, 1901	May 6, 1901	July 6, 1901.	
9	Cast iron water pipe, special castings, stop valves, pipe laying, etc. (See Contracts 9A, 9B and 9C for balance of contract)	D. J. McNichol. (Bids rejected on pipe lines "A" to "J" inclusive)			Feb. 11, 1901.			
9A	Stop box frames and covers	J. Alfred Clark	2,100 00	1,563 80	Feb. 11, 1901		Dec. 1, 1901.	
9B	Stop and check valves, etc	Eddy Valve Co	17,000 00	14,403 06	Feb. 11, 1901		Dec. 1, 1901.	
9C	Furnishing cast iron pipe, etc., for Lower Roxboro Filters	D. J. McNichol	7,500 00	7,488 14	Feb. 11, 1901		Dec. 1, 1901.	

List of Contracts for Improvement, Extension and Filtration of the Water Supply—Continued.

No.	Description.	Contractor.	Limit.	Amount Paid to Dec. 31, '08.	Bids Opened.	Work Begun.	Work Completed.	Percentage of Work Done.
10	Lower Roxboro Filters	D. J. McNichol	$250,000 00	$230,929 70	Feb. 11, 1901	April 9, 1901	Mch. 1, 1902.	
11	Pumping engines, boilers and electric traveling crane for Lardner's Point Station No. 2	Holly Manufacturing Co	360,000 00	359,169 00	May 1, 1901		Feb. 23, 1905.	
12	Upper Roxboro Filters	D. J. McNichol	540,000 00		April 17, 1901	May 15, 1901	Sept. 1, 1903.	
12 Sup.	Upper Roxboro Filters	D. J. McNichol	12,000 00	550,911 59				
13	Stop valves, patterns and core boxes	Eddy Valve Co	13,000 00	12,825 00	April 17, 1901		Nov. 1, 1902.	
14	Torresdale Conduit	D. J. McNichol	1,365,500 00	1,364,646 26	May 28, 1901	Nov. 23, 1901	April 23, 1904.	
14 Sup.	Torresdale Conduit	D. J. McNichol	15,000 00					
15	Test Pit at Lardner's Point	(Work done by Bureau of Water.)						
16	Belmont Filters and Reservoir	Ryan & Kelley	2,000,000 00	1,969,136 18	May 28, 1901	July 10, 1901	Dec. 1, 1903.	
17	Pipe lines "A" to "J" inclusive	D. J. McNichol	750,000 00	749,455 01	April 17, 1901	June 26, 1901	Sept. 8, 1902.	
18	Low service pumping machinery for Upper Roxboro Filters	Henry R. Worthington, Inc.	23,500 00	21,332 09	July 29, 1901		Mch. 1, 1904.	
19	Pipe lines "K" to "R" inclusive	D. J. McNichol	460,000 00			April 11, 1902	Jan. 31, 1903.	
19 Sup.	Pipe lines "K" to "R" inclusive	D. J. McNichol	40,000 00	499,805 18	July 29, 1901. Dec. 18, 1901			
20	Triplex pumps and gasoline driving engines for Upper Roxboro Filters	Fairbanks, Morse & Co	10,800 00	10,490 00	Dec. 18, 1901		July 1, 1903.	

List of Contracts for Improvement, Extension and Filtration of the Water Supply—Continued.

No.	Description.	Contractor.	Limit.	Amount Paid to Dec. 31, '08.	Bids Opened.	Work Begun.	Work Completed.	Percentage of Work Done.
21	Low Service Pumping Station for Upper Roxboro Filters	Henderson & Co., Ltd	$21,000 00	$18,725 43	Sept. 25, 1901		May 20, 1902.	
22	Hand traveling crane for Low Service Pumping Station, Upper Roxboro Filters	Alfred Box & Co	2,900 00	2,800 00	July 29, 1901		Aug. 9, 1902.	
23A	Pumping Station and Administration Building for Upper Roxboro Filters	D. J. McNichol	43,000 00	38,440 60	June 25, 1902	Aug. 25, 1902	July 1, 1903.	
24	Filtering materials for Upper and Lower Roxboro, and sand washer for Lower Roxboro	D. J. McNichol	290,000 00	280,358 53	Dec. 18, 1901	Mch. 22, 1902	July 25, 1903.	
25	Torresdale Filters	D. J. McNichol	5,000,000 00	4,842,354 33 89,878 43	Dec. 18, 1901 (Awarded by arbiter.)	Jan. 23, 1902	C'ntr't annulled Mch. 7, 1906.	
26	Torresdale Testing Station	Patrick Gormley	9,000 00	8,643 00	July 29, 1901	Aug. 13, 1901	Dec. 19, 1901.	
27	Oak Lane Reservoir	R. A. Malone & Co	550,000 00		Dec. 18, 1901	April 14, 1902	Nov. 25, 1904.	
27 Sup.	No. 1, Oak Lane Reservoir	R. A. Malone & Co	10,000 00					
27 Sup.	No. 2, Oak Lane Reservoir	R. A. Malone & Co	4,974 22	564,921 10				
28	Lardner's Point Pipe Distribution System	D. J. McNichol	1,300,000 00	1,381,446 15	Feb. 16, 1903	Mch. 18, 1903	C'ntr't annulled	
28 Sup.	Lardner's Point Pipe Distribution System	D. J. McNichol	400,000 00	165,213 08	(Awarded by arbiter.)		Mch. 7, 1906.	
29	Lardner's Point Pumping Station No. 2	Geo. C. Dietrich	565,000 00	555,815 20	Aug. 12, 1902 Sept. 17, 1902	Sept. 27, 1902	Jan. 31, 1905.	

List of Contracts for Improvement, Extension and Filtration of the Water Supply—Continued.

No.	Description.	Contractor.	Limit.	Amount Paid to Dec. 31, '08.	Bids Opened.	Work Begun.	Work Completed.	Percentage of Work Done.
30	Lardner's Point Pumping Station. (Re-advertised as Contract No. 29)				Feb. 26, 1902.			
31	Coal handling machinery and pockets, Lardner's Point Pumping Stations Nos. 2 and 3.	Henderson & Co., Ltd	$115,000 00	$4,905 50	Feb. 2, 1905. (Awarded by arbiter.)		C'ntr't annulled Mch. 7, 1906.	
32	Addition to Spring Garden Testing Station	No award			Sept. 25, 1901.			
33	Sand washers for Upper Roxboro Filters	E. M. Nichols	4,000 00	3,849 00	Mch. 24, 1903		July 1, 1903.	
34	Torresdale Intake	D. J. McNichol	180,000 00	46,595 97 78,396 71	Aug. 2, 1904. (Awarded by arbiter)	Sept. 19, 1904	C'ntr't annulled Mch. 7, 1906.	
35	Low lift pumping machinery, Torresdale Pumping Station	Stuart Wood	210,000 00	138,645 00	April 26, 1906	June 23, 1906		90
36	Pumping Station at Torresdale	David Peoples	120,000 00		June 20, 1906	July 2, 1906	Sept. 3, 1907.	
36 Sup.	Pumping Station at Torresdale	David Peoples	7,000 00	125,512 24				
37	Preliminary Filters, Lower Roxboro Filter Plant	Maignen Filtration Co	49,800 00	49,600 00	Sept. 23, 1902	June 1, 1903	Dec. 1, 1904.	
37A	Foundations and superstructure for Lower Roxboro Preliminary Filters	D. J. McNichol	50,000 00	47,076 48	Feb. 16, 1903	Mch. 3, 1903	Dec. 31, 1903.	
38	Preliminary Filters at Belmont. (Readvertised as Contract No. 39)				Feb. 18, 1904.			
39B	Belmont Preliminary Filters	D. J. McNichol	226,000 00	40,870 21 63,395 75	Nov. 1, 1904 (Awarded by arbiter.)	Nov. 16, 1904	C'ntr't annulled Mch. 7, 1906.	

List of Contracts for Improvement, Extension and Filtration of the Water Supply—Continued.

No.	Description.	Contractor.	Limit.	Amount Paid to Dec. 31, '08.	Bids Opened.	Work Begun.	Work Completed.	Percentage of Work Done.
39T	Torresdale Preliminary Filters	D. J. McNichol	$1,354,000 00	{ $101,690 82 439,895 89	Nov. 1, 1904 (Awarded by arbiter.)	Nov. 2, 1904	C'ntr't annulled Mch. 7, 1906.	
40A	Low service drainage pumps for Belmont	Camden Iron Works	7,000 00		June 30, 1903	Mch. 5, 1904	Sept. 11, 1904.	
40A-Sup.	Low service drainage pumps for Belmont	Camden Iron Works	300 00	7,298 44				
40B	Sand washer pumps and boilers for Belmont Filters	I. P. Morris Co	29,000 00	28,725 43	June 30, 1903	Feb. 1, 1904	Dec. 20, 1905.	
41	Queen Lane Filter Plant	No award			Aug. 1, 1906.			
42	Administration Building and Pumping Station, Belmont Filters	H. B. Shoemaker & Co	55,000 00	51,488 36	June 30, 1903	July 20, 1903	Aug. 28, 1904.	
43	Chimney at Torresdale Pumping Station	Alphons Custodis Chimney Construction Co	7,500 00	7,423 99	June 20, 1906	Oct. 29, 1906	May 1, 1907.	
44	Electric lighting system for Upper and Lower Roxboro Filters	Penna. Equipment Co	15,500 00	15,360 48	Mch. 24, 1903	April 17, 1903	Aug. 18, 1903.	
45	Electric generators, driving engines, etc., Lardner's Point Station No. 2	J. F. Buchanan & Co	9,000 00	8,759 00	Feb. 18, 1904	Sept. 24, 1904	Oct. 11, 1906.	
46	Electric lighting system, Belmont Filters	Penna. Equipment Co	20,000 00	18,717 47	June 30, 1903	Sept. 1, 1903	Sept. 1, 1904.	
47	Lightning rods for Lardner's Point and Torresdale	Carl Bajohr	1,600 00		July 5, 1906	Oct. 8, 1906	May 1, 1907.	
47 Sup.	Lightning rods for Lardner's Point and Torresdale	Carl Bajohr	100 00	1,662 00				

List of Contracts for Improvement, Extension and Filtration of the Water Supply—Continued.

No.	Description.	Contractor.	Limit.	Amount Paid to Dec. 31, '08.	Bids Opened.	Work Begun.	Work Completed.	Percentage of Work Done.
48	Traveling crane, Lardner's Point Station No. 3	Alfred Box Co.	$6,500 00	$6,500 00	Nov. 1, 1904.	Aug. 14, 1905.	Nov. 6, 1905.	
49	Filtering materials for Belmont Filters	D. J. McNichol	365,000 00	349,736 67	Feb. 16, 1903.	July 28, 1903.	Aug. 30, 1904.	
50	Filtering materials for Torresdale Filters	D. J. McNichol	500,000 00	213,477 50	Feb. 16, 1903.	June 8, 1904.	C'ntr't annulled	
50 Sup.	Filtering materials for Torresdale Filters	D. J. McNichol	200,000 00	372,552 57	(Awarded by arbiter.)		June 20, 1905.	
51	Filtering materials for Torresdale Filters	Norcross & Edmunds	315,000 00	145,142 50	Sept. 6, 1905. Contr't annulled by Sup. Court	May 31, 1906.	May 6, 1907.	
52	Fence, Torresdale Filters	Edw. Fay & Son	6,000 00	5,530 25	June 20, 1906.	Sept. 20, 1906.	Dec. 26, 1906.	
53	Cleaning out George's Hill Reservoir	M. & J. B. McHugh	25,000 00		July 5, 1906.	Sept. 1, 1906.	Jan. 21, 1907.	
53 Sup.	Cleaning out George's Hill Reservoir	M. & J. B. McHugh	1,500 00	26,342 82				
54	Queen Lane contingent of filters at Torresdale	D. J. McNichol	570,000 00	481,873 41 58,252 41	Feb. 18, 1904. (Awarded by arbiter.)	April 4, 1904.	C'ntr't annulled Mch. 7, 1906.	
55	Cement for repairs to Torresdale Conduit	Knickerbocker Lime Co.	9,000 00	7,606 25	July 5, 1906.	Aug. 31, 1906.	Feb. 28, 1907.	
56	Cleaning North Basin, Queen Lane Reservoir	Geo. Moehrle	35,000 00	33,143 04	July 13, 1906.	Sept. 17, 1906.	Dec. 8, 1906.	
57	Electric traveling crane for Torresdale Pumping Station	North Penn Iron Co.	3,800 00	3,652 00	July 13, 1906.	Feb. 1, 1907.	Mch. 8, 1907.	
58	Repairs to D'Auria pump at Wentz Farm Reservoir	Builders' Iron Foundry	1,750 00		July 18, 1906.	Aug. 10, 1906.	Mch. 30, 1907.	

List of Contracts for Improvement, Extension and Filtration of the Water Supply—Continued.

No.	Description.	Contractor.	Limit.	Amount Paid to Dec. 31, '08.	Bids Opened.	Work Begun.	Work Completed.	Percentage of Work Done.
58 Sup.	Repairs to D'Auria Pump at Wentz Farm Reservoir	Builders' Iron Foundry	$500 00	$1,771 95				
59	Sand washers and ejector pipes for Torresdale Filters	E. M. Nichols	37,000 00	32,759 44	Aug. 11, 1904	Sept. 8, 1904	Aug. 24, 1905.	
60	Inspecting steel pipe and structural steel, Lardner's Point Pipe Distribution System	Osborn Engineering Co	6,000 00	5,473 23	July 25, 1906	Aug. 10, 1906.		
61	Completing Torresdale Intake	R. P. Bennis	160,000 00	150,097 11	Aug. 22, 1906	Oct. 1, 1906	Aug. 1, 1908.	
62	Baffles for Lower Roxboro Reservoir	No award			June 25, 1902.			
63	Sand washers for Belmont Filters	Patrick Gormley	6,800 00	6,595 00	June 30, 1903	Aug. 22, 1903	Nov. 1, 1903.	
65	Hand traveling crane for Low Service Pumping Station, Belmont Filters	Alfred Box Co	2,700 00	2,700 00	June 30, 1903	Jan. 11, 1904	April 20, 1904.	
66	Pipe line "U," extension of the Roxboro Distribution System	J. H. Louchheim	110,000 00	100,558 62	Feb. 18, 1904	May 26, 1904	Nov. 30, 1904.	
67	Pumping machinery for Lardner's Point Pumping Station No. 2	Holly Manufacturing Co	440,000 00	358,882 60	Feb. 18, 1904	May 11, 1904	Aug. 1, 1906.	
68	Lardner's Point Pumping Station No. 3	Ryan & Kelley	350,000 00	318,557 90	Feb. 18, 1904	May 11, 1904	Nov. 1, 1905.	
69M	Laying pipe and valves, Torresdale Pipe Distribution System	Jno. McMenamy	65,000 00		Aug. 8, 1906	Sept. 24, 1906	April 2, 1908.	
69M-Sup.	Laying pipe and valves, Torresdale Pipe Distribution System	Jno. McMenamy	60,000 00					

List of Contracts for Improvement, Extension and Filtration of the Water Supply—Continued.

No.	Description.	Contractor.	Limit.	Amount Paid to Dec. 31, '08.	Bids Opened.	Work Begun.	Work Completed.	Percentage of Work Done.
69M-Sup.	Laying pipe and valves, Torresdale Pipe Distribution System	Jno. McMenamy	$40,000 00	$152,237 57				
69R	Furnishing valves, Torresdale Pipe Distribution System	Roe-Stephens Mfg. Co	3,000 00	1,795 44	Aug. 8, 1906		Mch. 9, 1907.	
69U	Furnishing cast iron pipe, Torresdale Pipe Distribution System	U. S. Cast Iron Pipe and Foundry Co	100,000 00		Aug. 8, 1906	Sept. 26, 1906	Sept. 1, 1907.	
69U-Sup.	Furnishing cast iron pipe, Torresdale Pipe Distribution System	U. S. Cast Iron Pipe and Foundry Co	35,000 00	131,513 65				
69W	Furnishing C. I. pipe and specials, Torresdale Pipe Distribution System	Stuart Wood	60,000 00		Aug. 8, 1906	Sept. 18, 1906	Sept. 1, 1907.	
69W-Sup.	Furnishing C. I. pipe and specials, Torresdale Pipe Distribution System	Stuart Wood	22,000 00	82,000 00				
69XK	Furnishing riveted steel pipe, Torresdale Pipe Distribution System	E. Keeler Co	6,500 00		Oct. 3, 1906		Sept. 1, 1907.	
69XK-Sup.	Furnishing riveted steel pipe, Torresdale Pipe Distribution System	E. Keeler Co	142 00	6,642 00				
69XW	Furnishing C. I. pipe and specials, Torresdale Pipe Distribution System	Walter Wood	7,500 00	7,002 11	Oct. 3, 1906		Sept. 1, 1907.	
70A	Furnishing grey iron castings, Torresdale Pipe Distribution System	J. Alfred Clark	1,100 00		July 5, 1906	Oct. 29, 1906	April 1, 1907.	

List of Contracts for Improvement, Extension and Filtration of the Water Supply—Continued.

No.	Description.	Contractor.	Limit.	Amount Paid to Dec. 31, '08.	Bids Opened.	Work Begun.	Work Completed.	Percentage of Work Done.
70A-Sup.	Furnishing grey iron castings, Torresdale Pipe Distribution System	J. Alfred Clark	$800 00	$1,555 44				
70O	Furnishing riveted steel pipe, Torresdale Pipe Distribution System	Carrol-Porter Boiler and Tank Co	160,000 00		June 12, 1906	Aug. 21, 1906	April 1, 1907.	
70O-Sup.	Furnishing riveted steel pipe, Torresdale Pipe Distribution System	Carrol-Porter Boiler and Tank Co	80,000 00	231,577 37				
70E	Furnishing lock bar pipe, Torresdale Pipe Distribution System	East Jersey Pipe Co	279,000 00		June 12, 1906	Oct. 9, 1906	Sept. 1, 1907.	
70E-Sup.	Furnishing lock bar pipe, Torresdale Pipe Distribution System	East Jersey Pipe Co	220,000 00	492,092 66				
70F	Furnishing stop valves, Torresdale Pipe Distribution System	The Fairbanks Co	30,000 00	28,884 04	June 12, 1906	Oct. 15, 1906	June 17, 1907.	
70M	Laying pipe and valves, Torresdale Pipe Distribution System	Cunningham & Murray	185,000 00		June 12, 1906	Oct. 8, 1906	April 1, 1908.	
70M-Sup.	Laying pipe and valves, Torresdale Pipe Distribution System	Cunningham & Murray	35,000 00					
70M-Sup.	Laying pipe and valves, Torresdale Pipe Distribution System	Cunningham & Murray	90,000 00					
70M-Sup.	Laying pipe and valves, Torresdale Pipe Distribution System	Cunningham & Murray	10,000 00	319,324 44				
70N	Furnishing riveted steel pipe, Torresdale Pipe Distribution System	Jas. McNeil & Bros. Co	190,000 00		June 12, 1906	Aug. 18, 1906	Aug. 1, 1907.	

List of Contracts for Improvement, Extension and Filtration of the Water Supply—Continued.

No.	Description.	Contractor.	Limit.	Amount Paid to Dec. 31, '08.	Bids Opened.	Work Begun.	Work Completed.	Percentage of Work Done.
70N-Sup.	Furnishing riveted steel pipe, Torresdale Pipe Distribution System	Jas. McNeil & Bros. Co	$49,000 00					
70N-Sup.	Furnishing riveted steel pipe, Torresdale Pipe Distribution System	Jas. McNeil & Bros. Co	45,000 00	$279,087 52				
70P	Laying riveted steel pipe, Torresdale Pipe Distribution System	American Paving and Construction Co	57,000 00		June 12, 1906	Oct. 2, 1906	May 22, 1908.	
70P-Sup.	Laying riveted steel pipe, Torresdale Pipe Distribution System	American Paving and Construction Co	45,000 00	96,550 02				
70S	Laying riveted steel pipe, Torresdale Pipe Distribution System	R. C. Storrie	244,000 00		June 12, 1906	July 28, 1906	May 25, 1908.	
70S-Sup.	Laying riveted steel pipe, Torresdale Pipe Distribution System	R. C. Storrie	65,000 00					
70S-Sup.	Laying riveted steel pipe, Torresdale Pipe Distribution System	R. C. Storrie	65,000 00					
70S-Sup.	Laying riveted steel pipe, Torresdale Pipe Distribution System	R. C. Storrie	50,000 00	419,037 76				
70W	Furnishing cast iron water pipe, Torresdale Pipe Distribution System	Walter Wood	50,000 00		June 12, 1906	Oct. 19, 1906	Oct. 10, 1907.	
70W-Sup.	Furnishing cast iron water pipe, Torresdale Pipe Distribution System	Walter Wood	62,000 00	109,570 66				

List of Contracts for Improvement, Extension and Filtration of the Water Supply—Continued.

No.	Description.	Contractor.	Limit.	Amount Paid to Dec. 31, '08.	Bids Opened.	Work Begun.	Work Completed.	Percentage of Work Done.
72	Filtering materials for Queen Lane Contingent, Torresdale Filters	Norcross & Edmunds	$35,000 00		Nov. 14, 1907	(Co't ct annulled	May 7. 1907.)	
73	Washers, boxes and piping for foundation bolts of engines at Lardner's Point Pumping Station No. 3	J. Alfred Clarke	2,050 00	$2,048 00	Aug. 11, 1904	Aug. 29, 1904	Sept. 5, 1904.	
74	Removal of laboratories from Spring Garden Testing Station to Belmont Filters	(No award—done by Bureau of Water)			{ Aug. 5, 1904. Sept. 6, 1904.			
75	Furnishing electrical ducts for Torresdale Filters	Standard Vitrified Conduit Co	1,000 00	924 75	Aug. 15, 1904		Oct. 1, 1904.	
76	Screens for ventilator shafts for Torresdale Filters	DeWitt Wire Cloth Co	7,750 00	7,619 96	Aug. 15, 1904		Dec. 1, 1904.	
77	Grading and sodding walks around Lardner's Point Station No. 2	No award			June 19, 1905.			
78	Restoring sand at the Belmont Filters	Williamson & McLaughlin	2,300 00	2,300 00	June 19, 1905	Aug. 15, 1905	Oct. 13, 1905.	
79	Flooring Lardner's Point Station No. 2	No award			June 19, 1905.			
80	Restoring sand to filters, Belmont, Upper and Lower Roxboro	Wm. McKeon	2,500 00	2,484 49	Oct. 3, 1905	Oct. 17, 1905	Dec. 28, 1905.	
81	Pumping out Torresdale Conduit	D'Olier Engineering Co	30,000 00		Oct. 3, 1905	Oct. 20, 1905	Dec. 23, 1905.	
81-Sup.	Pumping out Torresdale Conduit	D'Olier Engineering Co	20,000 00					
81-Sup.	Pumping out Torresdale Conduit	D'Olier Engineering Co	15,000 00					

List of Contracts for Improvement, Extension and Filtration of the Water Supply—Continued.

No.	Description.	Contractor.	Limit.	Amount Paid to Dec. 31, '08.	Bids Opened.	Work Begun.	Work Completed.	Percentage of Work Done.
81-Sup.	Pumping out Torresdale Conduit	D'Olier Engineering Co	$15,000 00	$76,867 68				
82	Ten boilers for Belmont Pumping Station	Coatesville Boiler Works	42,000 00	39,800 00	Nov. 3, 1905	Dec. 8, 1905	July 2, 1906.	
83	Boiler house and chimney, Belmont Pumping Station	Abel Bottoms & Son	59,000 00	53,015 96	Jan. 23, 1906	Feb. 6, 1906	Oct. 1, 1906.	
84	Electrical supplies	Mayer & Englund Co	4,500 00	4,269 33	Nov. 3, 1905		Dec. 18, 1905.	
85	Electro-pneumatic drill for Torresdale Conduit	Ingersoll-Rand Co	1,410 00	1,410 00	Nov. 3, 1905		Dec. 30, 1905.	
86	Tram track and cars for Torresdale Conduit	Arthur Koppel Co	4,928 00	4,835 00	April 26, 1906	May 25, 1906	Sept. 24, 1906.	
87	Restoring sand to filters, Belmont, Upper and Lower Roxboro	Williamson & McLaughlin	7,000 00	6,987 58	June 6, 1906	June 7, 1906	Nov. 2, 1906.	
88	Coal handling machinery for Torresdale Pumping Station	(No award — readvertised as Contract No. 106)			Jan. 4, 1907.			
89	Completing Preliminary Filters at Belmont Station	P. A. Maignen	155,000 00	152,938 11	Nov. 7, 1906	Mch. 22, 1907	Oct. 22, 1907.	
90	Repairs to Wetherill pump at Frankford Pumping Station	H. B. Underwood & Co	1,200 00		Oct. 30, 1906		Jan. 22, 1907.	
90-Sup.	Repairs to Wetherill pump at Frankford Pumping Station	H. B. Underwood & Co	500 00	1,051 00				
91	Cement for Torresdale Conduit	W. T. Bradley Co	9,000 00	4,075 68	Nov. 7, 1906		Jan. 16, 1907.	

List of Contracts for Improvement, Extension and Filtration of the Water Supply—Continued.

No.	Description.	Contractor.	Limit.	Amount Paid to Dec. 31, '08.	Bids Opened.	Work Begun.	Work Completed.	Percentage of Work Done.
92	Boiler equipment for Lardner's Point Station No. 2	Edgemoor Iron Co	$63,000 00	$59,968 00	Nov. 30, 1906	Mch. 26, 1907	Dec. 6, 1907.	
93	Four pumping engines for Lardner's Point Station No. 3	Holly Manufacturing Co	600,000 00	243,167 10	Jan. 4, 1907	Mch. 26, 1907		98
94	Coal handling machinery for Lardner's Point	Filbert Paving & Construction Co	135,000 00	43,095 15	Aug. 18, 1908	Sept. 8, 1908		35
95E	Boiler equipment for Lardner's Point Pumping Station No. 3	Edgemoor Iron Co	73,000 00	70,275 00	Feb. 5, 1907	Aug. 22, 1907	Aug. 19, 1908.	
95G	Economizer for Lardner's Pumping Station No. 3	Green Fuel Economizer Co	18,500 00	14,532 70	Feb. 5, 1907	Aug. 28, 1907	Dec. 31, 1908	100
95F	Foundations for boilers for Lardner's Point Pumping Station No. 3	Edw. Fay & Son	12,000 00	11,948 28	Feb. 5, 1907	Nov. 13, 1907	June 4, 1908.	
96	Boiler repairs for Frankford Pumping Sta'n	Just Manufacturing Co	3,300 00	3,299 83	Nov. 22, 1906		April 16, 1907.	
97	Completing main collectors, 56 to 65, Torresdale Station	David G. Gray	5,000 00	4,591 72	Nov. 14, 1906	Feb. 24, 1907	April 5, 1907.	
98	Wooden floor for Lardner's Point Station No. 2	Edward Fay & Son	7,500 00	6,568 00	July 8, 1907	July 23, 1907	Feb. 1, 1908.	
99	Filling and grading for Torresdale Filter Station	No award			Dec. 12, 1906.			
100	Furnishing steel castings for Torresdale Pipe Distribution System	Penn Steel Casting and Machine Co	2,000 00	1,464 42	Dec. 19, 1906	Mch. 14, 1907	Mch. 15, 1907.	

List of Contracts for Improvement, Extension and Filtration of the Water Supply—Continued.

No.	Description.	Contractor.	Limit.	Amount Paid to Dec. 31, '08.	Bids Opened.	Work Begun.	Work Completed.	Percentage of Work Done.
101	Pipe connections for Torresdale Pumping Station	Bennis Construction Co	$42,000 00		Jan. 23, 1907	Jan. 28, 1907	Sept. 23, 1907.	
101-Sup.	Pipe connections for Torresdale Pumping Station	Bennis Construction Co	12,000 00	$53,256 46				
102	Preliminary Filters for Torresdale Station	Millard Construction Co	500,000 00		Aug. 22, 1907	Sept. 24, 1907		95
102-Sup.	Preliminary Filters for Torresdale Station	Millard Construction Co	550,000 00					
102-Sup.	Preliminary Filters for Torresdale Station	Millard Construction Co	100,000 00	897,260 98				
103B	Electric wiring at Torresdale Pumping Sta'n.	J. F. Buchanan Co	2,500 00	1,808 25	May 2, 1907	Aug. 7, 1907	Oct. 26, 1908.	
103F	Completion of Court No. 3, and interior work, Torresdale Pumping Station	Edward Fay & Son	40,000 00	35,222 10	May 2, 1907	May 27, 1907	Aug. 21, 1907.	
103W	Steam heating and plumbing system for Torresdale Pumping Station	West End Heating and Engineering Co	5,500 00	4,984 46	May 2, 1907	Aug. 9, 1907	May 7, 1908.	
104	Crushed stone or gravel for Torresdale Filters	No award			Jan. 28, 1907.			
105	Pipe connections for House No. 1, Frankford	No award			Mch. 22, 1907. April 8, 1907.			
106B	Wharf and track, Torresdale Pumping Sta'n	Bennis Construction Co	36,000 00	31,587 62	Mch. 28, 1907	July 8, 1907	Aug. 29, 1908.	
106F	Revolving crane and cars, Torresdale Pumping Station	Filbert Paving and Construction Co	10,000 00	8,190 00	Mch. 28, 1907	July 31, 1907	Feb. 15, 1908.	

List of Contracts for Improvement, Extension and Filtration of the Water Supply—Continued.

No.	Description.	Contractor.	Limit.	Amount Paid to Dec. 31, '08.	Bids Opened.	Work Begun.	Work Completed.	Percentage of Work Done.
106L	Coal storage tower, Torresdale Pumping Station	W. W. Lindsay & Co	$28,000 00	$27,902 31	Mch. 28, 1907	May 28, 1907	Mch. 14, 1908.	
106LB	Coal and ash handling machinery, Torresdale Pumping Station	Link Belt Co	15,000 00	13,150 00	Mch. 28, 1907	June 27, 1907	Mch. 17, 1908.	
107	Machinery castings, Pump No. 3, Frankford Station	Gray's Ferry Machine Co	600 00	561 00	Feb. 28, 1907		July 6, 1907.	
108M	Laying pipe, extension of Roxboro Pipe System	M. & J. B. McHugh	41,000 00		Aug. 22, 1907	Oct. 15, 1907	May 30, 1908.	
108M-Sup.	Laying pipe, extension of Roxboro Pipe System	M. & J. B. McHugh	5,000 00	45,816 47				
108W	Furnishing pipe, extension of Roxboro Pipe System	Walter Wood	55,000 00	50,512 39	Aug. 22, 1907	Oct. 22, 1907	Feb. 9, 1908.	
109	Electric wiring for Torresdale Filters	D'Olier Engineering Co	40,000 00		Oct. 22, 1907	Dec. 4, 1907		95
109-Sup.	Electric wiring for Torresdale Filters	D'Olier Engineering Co	40,000 00	56,528 36				
110	Electric machinery for Torresdale Filter Sta'n	Dravo, Doyle & Co	30,000 00	22,635 00	Aug. 29, 1907	Nov. 27, 1907		90
111	Furnishing flanged pipe	(No award — readvertised as Contract No. 123)			April 10, 1907.			
113	Feed water heater, Lardner's Point Station No. 2	Harry F. Murphy & Co	2,500 00	1,687 00	July 8, 1907	Oct. 22, 1907	Nov. 20, 1907.	
115	Closure pieces for steel pipe, Torresdale Distribution System	Henry Goldner & Sons Co	3,000 00	2,260 28	May 16, 1907	May 17, 1907	Nov. 12, 1907.	

List of Contracts for Improvement, Extension and Filtration of the Water Supply—Continued.

No.	Description.	Contractor.	Limit.	Amount Paid to Dec. 31, '08.	Bids Opened.	Work Begun.	Work Completed.	Percentage of Work Done.
116	Water proofing basements, Lardner's Point Station, No. 2 and No. 3	No award			April 26, 1907.			
118	Filtering materials for Torresdale Filter Station	Norcross & Edmunds	$215,000 00	$204,396 38	May 31, 1907	June 9, 1907	Jan. 18, 1908.	
119	Sand washer pumps at Torresdale Pumping Station	Dravo, Doyle & Co	8,000 00	6,640 00	Aug. 29, 1907	Nov. 27, 1907	July 1, 1908.	
120	Furnishing breeches pipe	J. K. Dimmick & Co	1,800 00	1,292 20	July 8, 1907		Sept. 20, 1907.	
121	Extension of injector pipe, Lardner's Point Pumping Station	Mack Paving Co	7,000 00	5,442 05	July 8, 1907	Aug. 8, 1907	Aug. 30, 1907.	
122	Furnishing lumber, Torresdale Filter Station	R. A. & J. J. Williams Co	5,000 00	4,932 75	July 8, 1907	Aug. 9, 1907	Oct. 31, 1907.	
123	Furnishing flange pipe	M. & J. B. McHugh	1,500 00	1,048 70	July 8, 1907		Nov. 4, 1907.	
124	Furnishing lumber at Belmont Filters	Chas. F. Felin & Co	1,800 00	1,548 67	July 17, 1907	Aug. 7, 1907	Oct. 11, 1907.	
125	Restoring sand to Belmont, Upper and Lower Roxboro Filters	M. & J. B. McHugh	13,000 00	8,799 73	July 17, 1907	Aug. 28, 1907	Dec. 27, 1907.	
126	Two pumping engines for Lardner's Point Pumping Station No. 3	Holly Manufacturing Co	60,000 00		Oct. 22, 1907	Dec. 1, 1907		88
126-Sup.	Two pumping engines for Lardner's Point Pumping Station No. 3	Holly Manufacturing Co	215,000 00	165,561 70				
127	Boilers for Torresdale Pumping Station	D'Olier Engineering Co	25,000 00		Oct. 22, 1907	Dec. 15, 1907		90

List of Contracts for Improvement, Extension and Fitration of the Water Supply—Continued.

No.	Description.	Contractor.	Limit.	Amount Paid to Dec. 31, '08.	Bids Opened.	Work Begun.	Work Completed.	Percentage of Work Done.
127-Sup.	Boilers for Torresdale Pumping Station	D'Olier Engineering Co	$10,000 00	$26,122 50				
128	Centrifugal pumping engine for Torresdale Pumping Station	Allis-Chalmers Co	20,000 00		Oct. 22, 1907	Mch. 11, 1908		50
129	Furnishing special castings and breeches pipe for 1907	J. K. Dimmick & Co	7,000 00		Aug. 22, 1907	Nov. 27, 1907	Feb. 20, 1908.	
129-Sup.	Furnishing special castings and breeches pipe for 1907	J. K. Dimmick & Co	1,500 00	8,258 89				
130	Auxiliary pumps for Torresdale Pumping Station	Dravo, Doyle & Co	8,500 00	5,859 00	Mch. 17, 1908			90
131	Extension of Third street pipe line	Millard Construction Co	100,000 00		Sept. 17, 1907	Oct. 1, 1907	June 1, 1908.	
131-Sup.	Extension of Third street pipe line	Millard Construction Co	45,000 00	144,991 15				
132	Sewer connections, Upper Roxboro Filter Station	Thos. F. Reilly	16,000 00	13,208 24	Sept. 17, 1907	Nov. 8, 1907	June 4, 1908.	
133	Shelter houses for Torresdale Filter Station	David Peoples	27,000 00	22,795 50	Jan. 30, 1908	Mch. 23, 1908	Oct. 31, 1908.	
134J	Painting engines, Lardner's Point Pumping Station No. 2	John Jameson & Son	800 00	750 00	Oct. 22, 1907	Dec. 5, 1907	Jan. 29, 1908.	
134JM	Magnesia covering for engines at Lardner's Point Pumping Station No. 2	H. W. Johns, Manville Co	6,000 00	5,464 33	Oct. 22, 1907	Dec. 5, 1907	Jan. 3, 1908.	
135E	Boiler equipment for Roxboro Pumping Station	Edgemoor Iron Co	47,000 00	25,553 71	Jan. 30, 1908	April 13, 1908		78

List of Contracts for Improvement, Extension and Filtration of the Water Supply—Continued.

No.	Description.	Contractor.	Limit.	Amount Paid to Dec. 31, '08.	Bids Opened.	Work Begun.	Work Completed.	Percentage of Work Done.
135H	Chimney for Roxboro Pumping Station	Heine Chimney Co	$7,000 00	$6,271 00	Jan. 30, 1908	May 20, 1908	July 23, 1908.	
136	Apparatus for measuring discharge of centrifugal pumps, Torresdale Pumping Sta'n	Pitometer Co	3,000 00	2,625 00	Nov. 21, 1907	Dec. 4, 1907	Mch. 10, 1908.	
137	Automobile	No award			Dec. 9, 1907.			
138B	Two ten million gallon pumps, Belmont Pumping Station	Bethlehem Steel Co	92,000 00	50,810 48	Mch. 3, 1908			82
138E	Pump foundations, Belmont Pumping Sta'n	Owen J. Evers	9,000 00	2,046 46	Mch. 3, 1908	Nov. 4, 1908		25
138SP	Two five million gallon pumps for Roxboro Pumping Station	Snow Steam Pump Works	82,000 00	38,563 00	Mch. 3, 1908			70
138S	Pump foundations, Roxboro Pumping Sta'n	J. H. Stitzer, Jr	4,500 00	3,646 97	Mch. 3, 1908	Oct. 20, 1908	Dec. 18, 1908	100
139D	Air pump, Queen Lane Pumping Station	Dean Steam Pump Co	1,500 00	1,370 00	Mch. 17, 1908	Aug. 25, 1908	Aug. 28, 1908.	
139M	Pump ends for Queen Lane Pumping Station	I. P. Morris Co	40,000 00		Mch. 17, 1908	Sept. 21, 1908		70
139M-Sup.	Pump ends for Queen Lane Pumping Station	I. P. Morris Co	20,000 00	25,219 07				
140	Extension of High Pressure Fire Main System	Michael O'Rourke	150,000 00	85,022 46	July 29, 1908	Sept. 10, 1908		63
141	Pipe connections for Lardner's Point Pumping Station No. 3	Filbert Paving and Construction Co	28,000 00	25,039 92	Mch. 17, 1908	May 2, 1908	Aug. 20, 1908.	

List of Contracts for Improvement, Extension and Filtration of the Water Supply—Continued.

No.	Description.	Contractor.	Limit.	Amount Paid to Dec. 31, '08.	Bids Opened.	Work Begun.	Work Completed.	Percentage of Work Done.
142M	Foundations for track scales for Torresdale Pumping Station	McGowan & Maginnis	$1,500 00	$1,426 04	Mch. 17, 1908	April 29, 1908	June 30, 1908.	
142S	Track scales, Torresdale Pumping Station	Standard Scale and Supply Co	1,300 00	1,224 00	Mch. 17, 1908	July 14, 1908	July 31, 1908.	
143	Pump ends for Belmont Pumping Station	I. P. Morris Co	20,000 00	2,317 50	April 7, 1908	June 15, 1908		12
144	Sewers on Sixth street, Sedgeley and Glenwood avenues	O'Toole, Walls & Dempsey	5,000 00	4,545 50	April 21, 1908	May 11, 1908	July 1, 1908.	
145	Curbing on Robbins street and Delaware ave.	Arthur McGinn	2,000 00	1,620 40	July 29, 1908	Sept. 8, 1908	Sept. 21, 1908.	
146	Restoring sand to Belmont, Upper and Lower Roxboro and Torresdale Filters	E. M. Nichols	10,000 00	9,638 51	July 29, 1908	Sept. 2, 1908	Dec. 12, 1908.	
147	Four sluice gates for Torresdale Filter Sta'n.	W. W. Lindsay & Co	2,600 00	2,173 50	July 29, 1908		Nov. 19, 1908	100
148	48-inch pipe and specials for Twenty-second street line	Walter Wood	15,000 00	13,146 40	July 29, 1908	Oct. 12, 1908	Nov. 21, 1908.	
149	Painting buildings at Upper and Lower Roxboro and Belmont Filters	Edw. Fay & Son	2,750 00	2,285 00	July 29, 1908	Aug. 6, 1908	Sept. 5, 1908.	
150	Surface condenser for Roxboro Auxiliary Pumping Station	C. H. Wheeler Mfg. Co	1,000 00	575 00	July 29, 1908		Nov. 11, 1908.	
151	Furnishing 6-inch, 8-inch and 10-inch cast iron pipe and specials	R. D. Wood & Co	30,000 00	27,151 35	July 29, 1908	Aug. 8, 1908		90

List of Contracts for Improvement, Extension and Filtration of the Water Supply—Continued.

No.	Description.	Contractor.	Limit.	Amount Paid to Dec. 31, '08	Bids Opened.	Work Begun.	Work Completed.	Percentage of Work Done.
152B	Apparatus for cleaning slow sand filters at Torresdale	Geo. P. Baldwin	$6,500 00		Sept. 3, 1908	Dec. 3, 1908.		
152N	Apparatus for cleaning slow sand filters at Upper and Lower Roxboro and Torresdale Stations	E. M. Nichols	13,000 00		Sept. 3, 1908.			
153	Suspension bridge at Torresdale Filter Sta'n	Sax & Abbott Const. Co	2,000 00		Nov. 20, 1908.			

OPERATION OF FILTERS.

Lower Roxborough Filters.

This station consists of a storage reservoir of 12,838,000 gallons capacity, giving a period of 1.26 days' sedimentation; five covered filter beds having a combined area of 2.65 acres; eleven preliminary filter tanks with a combined area of 0.2586 acres, and a covered clear water basin of 3,000,000 gallons capacity.

During the year there were filtered at this station 3,550,858,000 gallons of water, or a daily average of 9,701,700 gallons, corresponding to an average rate of 3.66 million gallons per acre per day. The filters are operated at times at rates between five and six million gallons per acre per twenty-four hours.

The total cost of operation, not including the cost of the wash water, was $18,502.00, or $5.21 per million gallons filtered, of which the laboratory cost was 43.5 cents per million gallons filtered.

The preliminary filters are operated at rates approximately 41,270,000 gallons per acre per twenty-four hours, and cost 46 cents per million gallons for water, labor and power in washing; 30 cents for replacing sponge and slag, making the total cost 76 cents per million gallons filtered. The average reduction in turbidity was 45.5 per cent.

The total number of runs or washings of the slow sand filters during the year was 49, an average of 10 runs to each filter; the average time between scrapings was 33.5 days and the average amount filtered between cleanings was 72.467 million gallons, or 136.73 gallons per acre.

In Filters Nos. 1, 2 and 5, 3138.2 cubic yards of sand was replaced at a cost of 23 cents per cubic yard, by contract.

Comparing the filtered water and the water flowing from the preliminary filters, the reduction for the past year was as follows:

	Per cent.
Average reduction, turbidity	98.01
Average reduction, bacteria	98.09
Maximum reduction, turbidity	100.00
Maximum reduction, bacteria	99.98
Minimum reduction, turbidity	87.50
Minimum reduction, bacteria	94.31

In the following table a comparison is made showing the reduction of the bacteria and turbidity in the water received from the Schuylkill river. This is the work of the combined plant, consisting of a sedimentation basin (where the water is allowed to stand for an average period of 1.4 days,) preliminary filters and the final filters:

	Per cent.
Average reduction, turbidity	99.13
Average reduction, bacteria	98.97
Maximum reduction, turbidity	100.00
Maximum reduction, bacteria	99.96
Minimum reduction, turbidity	92.30
Minimum reduction, bacteria	86.66

Upper Roxborough Filters.

This station consists of a storage reservoir of 147,032,000 gallons capacity, giving a period of about seven days' sedimentation; eight covered filter beds of a combined area of 5.6 acres, and a covered clear water basin of 8,000,000 gallons capacity.

During the year there were filtered at this station 4,797,140,000 gallons of water, an average of 13,106,700 gallons per day; corresponding to an average rate of 2.34 million gallons per acre per day.

The total cost of operation was $21,436.81, or $4.46 per million gallons, of which the laboratory cost was $.435 per

million gallons filtered. This includes all the items connected with the operation of the station, including the cost of pumping water from the storage reservoir or sedimentation basin to the filters, but does not include the cost of steam furnished for the pumping.

In Filters Nos. 1, 2, 4, 5 and 7, 4,516 cubic yards of sand were replaced at a cost of 22 cents per cubic yard.

Comparing the filtered water and the water flowing from the Upper Roxborough sedimentation reservoir, the reductions were as follows:

	Per cent.
Average reduction, turbidity	98.79
Average reduction, bacteria	99.16
Maximum reduction, turbidity	100.00
Maximum reduction, bacteria	99.76
Minimum reduction, turbidity	94.44
Minimum reduction, bacteria	87.74

Comparing the effluent in the filters with the water pumped from the Schuylkill river, the reductions were as follows:

	Per cent.
Average reduction, turbidity	99.34
Average reduction, bacteria	99.88
Maximum reduction, tubidity	100.00
Maximum reduction, bacteria	99.98
Minimum reduction, turbidity	92.30
Minimum reduction, bacteria	99.36

The total number of runs or cleanings during the year was 62, an average of 8 runs to each filter; the average time between scrapings being 44.37 days. The average amount filtered between cleanings was 78.2 million gallons, or 111.7 million gallons per acre.

Belmont Filters.

The Belmont Filter Station is comprised of a sedimentation basin of 70,000,000 gallons capacity, giving a period

of 2.06 days' sedimentation; preliminary filters consisting of nine filter tanks, having a capacity of 40,000,000 gallons per twenty-four hours; eighteen covered sand filters, having a combined area of 13.23 acres, and a covered clear water basin with a capacity of 16,500,000 gallons.

The filters are operated at a nominal rate of 3,000,000 gallons per acre per twenty-four hours, and the total quantity filtered during the past year was 13,253,580,000 gallons, at an average yield of 36,211,400 gallons per day, corresponding to an average rate of 2.68 million gallons per acre per twenty-four hours.

The maximum amount of water filtered in any one day was 42.4 million gallons.

Filter No. 4 was continued during the year at a rate of 6,000,000 gallons per acre per day, with results as good as those obtained from filters operating at the usual 3,000,000 rate.

The preliminary filters were started on October 23, 1907. They are operated at a rate of 40,000,000 gallons per acre per twenty-four hours, and have materially increased the length of runs or time between scrapings of the slow sand filters without any decrease in efficiency.

The total cost of operation was $43,749.58, or $3.30 per million gallons filtered, which included a charge of $7,549.06 for operation of the preliminary filters, and $5,776.93 for laboratory expenses; the cost of preliminary filtration being $0.525 per million gallons, and the laboratory charge $0.435 per million gallons.

The reduction in turbidity and bacteria by the action of the preliminary filters was 70 per cent. and 65 per cent., respectively.

Two methods of cleaning the filters were used. During the larger portion of the year twelve filters were washed by the Brooklyn method, the remaining six being cleaned by the usual method of scraping and ejecting.

There were eighty-three runs or cleanings during the year, a decrase of 114 runs over the previous year, due undoubtedly to the use of the preliminary filters; sixty-six of these runs were on filters cleaned by the Brooklyn method, and seventeen by the usual method.

The average length of runs by the Brooklyn method was 70 days, the amount filtered between runs being 131,000,000 gallons, or 173,000,000 gallons per acre.

The average length of runs by the usual method of cleaning was 104 days, the average amount filtered between scrapings being 248,000,000 gallons, or 338,000,000 gallons per acre.

While the length of runs and quantity filtered with the Brooklyn method was not so large as with the usual method, it proved economical on account of the short time it was necessary to have the bed out of service, the low labor cost of cleaning and the saving in not having to replace the sand.

Twelve filters were operated for the entire year by the Brooklyn method. The items of cost, etc., in the process of cleaning, are as follows:

Number of runs	66
Average length of runs, days	70.12
Average m. g. filtered per run	131.12
Average m. g. filtered per acre per run	173.44
Average cost of water to wash per m. g. filtered	$0.03
Average cost of labor to wash and spade per m. g. filtered	$0.20
Total cost of washing and spading sand in place (water and labor), per m. g. filtered	$0.23
Average gallons water used to wash sand in place, per m. g filtered	2,457

In Filter No. 1, 1,348 cubic yards of sand were replaced during the year by Bureau labor at a cost of $0.59 per cubic yard.

Comparing the effluent from the Belmont Filters with the applied water, the reductions were as follows:

	Per cent.
Average reduction, turbidity	99.11
Average reduction, bacteria	93.53
Maximum reduction, turbidity	100.00
Maximum reduction, bacteria	99.37
Minimum reduction, turbidity	83.33
Minimum reduction, bacteria	93.33

Comparing the effluent of the plain sand filters and the water from the Schuylkill river, the reductions were as follows:

	Per cent.
Average reduction, turbidity	99.17
Average reduction, bacteria	99.08
Maximum reduction, turbidity	100.00
Maximum reduction, bacteria	99.97
Minimum reduction, turbidity	92.85
Minimum reduction, bacteria	96.70

During the year filtered water was stored in the George's Hill Reservoir, which has a capacity of 39,760,000 gallons. This reservoir is not covered, and determinations made weekly failed to show any ill effects from this open storage.

Torresdale Filters.

The Torresdale Filter Station consists of sixty-five 0.75 acre covered beds; a covered clear water basin of 50,000,000 gallons capacity; preliminary filter plant consisting of 120 concrete tanks, approximately 60 x 20 feet, and containing 1,140 square feet of filtering surface with a capacity of 240,000,000 gallons of water per twenty-four hours; a low lift pumping station, containing seven 40,000,000 gallon centrifugal pumps; three 75 K. W. generators; five sand washing pumps, with full complement of boilers, economizers, mechanical stokers, etc.

The district supplied from this station was enlarged as the distribution system was completed.

On April 13, 1908, the district was extended to include

that portion of the City east of Broad street and north of Girard avenue, and on May 12, 1908, it was further extended to include the territory east of Sixth street, between Vine and Spring Garden streets, and all east of Broad street and north of Spring Garden street, which is the present limit of the Torresdale supply.

The total amount of water filtered was 34,575,197,000 gallons. The average daily amount filtered from January 1, 1908, to April 13, 1908, was 63,000,000 gallons. From this date to May 12 the daily average was 86,150,000 gallons, and since this latter date 109,550,000 gallons were filtered daily.

The cost of operation, not including the cost of wash water, which is included in the expense of the Pumping Station, was $96,537.00, or $2.80 per million gallons of water filtered, of which the laboratory charge is 28.2 cents per million gallons.

In Filters Nos. 3, 15, 17, 18, 24, 28, 29, 30, 31, 33, 34, 35, 38, 41, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 59 and 62, twenty-eight in all, 36,162 cubic yards of sand were replaced during the year by contract at a cost of $0.24 per cubic yard. Owing to the appropriation being limited some 30,000 cubic yards of sand remain in the courts.

Comparing the effluent from the Torresdale final filters with the applied water taken directly from the Delaware river, the reductions were as follows:

	Per cent.
Average reduction, turbidity	94.65
Average reduction, bacteria	97.05
Maximum reduction, turbidity	100.00
Maximum reduction, bacteria	99.25
Minimum reduction, turbidity	76.19
Minimum reduction, bacteria	89.80

Comparison of Pumpage from the Delaware and Schuylkill Rivers, and Supplementary Pumpage at High Service Stations for 1907 and 1908.

	GALLONS.		
	1907.	1908.	Increase.
Annual pumpage from rivers	110,406,858,007	118,692,338,030	8,285,480,023
Average daily pumpage from rivers	302,484,542	324,296,005	21,811,463
Pumpage per capita	201.7	210.2	8.5
Maximum daily pumpage from rivers during months of greatest consumption	313,505,007	341,650,000	28,144,993
Pumpage per capita during months of greatest consumption	209.0	223.0	14.0
Total supplementary pumpage at High Service Station	6,475,354,615	7,805,636,156	1,330,281,541
Low Service Station, Torresdale, pumpage from the Delaware river	8,740,000,000	34,573,397,000	25,833,397,000

Volume and Cost of Pumpage for the years 1898 to 1908 Inclusive.

Years.	Number of Gallons Pumped.†	Number of Gallons Pumped 100 Feet High.†	Cost per Million Gallons Pumped 100 Feet High.	Gallons Pumped per Capita, per Day.	Population, Estimated.
1898	102,241,835,372	210,821,629,625	$2 97	196	1,400,000
1899	107,991,871,604	231,813,686,728	2 90	199	1,425,843
1900	106,822,576,055	218,119,532,621	3 71	221	*1,293,697
1901	103,805,457,224	210,456,847,513	4 14	211	1,321,304
1902	116,798,424,500	239,698,545,013	4 80	232	1,349,500
1903	124,015,934,669	248,768,806,094	5 20	238	1,378,298
1904	126,181,026,489	251,214,168,044	5 11	234	1,407,690
1905	125,367,447,176	261,281,445,628	4 61	227.7	1,437,730
1906	123,308,864,708	257,269,023,542	5 06	217.8	1,468,411
1907	116,882,212,622	242,285,589,708	5 68	201.7	1,499,747
1908	117,885,662,022	278,534,592,507	5 58	210.2	1,531,752

*United States Census. †Including Repumpage, or High Service.

Cost of Raising 1,000,000 Gallons 100 feet During 1907 and 1908.

Pumping Stations.	1907.	1908.	Increase.	Decrease.
Fairmount	$2 86	$4 82	$1 96	
Spring Garden	5 83	6 99	1 16	
Belmont	5 95	5 28		$0 67
Queen Lane	4 80	4 85	05	
Roxborough	6 80	7 33	53	
Frankford, No. 1	22 63			22 63
Frankford, No. 2	3 88	2 68		1 20
Frankford, No. 3		20 56	20 56	
Average	$5 44	$5 11		$0 33
High Service Stations.				
Belmont	$18 91	$25 87	$6 96	
Roxborough	11 25	12 91	1 66	
Mt. Airy	187 14	181 63		$5 51
Chestnut Hill*				
Frankford	20 61	28 95	5 31	
Average	$20 12	$27 76	$7 64	
Low Service Stations.				
Roxborough	$26 26	$17 29		$8 97
Torresdale		13 89	$13 89	
Total averages	$5 68	$5 58		$0 10

Comparison of the Capacity and Average Daily Pumpage for 1907 and 1908.

Pumping Stations.	Capacity.		Average.	
	1907.	1908.	1907.	1908.
Fairmount	33,290,000	33,290,000	22,282,506	14,671,642
Spring Garden	176,000,000	150,000,000	127,771,943	90,813,856
Belmont	62,500,000	62,500,000	42,717,279	43,502,421
Queen Lane	80,000,000	80,000,000	70,621,359	53,636,347
Roxborough	31,500,000	41,500,000	24,376,496	27,208,955
Total from Schuylkill	377,290,000	367,290,000	259,534,261	229,833,221
Increase				
Decrease		10,000,000		20,701,040
Frankford, No. 1	57,000,000	57,000,000	1,931,675	
Frankford, No. 2	120,000,000	120,000,000	41,018,606	91,704,314
Frankford, No. 3		120,000,000		554,487
Total from Delaware	177,000,000	297,000,000	42,950,281	92,258,801
Increase		120,000,000		49,308,520
Decrease				
Totals from Delaware and Schuylkill rivers	554,290,000	664,290,000	302,484,542	322,092,022
Increase		110,000,000		19,607,480
Decrease				
High Service Stations.				
Belmont	7,000,000	7,000,000	2,467,855	2,146,457
Roxborough	10,000,000	10,000,000	3,283,445	4,572,360
Mt. Airy	3,000,000	3,000,000	100,302	121,510
Chestnut Hill	750,000	750,000		972
Frankford	7,000,000	7,000,000	1,494,003	1,378,637
Total High Service	27,750,000	27,750,000	7,345,605	8,219,936
Increase				874,331

Comparison of the Capacity and Average Daily Pumpage for 1907 and 1908—Continued.

Pumping Stations.	Capacity.		Average.	
	1907.	1908.	1907.	1908.
Low Service Stations.				
Roxborough Annex	30,000,000	30,000,000	10,395,063	13,106,940
*Torresdale	120,000,000	240,000,000		94,462,833
Total daily	732,040,000	962,040,000	320,225,240	437,851,681
Increase		230,000,000		117,656,441

*Pumpage commenced July 15, 1907. Total quantity pumped, 8,740,000,000 gallons, not included in the above table.

The progress of the work is such that by March 1, 1909, it is expected that at least 200,000,000 gallons daily will be supplied from this station, which at the present rate of consumption will suppy the entire City, with the possible exception of the higher portion of the Queen Lane District.

Contrary to general opinion, the Delaware water has been found more difficult to filter than the Schuylkill river water, and is apparently more affected by the micro-organisms than is the latter river.

The runs, or periods between scrapings, at Torresdale have been considerably shorter than those obtained from the filters supplied with Schuylkill river water, due, it is thought, to the micro-organisms in the water, as in general the Delaware river water is better and of less turbidity than the Schuylkill river water.

The absence of these same organisms in the Delaware river water, which for the past two years has occurred in December and continued throughout the winter months, has given the effluent from the filters a higher bacterial count than is had in any other portion of the year. Studies of the micro-organisms and their effect upon the filtration of the Delaware river water are being made, and should in time prove very interesting if not of considerable importance in the operation of slow sand filters.

The following Appendices accompany this report:

A. Report of Chief Clerk.

B. Report of General Superintendent.

C. Report of Assistant in Charge of Distribution.

D. Report of Superintendent of Construction and Repair shop.

E. Report of Chief Draughtsman.

Distribution.

The total quantity of pipe laid was 150,835 feet. Of the above 134,754 feet were service mains from 4 to 16 inches in diameter; 8,275 feet were supply and pumping mains from 10 to 48 inches in diameter, in addition to which 7,806 feet of pipe were laid for fire hydrants and other connections.

The total length of new pipe laid was 28.26 miles, making, in addition to that previously laid, 1586.51 miles now in use.

The number of fire hydrants added to the distribution system was 316, making the total number now in service 15,168, and the number of water meters in use 1,722.

I wish here to testify to the faithful and valuable service rendered the City by the majority of the employees of the Bureau. Hours have not been too long, nor the weather or work too bad to stop them in the performance of their duties. This applies to the laborers as well as those holding higher positions.

During the past year it has in many instances been my pleasure to see men work as only good men can and will work, under conditions not in any sense enjoyable; and, after an experience of twenty years on public work I can state that there are men employed in this Bureau who, in the loyal and conscientious performance of their work, cannot be excelled, and it is to be regretted that the finances of the City are such that Councils did not feel justified in granting any increase in salaries.

Thanking you for the valuable assistance and support given me, I am,

Very respectfully yours,

FRED. C. DUNLAP,

Chief of Bureau.

APPENDIX A

REPORT OF CHIEF CLERK

Philadelphia, January 22, 1909.

FRED. C. DUNLAP, ESQ.,
Chief, Bureau of Water.

DEAR SIR:—I have the honor to submit herewith detailed statement of the expenditures of the Bureau from the appropriations made thereto, an itemized list of miscellaneous receipts, and a table of the revenues derived from the operations of the Bureau during the year 1908.

A statement taken from the books of the City Controller shows the amount expended for supplies by the Department created for that purpose.

The receipts from the operations of the Bureau and the expenditures for maintenance were as follows:

Receipts		**$4,233,045 49**
Expenditures from appropriation to the Bureau	**$1,555,855 81**	
Expenditures for supplies furnished through Department of Supplies	**925,231 14**	
		2,481,086 95
Receipts in excess of maintenance		**$1,751,958 54**

Yours respectfully,

J. T. HICKMAN,
Chief Clerk.

Detailed Expenditures of the Bureau for 1908.

General Appropriation.	Amount Appropriated.	Amount Expended.	Amount Merging.	Amount Not Merging.
An ordinance to make an appropriation to the Bureau of Water, approved Dec. 30, 1907	$1,064,627 25			
Balance from books of 1907	2,617,866 50			
Increased by additional appropriations and transfers	2,099,616 34			
	$5,782,110 09			
Diminished by transfer	169,714 71			
Net appropriation		$5,612,395 38		
Item 1—Salaries	$520,555 00			
Diminished by transfer	15,908 00			
Net appropriation		504,647 00		
Chief of Bureau		10,000 00	$10,000 00	
Chief clerk and assistants		5,000 00	5,000 00	
Stenographers		2,700 00	2,700 00	
Correspondence clerk		1,000 00	1,000 00	
Time clerk		1,000 00	1,000 00	
Messenger		720 00	720 00	
Draughtsmen		7,200 00	5,224 02	
Superintendent and assistants		5,000 00	5,000 00	
Clerks and paymasters		2,200 00	2,200 00	
Assistant clerks		3,600 00	3,600 00	
Assistants to chief		7,800 00	7,800 00	
Foremen, filter attendants		2,000 00	2,000 00	
Chemists and assistants		3,920 00	3,899 35	
Bacteriologists and assistants		3,420 00	3,420 00	
Assistant clerks		4,000 00	4,000 00	
Pipe inspector and clerk		2,500 00	2,500 00	
Search clerk		1,300 00	1,300 00	
Chief inspector		1,200 00	1,200 00	
Inspectors		22,000 00	21,818 43	
Permit clerk and assistant		2,500 00	2,475 53	
Purveyors		10,360 00	10,177 82	
Purveyors' clerks		6,300 00	6,300 00	
Purveyors' assistant clerks		5,600 00	5,600 00	
Yard keeper		915 00	915 00	
Hydrant inspectors		8,000 00	6,928 36	
General foremen		8,400 00	8,400 00	
Foremen of repairs		7,650 00	7,558 28	
Superintendent of shop and clerk		2,400 00	2,400 00	
Stop attendants		3,000 00	3,000 00	
Storekeepers		3,200 00	3,200 00	
Foreman machinist		2,000 00	2,000 00	
Foreman bricklayer		1,600 00	1,600 00	
Foreman city shop		1,400 00	1,400 00	
Foreman carpenter		1,200 00	1,200 00	
Foreman plumber		1,000 00	1,000 00	
Foreman stonemason		1,000 00	1,000 00	
Foreman painter		1,000 00	1,000 00	
Foreman rigger and assistant		1,900 00	1,900 00	
Foreman laborer		960 00	960 00	
Watchmen, office and yards		6,480 00	6,468 00	
Janitor, main office		720 00	720 00	
Lineman		1,200 00	1,200 00	
Telephone operators		1,600 00	1,600 00	
Electrician		1,400 00	1,400 00	
General storekeeper		1,000 00	1,000 00	
			$165,642 24	

Detailed Expenditures of Bureau for 1908—Continued.

General Appropriation.	Amount Appropriated.	Amount Expended.	Amount Merging.	Amount Not Merging.
Item 1—Continued.				
Salaries at Pumping and Filter Stations:				
Fairmount	$13,620 00	$13,492 89		
Spring Garden	85,040 00	79,409 42		
Belmont	49,040 00	45,671 78		
Queen Lane	41,520 00	38,050 02		
Roxborough	44,660 00	42,291 32		
Frankford	48,440 00	49,916 21		
Belmont High Service	9,240 00	8,956 69		
Roxborough High Service	12,840 00	12,540 71		
Frankford High Service	12,120 00	11,804 21		
Mt. Airy	5,160 00	5,160 00		
Chestnut Hill	2,250 00	2,250 00		
Belmont Filters	14,280 00	12,625 21		
Upper Roxborough Filters	7,280 00	7,326 05		
Lower Roxborough Filters	3,920 00	3,490 50		
Uniforms for watchmen and policemen	1,800 00	1,760 00		
		$500,387 25	$4,259 75	
Item 2. For the wages of mechanics, laborers and other workmen employed upon repairs to machinery and the maintenance of and repairs to buildings, grounds and reservoirs and the transportation of workmen incident thereto $175,000 00				
Increased by additional appropriations and transfers 117,816 34				
Net appropriation	$292,816 34			
Boilermakers		$10,250 36		
Bricklayers		10,426 72		
Carpenters		12,904 17		
Crane runner		709 81		
Helpers		8,098 64		
Horses, carts and drivers		4,604 85		
Laborers		163,404 56		
Machinists		64,419 13		
Painters		5,513 30		
Pump erector		1,020 56		
Stonemasons		4,763 12		
Waste water inspector		685 47		
Wireman		725 80		
Transportation		5,289 83		
		$292,816 32	$0 02	
Item 2½. For the same purposes as Item 2.				
Appropriation from loan of November 21, 1908	$39,000 00			
Boilermakers		$948 69		
Bricklayers		1,175 00		
Carpenters		1,098 90		
Crane runner		65 00		
Helpers		714 40		
Horses, carts and drivers		551 93		
Laborers		18,437 60		
Machinists		7,997 91		
Painters		728 00		
Pump erector		139 45		

Detailed Expenditures of Bureau for 1908—Continued.

General Appropriation.	Amount Appropriated.	Amount Expended.	Amount Merging.	Amount Not Merging.
Item 2½—Continued.				
Stonemasons		$730 50		
Waste water inspector		108 44		
Transportation		486 50		
		$33,182 32		$5,817 68
Item 3. For the wages of mechanics, drillers, laborers and other workmen connected with repairs to and improvement of the distribution and the laying of service mains, the transportation of workmen engaged in repairs and the traveling expenses of pipe inspectors $250,000 00				
Increased by additional appropriations and transfers 146,500 00				
Net appropriation	$396,500 00			
Transportation		$3,865 71		
Traveling expenses		1,051 08		
Wages:				
Improvement		44,482 01		
First District		33,118 00		
Second District		53,796 65		
Third District		88,254 86		
Fourth District		33,113 43		
Fifth District		27,615 63		
Sixth District		52,900 20		
Seventh District		58,268 98		
		$396,466 55	$33 45	
Item 3½. For the same purposes as Item 3.				
Appropriation from loan, November 21, 1908	$73,500 00			
Wages:				
Improvement		$6,691 40		
First District		4,786 57		
Second District		6,602 80		
Third District		18,801 50		
Fourth District		6,535 12		
Fifth District		5,041 83		
Sixth District		9,388 93		
Seventh District		11,316 35		
		$69,164 50		$4,335 50
Item 4. For the wages of mechanics, helpers and other workmen at the City construction and repair shop $32,500 00				
Increased by additional appropriation 5,400 00				
Net appropriation	$37,900 00			
Wages		$37,900 00		
Item 4½. For the same purposes as Item 4.				
Appropriation from loan, November 21, 1908	5,600 00			
Wages		5,016 23		$583 77

Detailed Expenditures of Bureau for 1908—Continued.

General Appropriation.	Amount Appropriated.	Amount Expended.	Amount Merging.	Amount Not Merging.
Item 5. For wages of hydrographic corps and expenses incident thereto	$1,596 00			
Wages		$1,596 00		
Item 6. For repairs to boilers	10,000 00			
Boiler tubes		254 70		
Gaskets		343 75		
Grate bars, arches and bridge walls:				
Roxborough $929 50				
Queen Lane 1,000 00				
Belmont 3,763 50				
		5,693 00		
Tools		484 16		
		$6,775 61	$2,610 39	$307 00
Item 7. For hauling water pipe and machinery	2,500 00	$2,497 50		2 42
Item 7½. For the same purposes as Item 7.				
Appropriation from loan, November 21, 1908	7,500 00	7,500 00		
Item 8. For repairs to roofs	1,000 00			
Belmont High Service		13 75		
Belmont		22 50		
Sixth District		52 50		
Second District		62 50		
Queen Lane		65 00		
Seventh District		71 25		
Fourth District		107 50		
Spring Garden		605 00		
		$1,000 00		
Item 8½. For the same purposes as Item 8.				
Appropriation from loan, November 21, 1908	1,000 00			
East Park		$5 00		
Corinthian avenue		10 00		
Spring Garden		102 50		
Roxborough		127 50		
Queen Lane		680 00		
		$925 00		75 00
Item 9. For clerk hire in writing up duplicates	2,715 26	$2,715 07	19	
Item 10. For keep of automobile for Chief of Bureau and keep of horse for general superintendent and assistants to Chief $1,200 00				
Increased by transfer 400 00				
Net appropriation	1,600 00	1,600 00		
Item 10½. For keep of automobile for Chief of Bureau.				
Appropriation from loan, November 21, 1908	400 00	400 00		

Detailed Expenditures of Bureau for 1908—Continued.

General Appropriation.	Amount Appropriated.	Amount Expended.	Amount Merging.	Amount Not Merging.
Item 11. For advertising, postage, horseshoeing, miscellaneous expenses, repairs to wagons, carts, harness, tools, pipes, pavements, ground rent of 918 Cherry street and electric current	$3,000 00			
Advertising		$61 65		
Binding books		62 32		
Coke		14 75		
Coal		79 70		
Current		156 87		
Cleaning office		39 00		
Desk		29 00		
Dating stamp		20 39		
Electroliers		17 20		
Engineers' supplies		49 61		
Freight		4 34		
Gasoline		7 88		
Ground rent, 918 Cherry st.		26 66		
Hauling		3 50		
Hardware		39 84		
Hire of automobile		109 00		
Horseshoeing		493 39		
Incidentals		8 49		
Incidentals, hydrographic		17 40		
Laboratory supplies		16 00		
Maps		134 00		
Meals for workmen		104 20		
Photo supplies		13 97		
Postage stamps		142 70		
Printing		3 50		
Professional services, V. S.		38 75		
Reamer		22 72		
Rent for fire extinguishers		22 50		
Rent for disinfectors		36 00		
Repairs to harness		72 95		
Repairs to meters		3 50		
Repairs to mowers		29 25		
Repairs to pyrometer		15 00		
Repairs to pipe		35 90		
Repairs to siding		17 68		
Repairs to typewriters		3 50		
Repairs to wagons		274 00		
Repairs to telephones		23 25		
Repairs to scales		63 38		
Rubber stamps		5 10		
Steel stamps		9 96		
Subscriptions (periodicals)		52 00		
Text book		2 00		
Telephone calls		7 65		
Telephone rental		5 50		
Tin coils		21 00		
Transportation		75 00		
Typewriter supplies		19 00		
Writing up duplicates		487 16		
		$2,998 11	$1 89	
Item 11½. For the same purposes as Item 11.				
Appropriation from loan, November 21, 1908	6,000 00			
Advertising		$69 00		
Addressograph		129 11		
Blank forms		34 25		
Car service		224 00		

Detailed Expenditures of Bureau for 1908—Continued.

General Appropriation.	Amount Appropriated.	Amount Expended.	Amount Merging.	Amount Not Merging.
Item 11½—Continued.				
Chairs		$33 20		
Cashier		150 00		
Carbons		5 20		
Care of and repairs to clocks		72 00		
Cleaning wells		50 00		
Current (electrical)		147 86		
Disinfector (rental)		108 00		
Engineer supplies		19 13		
Fire extinguishers (rental)		67 50		
Files		6 00		
Flag		10 73		
Freight		34 79		
Heating boiler and grate		80 12		
Hire of automobile		52 00		
Horseshoeing		1,196 11		
Index cards		25 40		
Incidentals		38 54		
Incidentals, hydrographic		44 70		
Keys		6 40		
Maps		559 00		
Meals for workmen		112 65		
Morning papers		15 60		
Mounting plans		109 70		
Oxygen gas		20 00		
Postage		275 24		
Professional services, V. S		84 50		
Repairs to harness		473 05		
Repairs to pavements		6 00		
Repairs to pipes		39 00		
Repairs to typewriter		5 05		
Repairs to scales		36 26		
Repairs to wagons		1,270 46		
Rebinding books		76 75		
Steel plate and printing		151 00		
Stencils		7 25		
Telegrams		2 02		
Text books		11 40		
Telephone mouth pieces (rental)		21 80		
Time book		11 75		
Use of dump		65 00		
		$5,957 52		$43 48
Item 12. For emergencies	$3,000 00			
Bolts and nuts		$18 52		
Brass fittings		233 89		
Bronze rods		160 38		
Concrete piers		25 78		
Gum hose		70 00		
Incidentals		41 93		
Iron castings		56 00		
Machine work		98 18		
Packing		194 50		
Repairs to siding		597 13		
Sand ejector		580 96		
Supporting tracks		316 92		
Valves		9 90		
Wagon trucks		800 00		
		$2,999 09	$0 91	

Detailed Expenditures of Bureau for 1908—Continued.

General Appropriation.	Amount Appropriated.	Amount Expended.	Amount Merging.	Amount Not Merging.
Item 12½. For emergencies.				
Appropriation from loan, November 21, 1908	$2,500 00			
Belting		$27 10		
Drip pans		48 00		
Hose		55 00		
Iron castings		247 30		
Iron pipe and fittings		51 84		
Lumber		401 23		
Machine work		67 76		
Oil		69 72		
Planimeter		68 75		
Repairs to boilers (damages)		112 65		
Repairs to roofs		220 80		
Supporting tracks		236 24		
Valves		240 28		
		$1,846 67		$453 33
Item 13. For hauling ashes from pumping stations	$4,000 00			
Increased by transfer	2,000 00			
Net appropriation	6,000 00			
Belmont		$1,033 35		
Spring Garden		1,666 65		
Queen Lane		3,300 00		
		$6,000 00		
Item 13½. For hauling ashes.				
Appropriation from loan, November 21, 1908	6,000 00			
Queen Lane		$600 00		
Belmont		2,066 72		
Spring Garden		3,333 28		
		$6,000 00		
Item 14. For the purchase of material connected with repairs to machinery, mains, buildings and sidings	4,706 58			
Brass fittings		$226 52		
Charts, etc		9 30		
Connectings rods		8 00		
Crank pin boxes		14 00		
Cutters		7 15		
Electric material		86 15		
Ferroinclave		23 30		
Fire brick		17 50		
Flue cleaners		33 08		
Frog		10 00		
Forgings		99 50		
Gaskets		220 00		
Governor for engine		50 00		
Gum hoods		7 20		
Hardware		60 32		
Iron castings		22 55		
Iron fittings		90 10		
Lead bars		8 00		
Lead wool		175 61		
Leather dogs		15 00		
Lubricators		33 90		
Lockers		460 00		
Load wheels		2 71		
Machine castings		260 89		
Machine work		539 74		
Meter materials		7 60		
Packing		33 98		

Detailed Expenditures of Bureau for 1908—Continued.

General Appropriation.	Amount Appropriated.	Amount Expended.	Amount Merging.	Amount Not Merging.
Item 14—Continued.				
Plumbing material		$419 00		
Piston rods, etc		185 29		
Repairs to calorimeter		6 75		
Repairs to copper pipe		242 79		
Repairs to pipe covering		107 08		
Springs and guards		30 90		
Screw plates		30 00		
Steel		14 14		
Steel castings		109 02		
Steel plates		60 62		
Steel tubes		38 65		
United steel		199 43		
Valves		97 73		
Valve seats		600 00		
Valve springs		30 90		
Venetian blind		9 00		
		$4,703 50	$3 08	
Item 14½. For the same purposes as Item 14.				
Appropriation from loan, November 21, 1908	$1,500 00			
Brass fittings		$222 91		
Electric material		113 53		
Fittings for engine		72 00		
Hardware		89 88		
Hex nuts		16 25		
Indicators		147 50		
Iron castings		14 61		
Iron fittings		2 80		
Lumber		61 64		
Meter fittings		187 75		
Paint		2 75		
Repairs to copper pipe		89 03		
Repairs, siding		7 14		
Rubber cups		6 00		
Syphon pump		32 50		
Tools		13 60		
Valve		11 50		
Valve fittings		13 20		
		$1,107 59	----------	$392 41
Item 15. To pay the Southwark Foundry and Machine Company for scrap brass	276 25	$276 25		
Item 16. For the wages of mechanics, laborers and other workmen employed in the maintenance and operation of the Upper and Lower Roxboro, Belmont and Torresdale Filter Stations, the Belmont and Torresdale Laboratories and the Torresdale Pumping Station	$41,000 00			
Increased by additional appropriations and transfers	103,000 00			
Net appropriation	144,000 00			
Lower Roxborough		8,349 81		
Upper Roxborough		9,250 01		
Belmont		14,901 37		
Torresdale		111,498 81		
		$144,000 00		

Detailed Expenditures of Bureau for 1908—Continued.

General Appropriation.	Amount Appropriated.	Amount Expended.	Amount Merging.	Amount Not Merging.
Item 16½. For the same purposes as Item 16.				
Appropriation from loan, November 21, 1908	$3,000 00			
Torresdale		$2,916 46		$83 54
Item 17. For resanding the filters, painting and incidental expenses for operating the filter plants	17,000 00			
Brass fittings		26 70		
Blank forms		8 40		
Current (electric)		6 20		
Electric supplies		35 00		
Filter		31 50		
Flange leathers and cups		62 60		
Gum goods		76 06		
Gas for fuel		332 00		
Hose couplings		558 02		
Hose patches		9 00		
Ice		414 09		
Incidentals		341 46		
Iron fittings		138 07		
Laboratory supplies		809 73		
Lumber		23 08		
Painting		2,285 00		
Repairs to dynamos		2 00		
Repairs to sterilizer		9 76		
Repairs to incubator		88 00		
Restoring sand		9,638 51		
Spindles		15 00		
Sponge clippings		1,187 50		
Subscription (periodicals)		5 00		
Transportation		273 12		
Telephone rental		105 05		
Valves and stems		40 00		
		$16,521 63	$116 88	361 49
Item 17½. For the same purposes as Item 17.				
Appropriation from loan, November 21, 1908	1,000 00			1,000 00
Item 18. For supplying the citizens of Bustleton with water.				
Balance, Jan. 1, 1908 $4,393 27				
Diminished by transfer 3,806 71				
Net appropriation	586 56			
Excavating pipe trench		$586 56		
Item 19. For the improvement, extension and filtration of the water supply. Balance, January 1, 1908	4,740 88			
Belting		73 82		
Binding books		31 00		
By-pass		15 75		
Castings (iron)		96 81		
Electric supplies		25 35		
Engineer supplies		67 80		
Expressage		12 68		
Fan		16 50		
Handled stops		150 00		
Lead wool		50 00		
Lumber		56 52		
Motor		278 00		

Detailed Expenditures of Bureau for 1908—Continued.

General Appropriation.	Amount Appropriated.	Amount Expended.	Amount Merging.	Amount Not Merging.
Item 19—Continued.				
Oak stakes		$45 00		
Photo supplies		23 97		
Printing		60 00		
Pipe-cutting machines		539 25		
Rope		8 07		
Transportation		115 20		
Scale foundations, Contract No. 142M		1,426 01		
Track scales, Contract 142S		1,224 00		
		$4,315 76		$425 04
Item 20. For the completion of High Pressure Mains. Balance, January 1, 1908	$617 37			
Iron pipe		$222 63		
Plug caps		19 14		
Traveling expenses, pipe inspectors		311 85		
		$553 62		63 75
Item 21. For furnishing and laying mains for filtered water. Balance, January 1, 1908	15,278 70			
Gate valves, Contr't No. 69R		$1,795 44		
Stop boxes, Contr't No. 70A		248 16		
Valves, Contract No. 70F		3,868 30		
Special castings, Contract No. 129		6,246 97		
		$12,158 87		3,119 83
Item 22. Sand for Torresdale beds. Balance, Jan. 1, 1908	53,392 40			
Sand, Contract No. 118		$42,788 78		10,603 62
Item 23. For repairs to pumping engines. Balance, Jan. 1, 1908	42,324 62			
High pressure cylinder		1,540 00		
Pump engineer		23 50		
Repairs to copper pipe		143 46		
Repairs to engine		14 00		
Removing engine		36,475 00		
Valves		132 06		
		$38,328 02	$11 60	3,985 00
Item 24. For the purchase of and repairs to pumps and machinery. Balance, Jan. 1, 1908 $346,133 97				
Increased by additional allotment 140,000 00				
Net appropriation	486,133 97			
Brass fittings		$161 55		
Breeches pipe		12 00		
Cylinder for engine		16 50		
Cylinder head		133 36		
Cylinders and liners		193 45		
Exhaust valve arms		15 15		
Expansion joint		65 40		
Fittings for stoker		184 92		
Iron fittings		1,156 90		
Jet pump		21 00		
Machine work		2,095 03		
Nozzles for sand ejectors		211 82		
Oil cups		409 25		

Detailed Expenditures of Bureau for 1908—Continued.

General Appropriation.	Amount Appropriated.	Amount Expended.	Amount Merging.	Amount Not Merging.
Item 24—Continued.				
Parts of pump		$32 66		
Piston rods		208 00		
Pressure regulator		120 00		
Plunger casting		418 00		
Pump fittings		115 96		
Ratchet gears		19 35		
Reboring cylinder		451 48		
Repairs to steam drill		11 00		
Repairs to engine		70 48		
Repairs to pump chambers		200 00		
Shafting and pulleys		57 50		
Shafting and runners		18 50		
Tube cutter		24 75		
Valves		142 00		
Valve springs		55 00		
Repairs to machinery		8,913 87		
Pumping engine, Contract 90BW		32,970 00		
Pumping engine, Contract 126		30,000 00		
Boiler equipment, Contract 127		1,122 50		
Auxiliary pump, Contract 130		5,859 00		
Chimney, Contract 135H		5,771 00		
Boiler equipment, Contract 135E		25,553 71		
Foundations for engine, Contract 138E		2,046 46		
Foundations for engine, Contract 138S		3,646 97		
Pumping engines, Contract 138SP		38,563 00		
Pumping engines, Contract 138B		50,810 48		
Air pump, Contract 139D		1,370 00		
Pump ends, Contract 139M		25,219 07		
Pump ends, Contract 143		2,317 50		
		$241,287 66		$244,846 81
Item 24½. For the extension of the High Pressure Fire System. Balance, January 1, 1908 $150,000				
Diminished by transfer 150,000				
Additional allotment, May 14, 1908	$150,000 00			
Furnishing and laying high pressure fire main, Contract No. 140		$85,022 46		64,977 54
Item 25. For the improvement, extension and filtration of the water supply. Balance, January 1, 1908	1,072,055 52			
Advertising		999 45		
Affidavits		59 00		
Air compressor		235 21		
Bar iron		127 41		
Binding books		19 00		
Brass fittings		74 15		
Bricks, sand, etc		283 00		
Bridge jacks		90 00		
Burlap		7 21		
Car service		52 00		

Detailed Expenditures of Bureau for 1908—Continued.

General Appropriation.	Amount Appropriated.	Amount Expended.	Amount Merging.	Amount Not Merging.
Item 25—Continued.				
Canvas bags		$92 00		
Centrifugal pumps, etc		1,181 50		
Cement		945 75		
Chair		8 00		
Charging cars		495 00		
Coal		156 39		
Constructing chambers		465 00		
Cylinder head		3 50		
Doors and frames		96 00		
Dump grates		154 64		
Electric supplies		918 41		
Enclosures		580 00		
Engineer supplies		168 67		
Exhaust fan		16 00		
Felt		198 00		
Fenders		47 50		
Fire bricks		107 25		
Fire extinguishers		54 00		
Freight		259 72		
Furnace		235 00		
Gasket		112 23		
Gauge		80 20		
Glass		6 10		
Grates		4 90		
Gravel, slag, etc		203 49		
Gum goods		1,284 35		
Hardware		53 85		
Hauling		178 10		
Hire of automobile		80 00		
Hire of pump		211 94		
Ice		7 65		
Incidentals		654 52		
Indicator		375 00		
Interest		132 32		
Injectors		234 00		
Iron castings		273 27		
Iron fittings		1,430 31		
Laboratory supplies		17 04		
Lumber		345 19		
Lumber crayons		24 40		
Lead wool		100 10		
Lockers		371 52		
Manifold		109 00		
Machine work		381 68		
Oakum		24 40		
Oil		31 25		
Oiled hats		6 00		
Packing		271 25		
Parts of meters		193 75		
Painting stand pipes		370 00		
Placing engine on track		47 22		
Pig lead		358 08		
Pipe covering		17 05		
Pipe machine		318 75		
Plunger		418 01		
Piston rods		10 50		
Pressure register		59 75		
Printing		132 01		
Raising crane		24 23		
Rent of No. 427 North Third street		18 00		
Rent of No. 538 West Venango street		51 00		
Recording device		380 00		

Detailed Expenditures of Bureau for 1908—Continued.

General Appropriation.	Amount Appropriated.	Amount Expended.	Amount Merging.	Amount Not Merging.
Item 25—Continued.				
Repairs, copper pipe		$43 41		
Repairs, sewer		194 12		
Sand ejector		135 00		
Services of diver		40 00		
Skylight		450 00		
Scratch blocks		16 57		
Stationery		20 41		
Stakes		28 27		
Steel		47 91		
Steel ladder		24 50		
Stone		353 80		
Subscriptions (periodicals)		9 00		
Taps and drills		38 59		
Telephone rental		569 61		
Testing lamps		62 50		
Towel service		175 40		
Trap rock		74 97		
Transportation		1,080 21		
Traveling expenses		1,243 93		
Transforming crane		435 00		
Typewriter supplies		5 60		
Use of tools		16 78		
Valves		1,312 94		
Water register		100 00		
Wages:				
Carpenters $368 10				
Horses and carts 502 50				
Laborers 8,225 06				
Machinists 213 28				
Waste water insp'r 260 00				
		9,568 94		
Intake, Contract No. 61		47,979 49		
Preliminary filters, Contract No. 89		32,467 90		
Boiler equipment, Contract No. 92		7,131 07		
Pumping engines, Contract No. 93		99,843 19		
Boiler equipment, Contract No. 95E		70,275 00		
Boiler equipment, Contract No. 95F		10,972 48		
Economizer, Contract No. 95G		14,532 70		
Floor of pump house, Contract No. 98		6,568 00		
Preliminary Contract No. 102		45,927 86		
Electric work, Contract No. 103B		1,084 21		
Heating and plumbing, Contract No. 103W		1,935 49		
Completing Contract No. 3, Contract No. 103F		8,353 48		
Revolving crane and cars, Contract No. 106F		8,190 00		
Cold storage, Contract No. 106L		9,122 90		
Coal and ash handling machinery, Contract No. 106LB		13,150 00		
Wharf and intake, Contract No. 106B		16,620 12		
Electric wiring, Contract No. 109		37,786 15		

Detailed Expenditures of Bureau for 1908—Continued.

General Appropriation.	Amount Appropriated.	Amount Expended.	Amount Merging.	Amount Not Merging.
Item 25—Continued.				
Electric machinery, Contract No. 110		$22,635 00		
Feed water heater, Contract No. 113		1,687 00		
Sand washer pump, Contract No. 119		6,640 00		
Pumping engines, Contract No. 126		60,000 00		
Boilers, Contract No. 127		25,000 00		
Sewers, Contract No. 132		9,333 14		
Painting, Contract No. 134J		750 00		
Magnesia covering, Contract No. 134JM		5,464 33		
Measuring apparatus, Contract No. 136		3,000 00		
		$600,028 64		$472,026 88
Item 26. For furnishing and laying water mains. Balance, January 1, 1908 $286,945 41				
Increased by additional allotment 150,000 00				
Net appropriation	$436,945 41			
Bolts and nuts		$275 02		
Closures		341 96		
Damages, broken water main		178.72		
Digging and refilling ditch		114 80		
Freight		7 86		
Hauling		28 80		
Inspecting pipe		169 82		
Iron castings		611 64		
Paint		136 08		
Paving		219 15		
Repairs, awning pole		4 38		
Repairs, pipe		32 40		
Rent of No. 744 Carpenter st.		40 00		
Rent of No. 538 West Venango street		51 00		
Rent of No. 427 North Third street		54 00		
Rent of No. 345 Tusculum street		61 00		
Rent of No. 4111 Frankford avenue		65 00		
Steel flanges		79 40		
Stone		13 25		
Supporting tracks		135 74		
Pipe laying, Contract No. 69M		11,376 97		
Pipe laying, Contract No. 70M		9,324 44		
Pipe laying, Contract No. 70P		17,664 94		
Pipe laying, Contract No. 70S		108,179 36		
Pipe laying, Contract No. 108M		37,763 52		
Iron water pipe, Contract No. 108W		23,841 09		
Special castings, Contract No. 129		1,311 84		
Third street pipe extension, Contract No. 131		99,368 61		

Detailed Expenditures of Bureau for 1908—Continued.

General Appropriation.	Amount Appropriated.	Amount Expended.	Amount Merging.	Amount Not Merging.
Item 26—Continued.				
Pipe connections, Contract No. 141		$25,039 92		
Sewers, Contract No. 144		4,545 50		
Iron water pipe and specials, Contract No. 148		13,146 40		
Iron water pipe and specials, Contract No. 151		27,151 35		
		$381,336 06		$55,608 45
Item 27. For the improvement, extension and filtration of the water supply. Balance, Jan. 1, 1908	$562,500 00			
Increased by additional allotment	987,500 00			
Net appropriation	$1,550,000 00			
Affidavits		$9 00		
Brass fittings		499 22		
Cement		54 00		
Chandlery		107 92		
Coal		213 08		
Electric cement		36 54		
Electric supplies		196 58		
Engineer supplies		1,140 62		
Erection of columns		368 54		
Freight		429 65		
Forge and fittings		100 30		
Gasoline		17 42		
Gauge tester		60 80		
Gum goods		567 30		
Hardware		746 16		
Hauling		190 00		
Hose couplings		254 20		
Ice		10 30		
Incidentals		462 30		
Index cards		42 50		
Interest		132 32		
Iron castings		265 65		
Iron fittings		339 07		
Iron screens		384 00		
Iron work		519 28		
Lamps		241 26		
Lead wool		66 44		
Liquid granite		60 00		
Lubricator		56 77		
Lumber		746 10		
Machine tools		465 98		
Machine work		26 94		
Oil		49 50		
Packing		330 93		
Paint		158 98		
Photo supplies		53 79		
Pipe tools		59 41		
Printing and stationery		1,935 05		
Repairing tracks		483 68		
Rent of No. 744 Carpenter street		16 00		
Rent of No. 427 North Third street		18 00		
Rent of No. 345 Tusculum street		48 00		
Rent of No. 538 West Venango street		51 00		
Rent of pump		922 13		

Detailed Expenditures of Bureau for 1908—Continued.

General Appropriation.	Amount Appropriated.	Amount Expended.	Amount Merging.	Amount Not Merging.
Item 27—Continued.				
Sand ejector		$450 00		
Steam hose		12 37		
Steel lockers		66 00		
Steel rollers		132 80		
Stone and gravel		165 63		
Telephone rental		158 07		
Transportation		519 88		
Traveling expenses		367 71		
Typewriter supplies		65 75		
Valves		654 10		
Salaries		115,876 78		
Wages:				
Carpenters $1,815 75				
Caulkers 238 87				
Horses and carts 2,625 03				
Laborers 37,634 71				
Machinists 762 87				
Waste water inspector 212 50				
		43,289 73		
Coal and ash handling machinery, Contract No. 94		43,095 15		
Preliminary filters, Contract No. 102		807,260 98		
Electric wiring, Contract No. 109		16,528 36		
Pumping engines, Contract No. 126		21,000 00		
Shelter houses, Contract No. 133		22,795 50		
Curbing, Contract No. 145		1,620 40		
Sluice gates, Contract No. 147		2,173 50		
Surface condenser, Contract No. 150		575 00		
		1,089,774 46		$460,225 54
Item 28. For furnishing and laying mains and other purposes. Balance, Jan. 1, 1908 $74,062 52				
Increased by additional allotment 150,000 00				
Net appropriation $224,062 52				
Advertising		$74 85		
Brass fittings		83 05		
Bolts and nuts		24 83		
Bush hammering		499 00		
Cement		249 00		
Closures		247 46		
Coal		13 70		
Copper bends		424 44		
Drilling machine		164 50		
Flange pipe and fittings		6,500 00		
Gum goods		86 51		
Hire of pump		260 00		
Iron boxes and caps		257 50		
Iron fittings		24 41		
Lumber		154 25		
Oil		12 88		
Packing		61 82		
Paint		21 75		
Paving blocks		227 36		

Detailed Expenditures of Bureau for 1908—Continued.

General Appropriation.	Amount Appropriated.	Amount Expended.	Amount Merging.	Amount Not Merging.
Item 28—Continued.				
Printing		$20 00		
Removing boilers		837 24		
Supporting tracks		44 54		
Telephone rental		6 58		
Timbering and paving		163 13		
Transportation		146 60		
Watching tracks		100 92		
Valve bodies		82 50		
Pipe laying, Contract No. 70S		1,317 37		
Pipe laying, Contract No. 70M		42,972 47		
Pumping engine, Contract No. 126		54,561 70		
		$109,640 36		$114,422 16

Statement of the Amount Expended by the Department of Supplies for the Bureau of Water and Filtration.

Taken from the Books of the City Controller.	Amount Appropriated.	Amount Expended.	Amount Merging.	Amount Not Merging.
Item 11. For stationery, office and engineer supplies, printing, etc.	$3,000 00	$2,999 91	$0 09	
Item 11½. For the same purposes as Item 11	4,300 00	4,273 44		$26 56
Item 12. For the purpose of coal	500,000 00	499,340 16	659 84	
Item 12½. For the purpose of coal	200,000 00	200,000 00		
Item 13. For oil, lubricant, paints, brushes, wood and coke	8,000 00	7,877 95	122 05	
Item 13½. For the same purposes as Item 13	10,000 00	8,634 23		1,365 77
Item 14. For iron water pipe, special castings and pig lead	5,000 00	4,465 40	534 60	
Item 14½. For the same purposes as Item 14	12,500 00	12,005 04		494 96
Item 15. For hardware, bolts, nuts, iron, steel and malleable coatings	20,000 00	19,954 46	45 54	
Item 15½. For the same purposes as Item 15	15,000 00	13,627 65		1,372 35
Item 16. For gum goods and packing	20,000 00	19,925 60	74 40	
Item 16½. For the same purposes as Item 16	20,000 00	19,853 57		146 43
Item 17. For chandlery	4,000 00	3,964 96	35 04	
Item 17½. For chandlery	2,500 00	2,296 31		203 69
Item 18. For wrought iron pipe and fittings	4,000 00	3,907 74	92 26	
Item 18½. For the same purposes as Item 18	4,500 00	4,328 22		171 78
Item 19. For fire brick and fire clay	1,000 00	392 31	607 69	
Item 20. For brass fittings and castings, cocks and valves for steam and water, expansion metal and lead coating	13,000 00	12,917 91	82 09	
Item 20½. For the same purposes as Item 20	5,000 00	4,863 98		136 02
Item 21. For covering steam pipes and boilers	1,000 00	331 10	607 69	
Item 22. For lumber	18,000 00	17,978 70	21 30	
Item 22½. For lumber	6,500 00	6,500 00		

Bureau of Water—Continued.

Taken from the Books of the City Controller.	Amount Appropriated.	Amount Expended.	Amount Merging.	Amount Not Merging.
Item 23. For forage	$5,000 00	$4,999 11	$0 89	
Item 23½. For forage	2,000 00	1,991 44		$8 56
Item 24. For iron and steel	2,000 00	1,997 27	2 73	
Item 24½. For iron and steel	1,500 00	1,475 88		24 12
Item 25. For cement, bricks, blocks, lime, sand and building stone	5,000 00	4,807 16	192 84	
Item 25½. For the same purposes as Item 25	2,500 00	2,437 90		62 10
Item 26. For electrical supplies	1,000 00	997 30	2 70	
Item 26½. For electrical supplies	1,000 00	1,000 00		
Item 27. For tapping and pipe cutting machines and fittings	1,500 00	1,349 53	150 47	
Item 28. For horses, wagons, carts, stable supplies and harness	3,000 00	2,989 04	10 96	
Item 28½. For the same purposes as Item 28	500 00	491 25		8 75
Item 29. For donkey pumps, machine tools and condensers	1,000 00	989 89	10 11	
Item 30. For special articles and small stores	2,000 00	1,988 60	11 46	
Item 30½. For the same purposes as Item 30	1,000 00	998 53		1 47
Item 31. For lead pipe, block tin and sheet lead	6,000 00	6,000 00		
Item 31½. For the same purposes as Item 31	4,000 00	4,000 00		
Item 32. For iron pipe, special castings and pig lead. Balance, January 1, 1908	16,279 60	16,279 60		
	$932,579 60	$925,231 14	$3,325 90	$4,022 56

Recapitulation.

Balance from the books of 1907	$2,617,866 50		
Additional and transfers	2,099,616 34		
Annual appropriation	1,064,627 25		
Appropriation, Department of Supplies	932,579 60		
			$6,714,689 69
Expended for improvements	$2,605,235 59		
Expended for maintenance	1,555,855 81		
Expended for supplies	925,231 14		
		$5,086,322 54	
Amount merging	$7,347 58		
Amount merging, Department of Supplies	3,325 90		
Transferred	169,714 71		
Amount not merging	1,443,956 40		
Amount not merging, Department of Supplies	4,022 56		
		$1,628,367 15	$6,714,689 69

Receipts of the Bureau of Water Rents—1908.

1908	Water Rents by Schedule on Existing Conditions.		On New Connections.	By Meter, Current and Delinquent.	Penalties		Charges for Ferrules on New Connections.	Fees for Searches.	Frontage Paid to Receiver of Taxes.	Miscellaneous	Liens.	Interest	Collected by City Solicitor.	Totals.
	Current.	Delinquent.			Current.	Delinquent.								
January		$5,283 13	$2,217 60	$17,804 57		$789 97	$624 00	$212 75	$11,645 84	$1,251 20	$27 00	$52 07	$2,647 85	$42,555 98
February	$186,645 15	2,249 00	4,169 48	1,941 74		354 64	294 00	207 75	15,393 61	97 63	9 00	13 88	2,465 46	213,841 34
March	297,456 34	14,117 15	12,880 57	74,211 26		2,077 94	1,026 00	219 25	10,571 43	2,516 33	31 00	81 14	2,587 02	417,775 43
April	302,926 18	3,799 50	14,227 37	17,395 73		568 72	822 00	242 75	17,756 03	320 92	26 00	44 06	2,991 84	361,121 10
May	2,352,340 42	1,759 25	8,815 30	32,469 39		260 03	573 00	246 50	10,253 24	516 32	5 00	8 49	4,297 54	2,411,574 48
June	68,345 20	1,033 00	6,973 00	28,323 49	$2,897 79	155 70	925 00	257 00	5,949 16	1,251 80	2 00	9 86	3,653 39	119,779 39
July	48,235 65	901 75	6,519 95	15,976 07	2,017 00	105 05	883 00	216 50	12,406 53	189 24	6 00	9 93	2,598 90	90,065 75
August	98,215,15	1,966 75	3,741 56	41,785 99	4,948 71	295 69	1,372 00	173 00	5,614 81	148 49	7 00	141 30	2,300 27	160,710 72
September	28,394 00	602 15	4,657 74	35,840 85	3,941 61	90 30	504 00	210 50	7,307 35	253 78	8 00	12 68	2,421 78	84,244 74
October	80,999 58	624 60	5,333 61	7,967 82	12,042 18	75 53	1,849 00	220 25	11,343 47	13 19	4 00	5 80	4,631 95	125,110 98
November	41,029 16	1,222 64	6,619 88	46,145 04	6,139 00	182 67	1,643 00	180 50	9,526 82	8,356 94	17 00	51 74	3,347 53	124,158 92
December	20,112 55	2,478 00	6,785 22	28,617 69	3,013 55	310 81	2,100 00	187 00	10,193 12	3,856 05	48 00	199 97	3,904 70	81,806 66
1908	$3,524,699 38	$36,036 92	$82,911 28	$348,479 64	$34,999 93	$5,267 05	$12,615 00	$2,573 75	$127,955 41	$18,804 89	$190 00	$633 92	$37,848 32	$4,233,045 49
1907	3,386,297 00	28,721 55	81,411 45	323,890 53	30,160 39	4,343 81	11,238 00	3,996 00	107,071 85	3,917 72	181 00	413 32	39,176 74	4,020,819 36
Increase	$138,402 38	$7,315 37	$1,529 83	$24,589 11	$4,839 54	$923 24	$1,377 00		$20,883 56	14,887 17	9 00	220 60		$212,226 13
Decrease								$1,122 25					$1,328 42	

List of Miscellaneous Receipts for the Year 1908.

January.

3	Plumb Manufacturing Company, renewing 3-inch stop	$33 48
7	Philadelphia and Reading Railway Company, removing fire hydrant	57 94
6	Philadelphia and Reading Railway Company, repairing leak	5 75
7	Philadelphia and Reading Railway Company, repairing leak	25 68
10	D. J. McNichol, moving 6-inch pipe	18 39
10	D. J. McNichol, moving 6-inch pipe	40 19
10	E. H. Vare, repairing fire hydrant	16 40
22	St. James Hotel, testing meter	2 00
23	Philadelphia Rapid Transit Company, relaying 8-inch main	48 62
23	Philadelphia Rapid Transit Company, repairing 6-inch main	12 25
23	Philadelphia Rapid Transit Company, cutting out 20-inch main	93 75
23	Philadelphia Rapid Transit Company, relaying main	16 13
23	Philadelphia Rapid Transit Company, cutting out 20-inch main	96 50
23	Philadelphia Rapid Transit Company, raising 20-inch main	36 00
23	Philadelphia Rapid Transit Company, raising 6-inch main	14 25
23	Philadelphia Rapid Transit Company, raising 6-inch main	45 25
23	Philadelphia Rapid Transit Company, oil used in burning out joints	64 40
23	Philadelphia Rapid Transit Company, repairing 6-inch main	48 68
23	Philadelphia Rapid Transit Company, cutting out 3-inch main	7 20
23	Philadelphia Rapid Transit Company, moving 16-inch main	23 00
23	Philadelphia Rapid Transit Company, relaying 8-inch main	14 00
23	Philadelphia Rapid Transit Company, cutting out 6-inch main	8 55
23	Philadelphia Rapid Transit Company, cutting out 6-inch main	8 55

January.

23	Philadelphia Rapid Transit Company, shifting 6-inch main	$43 75
23	Philadelphia Rapid Transit Company, repairing 6-inch main	25 91
23	Philadelphia Rapid Transit Company, moving 20-inch main	37 27
23	Philadelphia Rapid Transit Company, repairing 20-inch main	15 75
23	Philadelphia Rapid Transit Company, relaying 30-inch main	125 75
23	Philadelphia Rapid Transit Company, raising 30-inch main	54 50
23	Philadelphia Rapid Transit Company, repairing 7-inch main	15 10
23	Philadelphia Rapid Transit Company, repairing 6-inch main	26 33
23	Philadelphia Rapid Transit Company, repairing 6-inch main	32 21
23	Philadelphia Rapid Transit Company, repairing 6-inch main	23 91
23	Philadelphia Rapid Transit Company, repairing 6-inch main	17 59
23	Philadelphia Rapid Transit Company, cutting out 10-inch main	26 50
23	Philadelphia Rapid Transit Company, renewing No. 2 hydrant	56 63
23	Philadelphia Rapid Transit Company, removing 6-inch main	18 39
29	Pennsylvania Railroad Company, refund, over-payment	3 20

February.

2	Armour Company, repairing hydrant	15 31
7	Philadelphia and Reading Railway Company, repairing leak	15 31
10	C. E. Bergdoll, changing supply	71 07
10	Wolf Bros., recaulking joint	7 00

March.

17	Park Iron Yard Company, old material sold	1,000 00
17	Henderson Company, stone furnished	1,500 00
27	David McMahon, repairing break, 6-inch main	12 05
27	David McMahon, repairing service pipe	3 38

April.		
3	Baldwin Locomotive Works, renewing iron pipe..	$29 00
7	Philadelphia Rapid Transit Company, putting in No. 1 fire hydrant.....	96 87
7	Philadelphia Rapid Transit Company, putting in No. 1 fire hydrant.....	126 71
7	Philadelphia Rapid Transit Company, plugging ferrule	3 50
7	Philadelphia Rapid Transit Company, overdrawn warrants	64 84
May.		
1	United Gas Improvement Company, lowering fire hydrant	20 28
1	United Gas Improvement Company, lowering 6-inch main	20 42
5	Philadelphia Rapid Transit Company, relaying 6-inch main	108 98
5	Philadelphia Rapid Transit Company, puting in No. 1 fire hydrant.....	157 38
12	Philadelphia Rapid Transit Company, shifting 6-inch department stop.....	32 03
12	Philadelphia Rapid Transit Company, putting in No. 1 fire hydrant	72 40
12	Philadelphia Rapid Transit Company, lowering fire hydrant	84 31
12	Philadelphia Rapid Transit Company, relaying 6-inch fire connection.....	25 90
16	D. McMahon, repairing 6-inch service main.....	13 77
16	D. McMahon, repairing 6-inch service main.....	10 85
June.		
6	Otis Gas Engine Company, testing meter.....	2 00
17	Market Square Company, repairing 4-inch stop..	3 20
26	W. L. Gallagher, old material purchased.....	1,225 03
30	United Gas Improvement Company, lowering 6-inch pipe	24 57
July.		
15	United Gas Improvement Company, lowering 6-inch pipe	45 13
9	Dooner's Hotel Company, testing meter.....	2 00
16	Disston Water Company, material furnished.....	69 00
17	D. McMahon, repairing 6-inch pipe.....	15 00
17	D. McMahon, repairing 6-inch pipe.....	13 34
17	D. McMahon, making shut off.....	2 25

July.		
24.	D. McMahon, shutting off and redriving.....	$1 75
24	Bennis McNeil, shutting off and redriving.....	3 25
28	Pennsylvania Railroad Company, making shut off for repairs	2 00
29	Millard Construction Company, repairing 4-inch main	16 12
29	Millard Construction Company, repairing service pipe	19 40
August.		
1	D. McMahon, repairing service pipe.....	5 50
1	D. McMahon, repairing 20-inch main.....	75 65
1	B. F. Gaskill, repairing supply pipe.....	2 25
12	Pennsylvania Railroad Company, repairing 4-inch valve	6 68
14	Gladstone Apartment Company, testing meter....	2 00
26	Millard Construction Company, repairing 6-inch main	13 57
26	Millard Construction Company, repairing 6-inch main	17 47
26	Millard Construction Company, repairing 6-inch main	25 37
September.		
9	W. H. Ryan, repairing 8-inch main.....	28 30
4	W. H. Ryan, repairing 8-inch main.....	18 46
4	J. R. Wiggins, removing No. 1 fire hydrant.....	38 59
4	Powers & Weightman, repairs to sprinkler.....	5 00
21	Philadelphia Rapid Transit Company, cutting out 6-inch hydrant	28 60
21	Philadelphia Rapid Transit Company, lowering 6-inch main	26 77
21	Philadelphia Rapid Transit Company, lowering 20-inch main	22 66
21	Philadelphia Rapid Transit Company, lowering fire hydrant connection	16 25
21	Philadelphia Rapid Transit Company, cutting fire hydrant connection	26 68
21	Philadelphia Rapid Transit Company, moving No. 1 fire hydrant	40 07
28	Warrant No. 2971, overdrawn.....	2 40
October.		
10	Maurer Sons' Company, repairing 6-inch service connection	3 32

October.		
16	Lit Bros., renewing valve box	$5 50
17	Pennsylvania Hospital, repairing 4-inch valve	4 37
November.		
10	Pennsylvania Railroad Company, repairing 4-inch valve	1 33
10	Pennsylvania Railroad Company, repairing 6-inch valve	5 25
17	Millard Construction Company, replacing ½-inch ferrule	7 13
21	Pneumatic Tube Company, relaying 6-inch pipe	27 79
21	Pneumatic Tube Company, cutting 6-inch pipe	31 56
23	M. P. Quinn, old material	3,203 32
24	Philadelphia Rapid Transit Company, shifting 6-inch valve	29 77
27	H. A. Hitner's Sons, old material	5,000 00
30	Freihofer Baking Company, moving hydrant	47 30
30	Philadelphia and Reading Railway Company, repairing 6-inch valve	3 49
December.		
7	H. A. Hitner's Sons, old material bought	3,762 72
8	United Gas Improvement Company, cutting out and lowering 8.9-inch main	38 41
11	Hensel, Colladay Company, testing meter	2 00
14	Richard Bemis, repairing 6-inch main	13 80
14	Richard Bemis, repairing 6-inch main	10 99
18	Philadelphia and Reading Railway Company, shutting off water	3 38
29	A. D. McNeil, repairing 6-inch main	19 85
30	National Theatre, repairing 4-inch valve	4 90
	Total	$18,804 89

APPENDIX B

REPORT

OF THE

GENERAL SUPERINTENDENT

SUBMITTING

TABLES OF EXPENSES, PUMPAGE AND CONSUMPTION OF WATER DURING 1908

Philadelphia, January 1, 1909.

FRED. C. DUNLAP, ESQ.,
Chief, Bureau of Water.

DEAR SIR:—I respectfully submit the following report on the operations and the expenses in connection with the work performed at the several pumping stations during 1908:

There has been an increase in the pumpage from the Delaware and the Schuylkill rivers averaging 19,607,348 gallons per day, and an increase of 23,193 tons in the quantity of coal consumed.

The price of coal averaged 15 cents per ton more than that purchased in 1907, and this, together with the increased quantity consumed, represents an additional expenditure for coal during 1908 of $104,617.60, of which amount $34,766.25 was due to this increase of 15 cents

per ton; $21,887.31 for coal consumed to pump a greater quantity of water at the main and high service stations than that pumped during 1907, and $47,964.04 for low service pumpage at Torresdale and for sand washing and electric lighting at the Belmont Filter Plant, which was not included in the last report.

The pumpage at the high service stations was 932,135 gallons per day in excess of that during the preceding year, and in that same period 486 tons more of coal were consumed.

The following tables show the details of expenses, pumpage and other data, all of which are respectfully submitted.

Very respectfully yours,

A. J. FULLER,
General Superintendent.

Coal Consumed during 1908.

Pumping Stations.	Classification.	Tons.	Price Per Ton.	Cost.	Total Cost.
*Fairmount	Egg	115	$5 56	$639 40	$639 40
Spring Garden	Pea	53,204	3 18	169,188 72	169,188 72
Belmont	Pea	41,186	3 18	130,971 48	130,971 48
Queen Lane	Pea	34,105	3 45	117,662 25	117,662 25
Roxborough	Pea	40,317	3 18	128,208 06	142,679 46
Roxborough	Bituminous	5,420	2 67	14,471 40	
†Frankford, No. 1	Bituminous	1,217	2 79	3,395 43	3,395 43
Frankford, No. 2	Bituminous	28,263	2 79	78,853 77	78,853 77
Frankford, No. 3	Bituminous	706	2 79	1,969 74	1,969 74
Totals and averages		204,533	$3 16		$645,360 25
High Service Stations.					
Belmont	Pea	1,840	$4 02	$7,396 80	$7,396 80
Roxborough	Pea	1,734	3 65	6,329 10	6,329 10
Mt. Airy	Pea	295	4 05	1,194 75	1,194 75
*Chestnut Hill	Pea	51	3 65	186 15	186 15
Frankford	Pea	1,012	3 75	3,795 00	3,795 00
Totals and averages		4,932	$3 83		$18,901 80
Low Service Stations.					
Roxborough	Pea	4,128	$3 65	$15,067 20	$15,067 20
Torresdale	Bituminous	17,231	2 72	46,868 32	46,868 32
Totals and averages		21,359	$2 90		$61,935 52
Belmont Filters	Pea	961	$4 02	$3,823 02	$3,823 02
Grand totals and averages		231,775	$3 15		$730,020 59
Increase for 1908		23,193	$0 15		$104,617 60

*For heating only. †For heating and operating machine shop.

Cost of Pumpage, Gallons Pumped and Percentage of Work Done at Each Station for 1908.

Pumping Stations.	Total Expenses.	Total Gallons Pumped.	Lift in feet, including suction and friction.	Gallons pumped 100 feet high, suction and friction included.	Cost of raising 1,000,000 gallons 100 feet high.	Percentage of work done at each Station.
Fairmount	$23,056 64	5,369,821,111	112.3	6,030,309,107	$4 82	2.246
Spring Garden	342,527 36	33,237,851,480	147.3	8,959,355,230	6 99	18.239
Belmont	242,813 25	15,921,886,032	288.8	45,982,406,860	5 28	17.131
Queen Lane	261,043 36	19,630,905,000	274.2	53,827,941,510	4 85	20.053
Roxborough	276,579 32	9,958,477,407	378.8	37,722,712,417	7 33	14.053
Frankford, No. 1	26,000 50					
Frankford, No. 2	169,802 11	33,563,778,840	189.0	63,435,542,007	2 68	23.773
Frankford, No. 3	7,751 52	202,942,152	185.6	376,376,660,634	20 56	
Totals and averages	$1,355,571 06	117,885,662,022	217.4	256,334,927,765	$5 11	95.495
High Service Stations.						
Belmont	$27,606 84	785,608,165	135.8	1,066,849,098	$25 87	.397
Roxborough	25,372 24	1,673,483,865	117.4	1,964,670,057	12 91	.738

Cost of Pumpage, Gallons Pumped and Percentage of Work Done at Each Station—Continued.

Pumping Stations.	Total Expenses.	Total Gallons Pumped.	Lift in feet, including suction and friction.	Gallons pumped 100 feet high, suction and friction included.	Cost of raising 1,000,000 gallons 100 feet high.	Percentage of work done at each Station.
High Service Stations—Continued.						
Mt. Airy	$7,446 92	44,472,500	91.1	40,514,447	$181 63	.016
*Chestnut Hill	2,562 59	355,570	112.9	401,438	6,383 52	
Frankford	20,523 77	504,581,056	140.5	708,936,383	28 95	.264
Totals and averages	$83,512 36	3,008,496,156	125.7	3,781,371,423	$22 09	1.410
Grand totals and averages	$1,555,586 28	160,264,695,178	167.5	268,423,142,605	$5 58	100.00
Increase during 1908	$179,462 98	43,382,482,556	----------	26,137,552,897		
Decrease during 1908	----------	----------	39.8	----------	$0 10	
Roxborough Low Service	$23,463 93	4,797,140,000	28.3	1,357,590,620	$17 29	.506
Torresdale Low Service	93,035 93	34,573,397,000	20.1	6,949,252,797	13 39	2.589
Totals and averages	$116,499 86	39,370,537,000	21.1	8,306,843,417	$12 20	3.096

*Out of service.

No. 1—Worthington Duplex. Capacity. 2,000,000 gallons per day.
No. 2—Worthington High Service. Capacity, 5,000,000 gallons per day.

BELMONT HIGH SERVICE STATION, 1908.

Total Capacity.

No. 2—Worthington Horizontal Compound, High Duty. Capacity, 5,000,000 gallons per day.

1908.	Running Time of Each Engine in Hours.			Gallons Pumped by Each Engine.			Total Pumpage of Each Month.	Average Pumpage per Day.	Coal.		Lubricants.			Mean Head in Pounds per Square Inch, Including Friction Less Suction Lift.			Gallons Raised 100 Feet per Pound of Coal.
											Oils.		Grease and Tallow.				
											Cylinder.	Engine.					
Months.	No. 1.	No. 1.	No. 2.	No. 1.	No. 1.	No. 2.	Gallons.	Gallons.	Tons.	Lbs.	Qts.	Qts.	Lbs.	No. 1.	No. 1.	No. 2.	
January	31	------	713	2,035,875	----------	81,020,450	83,056,325	2,679,236	187	140	280	31	57	49	------	59	268.34
February	28	------	667	1,869,000	----------	53,160,300	55,029,300	1,897,562	180	1,500	262	12	52	49	------	59	186.24
March	------	------	744	----------	----------	56,070,900	56,070,900	1,808,739	158	100	174	8	44	------	------	59	215.31
April	------	------	720	----------	----------	52,166,700	52,166,700	1,738,890	149	1,530	270	15	------	------	------	59	211.51
May	------	------	732	----------	----------	53,491,050	53,491,050	1,725,518	136	2,190	186	8	31	------	------	59	236.99
June	------	------	720	----------	----------	56,544,920	56,544,920	1,884,831	103	1,530	257	7	36	------	------	59	330.97
July	15	------	729	1,201,500	----------	61,410,950	62,612,450	2,019,756	112	940	248	8	------	54	------	59	337.48
August	------	------	744	----------	----------	62,056,800	62,056,800	2,001,832	141	1,830	180	16	51	------	------	59	265.63
September	------	150	254	----------	25,621,365	46,024,200	71,645,565	2,388,185	144	1,330	512	354	36	------	59	59	300.72
October	------	183	560	----------	38,037,270	45,033,350	83,070,620	2,679,697	167	1,340	242	175	30	------	59	59	300.83
November	------	5	714	----------	984,300	65,275,200	66,259,500	2,208,650	183	1,950	180	8	------	------	59	59	218.71
December	------	578	164	----------	67,412,400	16,186,635	83,599,035	2,696,035	172	1,370	218	146	31	------	59	59	237.03
Totals and averages	74	916	7,461	5,106,375	132,055,335	648,441,455	785,603,165	2,146,457	1,839	70	3,009	788	368	51	59	59	259.15

No. 1—Worthington Duplex. Capacity, 5,000,000 gallons per day.

ROXBOROUGH HIGH SERVICE STATION, 1908.

Total Capacity, 10,000,000 gallons per day.

No. 2—Worthington Horizontal Compound High-Duty. Capacity, 5,000,000 gallons per day.

1908.	Running Time of Each Engine in Hours.		Gallons Pumped by Each Engine.		Total Pumpage of Each Month.	Average Pumpage per Day.	Coal.		Lubricants.			Mean Head in Pounds per Square Inch, Including Friction less Head on Suction Lift.		Gallons Raised 100 Feet per Pound of Coal.
									Oils.		Grease and Tallow.			
									Cylinder.	Engine.				
Months.	No. 1.	No. 2.	No. 1.	No. 2.	Gallons.	Gallons.	Tons.	Lbs.	Qts.	Qts.	Lbs.	No 1.	No. 2.	
January	15	728	2,794,770	126,849,030	129,643,800	4,182,058	164	740	124	24	23	51	51	413.87
February	19	677	3,783,780	128,874,225	132,658,005	4,574,414	161	360	------	------	------	51	51	431.82
March	6	738	1,392,930	144,352,215	145,745,145	4,701,456	158	280	108	23	31	51	51	483.53
April	3	717	644,490	132,931,290	133,575,780	4,452,526	135	800	90	22	30	51	51	517.69
May	8	735	2,052,270	133,446,600	135,498,870	4,370,931	139	1,240	93	23	31	51	51	509.36
June	100	607	26,061,720	121,440,945	147,505,665	4,916,855	157	2,220	90	23	45	49	51	486.78
July	26	718	5,996,430	143,059,265	149,055,695	4,808,248	147	20	108	23	47	51	51	531.90
August	9	735	1,995,840	140,276,460	142,272,300	4,589,429	131	1,960	152	24	46	51	51	565.96
September	9	711	2,126,520	136,746,720	138,873,240	4,629,109	135	1,200	150	23	45	51	51	537.51
October	19	721	4,579,740	141,849,090	146,428,830	4,723,511	136	2,060	155	23	31	51	51	561.03
November	50	669	10,763,280	128,121,745	138,885,025	4,629.501	132	1,720	166	24	43	51	51	548.77
December	15	729	3,638,250	129,703,260	133,341,510	4,301,339	133	1,280	155	23	48	51	51	523.69
Totals and averages.	**828**	**8,488**	**65,833,020**	**1,607,650,845**	**1,673,483,865**	**4,572,360**	**1,734**	**440**	**1,391**	**255**	**420**	**51**	**51**	**509.33**

No. 1—Davidson Rotary. Capacity, 1,000,000 gallons per day.
No. 2—Davidson Rotary. Capacity, 1,000,000 gallons per day.

MT. AIRY PUMPING STATION, 1908.

Total capacity, 3,000,000 gallons per day.

No. 3—Knowles Rotary. Capacity, 1,000,000 gallons per day.

1908	Running Time of each Engine in Hours.			Gallons Pumped by each Engine.			Total Pumpage of each Month.	Average Pumpage per Day.	Coal.		Lubricants.			Mean Head in pounds per Square Inch, Including Friction Less Head on Suction Lift.			Gallons Raised 100 Feet per Pound of Coal.
											Oils.		Grease and Tallow.				
											Cylinder.	Engine.					
Months.	No. 1.	No. 2.	No. 3.	No. 1.	No. 2.	No. 3.	Gallons.	Gallons.	Tons.	Lbs.	Qts.	Qts.	Lbs.	No. 1.	No. 2.	No. 3.	
January	116	70	-------	5,220,000	3,150,000	----------	8,370,000	270,000	35	1,500	28	22	2	44	44	-------	106.20
February	149	47	-------	6,435,000	2,115,000	----------	8,550,000	294,828	38	880	34	9	2	39	39	-------	89.34
March	189	25	-------	8,445,000	1,125,000	----------	9,570,000	308,710	43	80	35	11	2	39	39	-------	85.47
April	45	94	-------	2,025,000	4,230,000	----------	6,255,000	208,500	34	1,840	21	4	2	44	44	-------	81.30
May	6	4	-------	270,000	180,000	----------	450,000	14,516	15	60	4	1	2	44	44	-------	14.89
June	54	41	-------	2,130,000	2,045,000	----------	4,175,000	139,167	21	660	38	13	2	44	44	-------	88.73
July	56	31	-------	2,512,000	1,395,000	----------	3,907,500	126,048	21	60	50	5	2	44	44	-------	84.11
August	-------	17	-------	----------	765,000	----------	765,000	24,678	17	1,120	12	3	1	-------	44	-------	19.78
September	17	12	-------	765,000	510,000	----------	1,305,000	43,500	18	1,480	7	9	-------	44	44	-------	31.65
October	5	6	-------	225,000	270,000	----------	495,000	15,968	16	1,960	9	12	-------	44	44	-------	13.28
November	6	2	-------	270,000	90,000	----------	360,000	12,000	15	2,000	36	40	11	44	44	-------	10.25
December	2	14	-------	90,000	180,000	----------	270,000	8,709	16	1,960	8	3	2	44	44	-------	7.24
Totals and averages	645	363	-------	28,387,000	16,085,000	----------	44,472,500	121,510	294	1,400	282	132	28	44	44	-------	52.69

No. 1.—Knowles. Capacity, 250,000 gallons per day.

CHESTNUT HILL PUMPING STATION, 1908.

No. 2.—Worthington Duplex. Capacity, 500,000 gallons per day.

Total capacity, 750,000 gallons per day.

1908	Running Time of each Engine in Hours.		Gallons Pumped by each Engine.		Total Pumpage of each Month.	Average Pumpage per Day.	Coal.		Lubricants.			Mean Head in Pounds per Square Inch, including Friction Less Head on Suction Lift.		Gallons Raised 100 Feet per Pound of Coal.
									Oils		Grease and Tallow.			
									Cylinder.	Engine.				
Months.	No. 1.	No. 2.	No. 1.	No. 2.	Gallons.	Gallons.	Tons.	Lbs.	Qts.	Qts.	Lbs.	No. 1.	No. 2.	
January							5	1,200						
February							5	400						
March							5	1,200						
April							5	800						
May							5	650						
June		8		284,160	284,160	9,472	3	1,280	2				49	40.01
July		2		71,410	71,410	2,304	3	480	2				49	11.20
August							3	255						
September							3	30						
October							3	255						
November							4	40						
December							4	340						
Totals and averages		10		355,570	355,570	972	51	210	4				49	4.27

STATIONS.

	Total.	Average per Day.
*December	2,162,657,000	69,763,129
January,	2,278,741,000	73,577,275
February	2,298,739,000	74,152,871
March	2,774,467,000	92,482,233
April	3,431,453,000	110,692,032
May	3,686,681,000	122,889,367
June	3,920,460,000	126,466,452
July	3,912,184,000	126,199,484
August	3,705,140,000	123,504,666
September	3,797,167,000	122,489,258
October	3,604,105,000	120,136,833
November	3,798,743,000	122,540,097
†December		
	39,370,537,000	107,569,773
Totals		
	35,576,339,000	97,174,710
Increase		
Decrease		

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day.

	o. S.	1
January	,012,575	14
Februa	,591,225	10
March	,150,550	13
April	,190,000	15
May	,680,400	12
June	----------	8
July	,721,475	2
August	,664,325	1
Septem	,970,500	
Octobe	,879,725	2
Novemb	----------	------
Decemb	,922,750	1
Tota	,783,525	80

No. 5—Sc DE sion. Capacity, 30,000,000 gallons per day.
No. 6—Si sion. Capacity, 30,000,000 gallons per day.
No. 7—Cr pacit on. Capacity, 15,000,000 gallons per day.
No. 8—W sion. Capacity, 15,000,000 gallons per day.

EACH IN POUNDS PER SQUARE INCH, FRICTION AND SUCTION LIFT.

		USE.		NEW HOUSE.				Gallons Raised 100 Feet per Pound of Coal.
	No.	o. 7.	No. 8.	No. 2.	No. 3.	No. 9.	No. 10.	
January	379,68	63	62	62	62	67	84	416.40
February	397,42	63	62	63	63	64	72	405.43
March	382,20	63	62	62	62	66	83	387.29
April	397,11	63	62	62	62	67	74	374.31
May	316,26	63	62	62	62	63	63	397.78
June	291,90	63	62	62	62	63	63	422.35
July	117,07	63	62	62	62	63	66	473.19
August	-------	63	62	--------	62	63	67	432.98
September	573,09	63	62	62	62	63	63	414.33
October	777,00	63	62	62	62	63	63	428.71
November	512,82	-----	62	62	62	63	63	396.62
December	767,02	-----	62	62	--------	63	63	371.79
Totals a	,911,58	63	62	62	62	63	68	414.27

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		SQUARE AND		Gallons Raised 100 Feet High per Pound of Coal.
	No. 6.	No. 6.	No. 7.	
uary	252,163,800	126	126	482.87
ruary	259,567,560	126	126	473.24
ch	281,439,960	126	126	471.18
il	269,849,160	126	126	463.58
	272,951,280	126	126	497.39
e	267,986,880	126	126	493.71
	274,281,840	126	126	482.97
ust	274,135,680	126	126	487.77
tember	269,728,200	126	126	491.51
ber	283,207,680	126	126	581.46
ember	280,299,600	126	126	569.56
mber	132,796,440	126	126	503.43
Totals an	121,403,080	126	126	499.85

)00 gallons per day.
No.)00 gallons per day.
TATION, 1908.)00 gallons per day.
per day.)00 gallons per day.

UARE INCH, TION LIFT.

	OUSE.		OUSE.		
	No. 6.	N	No. 6.	No. 7.	Gallons Raised 100 Feet High per Pound of Coal.
Janua	68,872,650	11	175	175	315.27
Febru	90,432,900	11	178	178	362.34
March	130,050,360	12	175	175	346.76
April	110,674,170	9	171	171	352.47
May	127,691,415	1	171	171	366.61
June	127,947,735	1	171	171	372.52
July	132,139,635	1	171	171	397.39
Augus	121,627,845	1	171	171	411.32
Septen	102,761,625	1	171	171	395.19
Octob	112,150,680	1	171	171	370.31
Novem	117,275,745	1	171	171	390.73
Decem	100,169,055		171	171	360.90
Tot	1,341,793,815	1,3	172	172	351.82

No. 1.—uthwark Vertical Triple Exp
No. 2.—uthwark Vertical Triple Exp

	Coal.		LUBRICANTS.		
			Oils:		
			Cylinder.	Engine.	
	ns.	Lbs.	Qts.	Qts.	
January	275	1,400	1,096	720	
Februar	926	980	924	816	
March	981	2,160	848	520	
April	784	240	912	132	
May	547	1,120	984	856	
June	672	720	1,024	876	
July	718	880	1,612	980	
August	815	1,800	1,024	2,648	
Septem	544	2,016	1,046	450	
Octobe	965	1,600	1,296	824	
Novem	974	1,240	864	628	
Decemb	895	2,200	852	840	
Tot	108	656	12,482	10,340	

No. 1—Worthington Compound Vertical. Capacity, 10,000,000 gallons per day.

No. 2—Worthi
gallo

Mon	LUBRICANTS.		MEAN HEAD IN POUNDS PER SQUARE INCH, INCLUDING FRICTION LESS HEAD ON SUCTION LIFT.			Gallons Raised 100 Feet High per Pound of Coal.
	OILS. 190 Engine.	Grease and Tallow.				
	Qts.	Lbs.	No. 1.	No. 2.	No. 3.	
anuary	856	4				102.76
ebruary	1,270					119.51
[arch	2,120	2				132.32
pril	1,697	2				133.52
[ay	2,539					200.98
une	2,425	4				199.70
uly	420	8				181.00
ugust	2,940	1				208.42
eptember	2,780	4				162.41
ctober	255					115.88
ovember	2,226					115.65
ecember	2,051	4				100.91
Totals and av	21,582	29				147.76

No. 1—Cr. 3—Southwark Vertical Compound Rotary. Capacity, gallon 22,000,000 gallons per day.

No. 2—Co. 4—Southwark Vertical Compound Rotary. Capacity, per d. 15,000,000 gallons per day.

	LUBRICANTS.						
	OILS.		MEAN HEAD IN POUNDS PER SQUARE INCH, INCLUDING FRICTION AND SUCTION LIFT.				Gallons Raised 100 Feet High per Pound of Coal.
	Engine.	Grease and Tallow.					
	Qts.	Lbs.	No. 1.	No. 2.	No. 3.	No. 4.	
January	32						
February	3	2					
March	776						
April							
May							
June							
July							
August							
September							
October							
November							
December							
Totals a	811	2					

TION, 190

s.

	Total Pumpage c Each Mont
	Gallons.
J---	1,810,418,00
F---	1,894,084,00
M---	1,916,235,00
A---	2,404,269,00
M---	2,950,649,00
J---	3,212,218,00
J---	3,511,385,00
A---	3,479,613,00
S---	3,347,356,00
O---	3,406,085,00
N---	3,226,375,00
D---	3,414,710,00
---	34,573,397,00

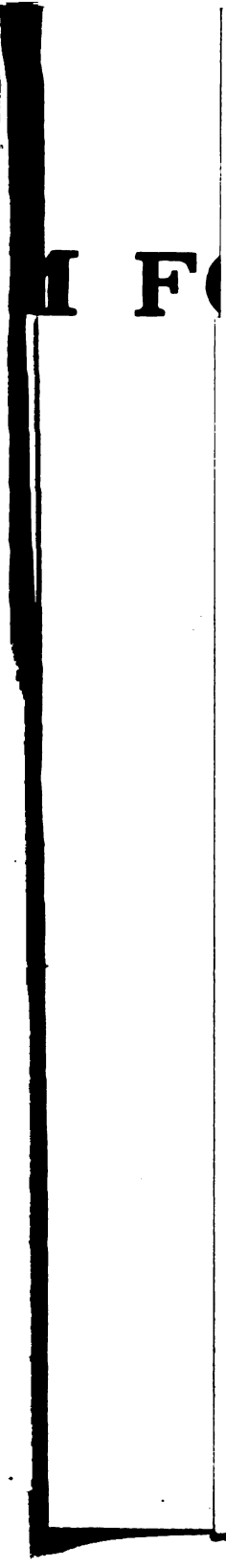
F PUM

MENTS.	Miscellaneous Supplies.	Total.	Total Expenses.
Wages.			
----------	$153 81	$23,748 67	$29,056 64
$1,029 50	2,730 76	301,352 20	342,527 36
315 00	1,333 94	204,791 77	242,813 25
768 00	2,230 83	187,228 59	261,043 36
----------	1,688 77	218,237 46	276,579 32
943 69	317 49	21,182 71	26,000 50
----------	2,335 72	149,974 12	169,802 11
----------	120 23	5,570 75	7,751 52
$3,056 19	$10,911 55	$1,112,146 27	$1,355,574 06
----------	$73 59	$21,290 36	$27,606 84
----------	46 66	22,030 41	25,372 24
----------	13 68	7,281 21	7,446 92
----------	28 65	2,522 97	2,562 59
----------3	29 10	19,080 32	20,523 77
----------3	$191 68	$72,205 27	$83,512 36
$4 2	$44 46	$22,013 03	$23,463 98
115 5	21 25	84,068 07	93,035 98
$119 7	$65 71	$106,101 10	$116,499 86
$3,175 93	$11,168 94	$1,290,452 64	$1,555,586 28
----------	$148 89	$200,167 16	$179,462 98
$7,692 12			

ons, at $4

PUMPIN

	Area of Grate (square feet).	Area of Heating Surface (square feet).	Estimated Horse-power, at 10 square feet for Shell and Fire Flues, 15 square feet for Tubes and 12 square feet for Drums.	Height of Stack (feet).	Section of Stack (square feet).
ring Garden	42	1,551	113	100	49
	42	1,116	100	150	27
	40½	1,371	95.9	95	25
elmont	42	1,116	100	150	38½
	42	1,116	100	150	38½
	42	1,116	100	150	38½
Belmont High S	42	1,116	80	125	20
Belmont Filters	41	1,302	.....	150	
Queen Lane	42	1,116	100	202	113
Roxborough	33¾	1,215	87	100	20¼
	37½	1,047	75	100	28
	42	1,551	113	100	28
	102	5,090	500	175	38½
	42	1,116	100	175	38½
Roxborough Hig	42	1,116	80	125	20
Mt. Airy	16¾	475	33	50	7 5/16
Chestnut Hill	13¾	175	16½		
	22½	.....	44		
Frankford	42	1,551	113	150 100	38 33
	40¼	1,811.5	110	150	38½
	102	5,090	500	150	38½
	102	5,080	500	150	38½
Frankford High	37½	1,116	100	125	12
Torresdale Filter	66	3,280	825	250	



No. 1.—Holly Rotary Duplex. Capacity, 3,000,000 gallons per day.

FRANKFORD HIGH SERVICE, 1908.

Total capacity 7,000,000 gallons per day.

No. 2.—D'Auria Horizontal Compound. Capacity, 4,000,000 gallons per day.

1908.	Running Time of Each Engine in Hours.		Gallons Pumped by Each Engine.		Total Pumpage of Each Month.	Average Pumpage per Day.	Coal.		Lubricants.			Mean Head in Pounds per Square Inch, Including Friction Less Head on Suction Lift.		Gallons Raised 100 Feet High per Pound of Coal
									Oils.		Grease and Tallow.			
									Cylinder.	Engine.				
Months.	No. 1.	No. 2.	No. 1.	No. 2.	Gallons.	Gallons.	Tons.	Lbs.	Qts.	Qts.	Lbs.	No 1.	No. 2.	
January	642	101	33,546,945	7,529,340	41,076,285	1,325,040	82	10	82	76	-------	61	61	314.29
February	584	111	29,975,760	7,530,916	37,506,676	1,293,334	90	250	78	90	-------	61	61	261.16
March	399	345	19,017,472	21,238,964	40,256,436	1,298,595	91	2,190	139	96	5	61	61	274.26
April	360	360	17,559,330	21,816,962	39,376,292	1,312,543	83	190	131	75	-------	61	61	299.48
May	369	375	20,131,965	23,658,124	43,790,089	1,412,584	84	1,280	127	60	-------	61	61	324.89
June	361	359	22,329,418	25,566,702	47,896,120	1,596,537	82	2,210	112	58	5	61	61	362.14
July	375	369	25,774,745	28,531,510	54,306,255	1,751,815	84	1,320	123	60	-------	61	61	402.83
August	371	373	21,467,786	25,679,344	47,147,130	1,520,875	84	2,030	124	59	-------	61	61	348.41
September	366	355	18,167,741	22,815,752	40,620,619	1,354,021	81	2,220	113	59	-------	61	61	310.86
October	375	369	16,684,648	22,452,878	39,500,400	1,274,206	86	1,970	125	55	10	61	61	285.28
November	296	322	12,179,034	25,626,548	37,805,582	1,260,186	76	1,950	132	62	-------	61	61	308.59
December	269	367	13,295,060	22,004,112	35,299,172	1,138,683	81	540	93	49	-------	61	61	272.63
Totals and averages	4,767	3,806	250,129,904	254,451,152	504,581,056	1,378,637	1,011	480	1,379	799	20	61	61	313.74

APPENDIX C

REPORT

OF THE

ASSISTANT IN CHARGE OF DISTRIBUTION

Philadelphia, January 21, 1909.

FRED. C. DUNLAP, ESQ.,
Chief, Bureau of Water.

DEAR SIR:—I have the honor to submit the following report on the distribution system, for the year 1908:

Mains.

The following is a statement of the mains, laid, relaid, taken up, etc.:

New Work.

	Feet.
Service mains laid	134,754
Supply mains laid	8,028
Pumping mains laid	247
Connections, etc.	7,806
Total	150,835

Comparison of Conditions Relative to the Distribution, 1907-1908.

	1908.	1907.	Increase.	Decrease.
Service mains, 4-in. to 16-in.	134,754	131,216	3,538	
Supply mains, 10-in. to 48-in.	8,028	13,787		5,759
Pumping mains, 12-in. to 48-in.	247		247	
Connections and miscellaneous work	7,806	6,897		909
Totals in feet	150,835	151,900	3,785	6,668

	1908.	1907.	Increase.	Decrease.
Relaid, 3-in. to 30-in	22,214	5,910	16,304	
Miscellaneous repairs, 3-in. to 48-in	11,874	9,216	2,658	
Taken up, 3-in. to 48-in	17,819	4,199	13,620	
Lowered, raised and shifted, 6-in. to 48-in	20,546	8,110	12,436	
Totals in feet	72,453	27,435	45,018	
Pipe cut off and abandoned, 3-in. to 20-in	6,043	2,431	3,612	

Meters.

	1908.	1907.	Increase.	Decrease.
Meters in use	1,722	1,726		4

Number of Dwellings and Principal Appliances for the Use of City Water.

	1908.	1907.	Increase.	Decrease.
Dwellings with water	292,565	282,455	10,110	
Dwellings without water	11,921	11,928		7
Water closets	380,628	362,733	18,095	
Baths	335,256	325,182	10,074	
Wash paves	99,195	99,419		224
Basins and sinks	155,843	145,708	10,135	
Urinals	6,617	6,921		304

Repairs.

	Feet.	Feet.
Mains relaid	22,214	
Repairs and connections	11,874	
		34,088
Old pipe taken up	17,819	
Pipe lowered, raised and shifted	20,546	
		38,365
Total		72,453

Abandoned.

	Feet.
Three-inch	13
Four-inch	1,212
Six-inch	4,396
Ten-inch	163
Sixteen-inch	22
Twenty-inch	237
Total	6,043

The total quantity of pipe handled for all purposes throughout the year was 223,288 feet, weighing 11,520,634 pounds.

The total quantity of new pipe laid was 149,187 feet, 28.26 miles, making, in addition to that previously laid, 1,586.51 miles now in use.

Fire Hydrants.

New style fire hydrants in new locations	407
New style fire hydrants in place of old style	493
Total	900
New style fire hydrants taken out	66
Old style hydrants taken out	25
Total	91

The total number of new style fire hydrants added to the distribution system was 900, and the total number in use December 31, 1908, was 15,168, of which 388 are of the old style, and 14,780, or 97.4 per cent. of the new patttern.

Drills for Attachments.

Size.	No. of Openings	Area, Sq. Inches
One-half inch	6,964	1,367
Five-eighth inch	353	108
Three-quarter inch	153	68
One inch	95	75
One and one-quarter inches	33	40

Size.	No. of Openings.	Area, Sq. Inches.
One and one-half inches	35	62
Two inches	93	292
Three inches	8	57
Four inches	9	113
Six inches	14	396
Total	7,757	2,578

For attachments, including ferrules, service pipes and curb stops, which were put in from the street mains to the curb by employees of this Bureau in order to provide for possible future service without breaking of street pavements, see Table "A."

Tabulations of work performed and of expenditures made are also submitted herewith, together with various other tables, compiled as in previous years.

The report of the Pipe Inspector, relative to the inspection of pipes and other castings during the year, in tabulated form, also accompanies this report.

In closing, I desire to give full credit to the assistance rendered this Bureau by Dr. William C. Robinson, Chemist, Bureau of Health. From time to time during the year Dr. Robinson made chemical analyses of samples of water submitted to him, thus enabling us to determine the source of leaks reported to the Bureau by various property owners throughout the City.

Respectfully submitted,

W. WHITBY,

Assistant in Charge of Distribution.

SERVICE AND SUPPLY MAINS LAID DURING 1908.

First District.

Comprising the 1st, 2nd, 3rd, 4th, 26th, 30th, 36th and 39th Wards.

	Purposes for which used.		Size in Inches. 3	4	6	8	10	12	20	Total in Feet and Pounds.
New pipe or feet added.	Service mains				5,333	40	1,289	882		7,544
	Service main connections				30					30
	Supply main connections								39	39
	Fire hydrant connections				341					341
	Supply connections (private)		40	15						55
	Total	Feet	40	15	5,704	40	1,289	882	39	8,009
		Pounds	600	300	188,232	1,680	70,895	66,150	6,045	333,902
Pipe used but adding nothing to feet ground.	Pipe relaid			15	17		30			62
	Repairs, general				207	11	18	21		257
	Pipe taken up		15	17	94					126
	Total	Feet	15	32	318	11	48	21		445
		Pounds	225	640	10,494	462	2,640	1,575		16,036
Total handled		Feet	55	47	6,022	51	1,337	903	39	8,454
		Pounds	825	940	198,726	2,142	73,535	67,725	6,045	349,938
Pipe cut off and abandoned					140					140

Second District.

Comprising the 5th, 6th, 7th, 8th, 9th, 10th, 11th, 12th, 13th, 14th, 16th and 17th Wards.

Purposes for which used.		Size in Inches.									Total in Feet and Pounds.
		3	4	6	8	10	12	16	20	30	
New pipe or feet added.	Service mains			479	389						868
	Supply mains								18		18
	Service main connections				71						71
	Supply main connections			19		76	4			17	116
	Fire hydrant connections			451							451
	Fire connections (private)		27	209		18					254
	Supply connections (private)	107	79	20							206
	Drains			146							146
	Total—Feet	107	106	1,324	460	94	4		18	17	2,130
	Total—Pounds	1,605	2,120	43,692	19,320	5,170	300		2,790	5,610	80,607
Pipe used but adding nothing to feet in ground.	Pipe relaid	50	12	891	964	9,005	717	89	429	256	12,413
	Repairs, general		21	664	20	219	61	26	66	5	1,082
	Pipe taken up		470	8,552	161	396	102	37	529		10,247
	Pipe shifted								5,380		5,380
	Total—Feet	50	503	10,107	1,145	9,620	880	152	6,404	261	29,122
	Total—Pounds	750	10,060	333,531	48,090	529,100	66,000	17,480	992,620	86,130	2,083,761
Total handled—Feet		157	609	11,431	1,605	9,714	884	152	6,422	278	31,252
Total handled—Pounds		2,355	12,180	377,223	67,410	534,270	66,300	17,480	995,410	91,740	2,164,368
Pipe cut off and abandoned		13	81	2,119		103					2,316

Third District.

Comprising the 18th, 19th, 23rd, 25th, 31st, 33rd, 35th, 41st, 45th, and part of 37th, 42nd, and 43rd Wards.

	Purposes for which used.	Size in Inches. 3	4	6	8	10	12	16	30	36	48	Total in Feet and Pounds.
New pipe or feet added.	Service mains			27,499	4,415	1,395	1,110					34,419
	Pumping mains										21	21
	Supply main connections			10			23			17		50
	Fire hydrant connections			1,472								1,472
	Fire connections (private)		37	75								112
	Supply connections (private)	11	30									41
	Drains			26								26
	Total—Feet	11	67	29,082	4,415	1,395	1,133			17	21	36,141
	Total—Pounds	165	1,340	959,706	185,430	76,725	84,975			7,140	13,650	1,329,131
Pipe used but adding nothing to feet in ground.	Pipe relaid			5,608	30	147						5,785
	Repairs, general		37	6,469	34	703	62	39	34	25	11	7,414
	Pipe taken up		4,342	243		9						4,594
	Pipe lowered			1,694					1,078		600	3,372
	Pipe raised			534					204			738
	Pipe shifted			3,258				410				3,668
	Total—Feet		4,379	17,806	64	859	62	449	1,316	25	611	25,571
	Total—Pounds		87,580	587,598	2,688	47,245	4,650	51,635	434,280	10,500	397,150	1,623,326
Total handled	Feet	11	4,446	46,888	4,479	2,254	1,195	449	1,316	42	632	61,712
	Pounds	165	88,920	1,547,304	188,118	123,970	89,625	51,635	434,280	17,640	410,800	2,952,457
Pipe cut off and abandoned			669	644		60						1,373

Fourth District.

Comprising the 15th, 20th, 28th, 29th, 32nd, 47th, and part of 37th and 38th Wards.

	Purposes for which used.	Size in Inches. 3	4	6	8	10	12	30	36	48	Total in Feet and Pounds.
New pipe or feet added.	Service mains		180	7,241	985		479				8,885
	Supply mains								23	12	35
	Supply main connections					11					11
	Fire hydrant connections			545							545
	Fire connections (private)	25	18								43
	Supply connections (private)		8	15							23
	Motor connections (private)	11									11
	Drains			30							30
	Total—Feet	36	206	7,831	985	11	479		23	12	9,583
	Total—Pounds	540	4,120	258,423	41,370	605	35,925		9,660	7,800	358,443
Pipe used but adding nothing to feet ground.	Pipe relaid			1,336	25						1,361
	Repairs, general		6	353	41	24	13	15		18	470
	Pipe taken up		1,141	323	10						1,474
	Total—Feet		1,147	2,012	76	24	13	15		18	3,305
	Total—Pounds		22,940	66,396	3,192	1,320	975	4,950		11,700	111,473
	Total handled—Feet	36	1,353	9,843	1,061	35	492	15	23	30	12,888
	Total handled—Pounds	540	27,060	324,819	44,562	1,925	36,900	4,950	9,660	19,500	469,916
	Pipe cut off and abandoned		98	180							278

Fifth District.

Comprising the 21st and part of the 38th Ward.

	Purposes for which used.		Size in Inches. 3	4	6	8	10	12	20	22	30	36	Total in Feet and Pounds.
New pipe or feet added.	Service mains			950	4,469								5,419
	Supply mains										1,562		1,562
	Supply main connections				7								7
	Fire hydrant connections				136								136
	Fire connections (private)				12								12
	Supply connections (private)				35								35
	Drains				39	84	23		40	168			354
	Total	Feet		950	4,698	84	23		40	168	1,562		7,525
		Pounds		19,000	155,034	3,528	1,265		6,200	30,240	515,460		730,727
Pipe used but adding nothing to feet in ground.	Pipe relaid				53								53
	Repairs, general		1		937		10	11	12		53	10	1,034
	Pipe taken up				77								77
	Pipe lowered				963				38				1,001
	Pipe shifted								397		72		469
	Total	Feet	1		2,030		10	11	447		125	10	2,634
		Pounds	15		66,990		550	825	69,285		41,250	4,200	183,115
Total handled		Feet	1	950	6,728	84	33	11	487	168	1,687	10	10,159
		Pounds	15	19,000	222,024	3,528	1,815	825	75,485	30,240	556,710	4,200	913,842

Sixth District.

Comprising the 22d, and part of the 33d, 37th, 38th and 42d Wards.

	Purposes for which used.	Size in Inches. 3	4	6	8	10	12	16	20	24	30	48	Total in Feet and Pounds.
New pipe or feet added.	Service mains			27,177	1,526	4,088	5,163						37,954
	Service main connections			72			23						95
	Supply main connections			8		18		82					108
	Fire hydrant connections			1,017									1,017
	Fire connections (private)	28		36									64
	Supply connections (private)	11	13										24
	Drains			27									27
	Total—Feet	39	13	28,337	1,526	4,106	5,186	82					39,289
	Total—Pounds	585	260	935,121	64,092	225,830	388,950	9,430					1,624,268
Pipe used but adding nothing to feet in ground.	Pipe relaid			210	21	11		12					254
	Repairs, general	6		496	6	34	92	10	18	5	28		695
	Pipe taken up		43	166		23						9	241
	Pipe lowered			3,459	512		511						4,482
	Pipe shifted						505						505
	Total—Feet	6	43	4,331	539	68	1,108	22	18	5	28	9	6,177
	Total—Pounds	90	860	142,923	22,638	3,740	83,100	2,530	2,790	1,050	9,240	5,850	274,811
	Total handled—Feet	45	56	32,668	2,065	4,174	6,294	104	18	5	28	9	45,466
	Total handled—Pounds	675	1,120	1,078,044	86,730	229,570	472,050	11,960	2,790	1,050	9,240	5,850	1,899,079
	Pipe cut off and abandoned			159				22					181

Seventh District.

Comprising the 24th, 27th, 34th, 44th and 46th Wards.

Purposes for which used.		Size in Inches. 3	4	6	8	10	12	16	20	30	Total in Feet and Pounds.
New pipe or feet added.	Service mains			30,355	6,074	1,680	436	1,120			39,665
	Supply mains							6,413			6,413
	Pumping mains						37		43	146	226
	Service main connections				7						7
	Supply main connections			49		65	20	43			177
	By-pass connections					19					19
	Fire hydrant connections			1,608							1,608
	Supply connections (private)	19		24							43
	Total Feet	19		32,036	6,081	1,764	493	7,576	43	146	48,158
	Total Pounds	285		1,057,188	255,402	97,020	36,975	871,240	6,665	48,180	2,372,955
Pipe used but adding nothing to feet in ground.	Pipe relaid			694			1,136		450	6	2,286
	Repairs, general			683	109	32	55		7	36	922
	Pipe taken up		647	136			48		229		1,060
	Pipe raised			234					697		931
	Total Feet		647	1,747	109	32	1,239		1,383	42	5,199
	Total Pounds		12,940	57,651	4,578	1,760	92,925		214,365	13,860	398,079
Total handled	Feet	19	647	33,783	6,190	1,796	1,732	7,576	1,426	188	53,357
	Pounds	285	12,940	1,114,839	259,980	98,780	129,900	871,240	221,030	62,040	2,771,034
Pipe cut off and abandoned			364	1,154					237		1,755

Alterations of Water Pipes on the Line of the Market Street Subway.

PIPE RELAID.

Streets.	Location.	Pipe.	
		Size.	Feet.
Eighth	From 23 feet 6 inches north of south curb line of Market street to 5 feet 6 inches south of north curb line of Market street	10	34
Eleventh	From 13 feet 6 inches north of south house line of Market street to 27 feet 6 inches south of north house line of Market street	10	50
Fifth	From 25 feet north of south house line of Market street to 25 feet south of north house line of Market street	10	50
Juniper	From 32 feet south of south house line of Market street to 23 feet north of south house line of Market street	10	55
Juniper	From 23 feet north of south house line of Market street to 17 feet north of north house line of Market street	6	94
Juniper, W. S	From south house line of Market street to 130 feet 6 inches north of north house line of Market street	30	256
Juniper, W. S	From Market street to 68 feet south of south curb line of Filbert street	20	309
Market, S. S.	From Delaware avenue to 25 feet west of east house line of Front street	8	278
Market, S. S	From 25 feet west of east house line of Front street to 10 feet west of west house line of Letitia street	10	266
Market, S. S	From 4 feet west of east curb line of Second street to 3 feet east of west curb line of Second street	6	19
Market, S. S	From east to west house line of Third street	10	50
Market, S. S	From east house line of Fourth street to 208 feet west of west house line of Fourth street	10	258
Market, S. S	From 255 feet 6 inches east of east house line of Sixth street to center of Twelfth street	10	2,957
Market, S. S	From center of Twelfth street to east house line of Thirteenth street	12	421
Market, S. S	From west house line of Thirteenth street to 37 feet east of east house line of Juniper street	12	218
Market, S. S	From 37 feet east of east house line of Juniper street to 24 feet west of east house line of Juniper street	10	61

Alterations of Water Pipes—Continued.

Streets.	Location.	Pipe.	
		Size.	Feet.
Market, N. S.	From Delaware avenue to east house line of Front street	8	248
Market, N. S.	From west house line of Third street to 20 feet west of east house line of Fourth street	10	415
Market, N. S.	From 20 feet west of east house line of Fourth street to west house line of Fourth street	6	30
Market, N. S.	From west house line of Fourth street to 10 feet 9 inches west of east curb line of Juniper street	10	3,856
Market and Thirteenth	Between 20-inch main in Market street and 12-inch main in Thirteenth street (supply main connection)	16	17
Market	From center of Front street to 19 feet east of west house line of Front street	10	12
Market	From 41 feet 6 inches east of east house line of Eighth street to 5 feet 6 inches east of east house line of Eighth street	16	36
Market	From 120 feet west of west house line of Eighth street to 152 feet west of west house line of Eighth street	16	35
Market	From 48 feet 10 inches east of east house line of Eleventh street to 10 feet east of east house line of Eleventh street	20	58
Market	From 138 feet west of west house line of Eleventh street to 180 feet west of west house line of Eleventh street	20	42
Market, S. S.	184 feet west of west house line of Eleventh street, for N. Snellenburg & Co.-Girard Estate (fire connection, private)	6	36
Market, N. S.	125 feet east of east house line of Twelfth street, for Philadelphia & Reading Railway, Reading Terminal (fire connection, private)	8	31
Market, N. S.	22 feet east of east house line of Twelfth street, for Philadelphia & Reading Railway (supply connection, private)	6	8
Ninth	From south curb line of Market street to 24 feet south of north house line of Market street	10	54
Seventh	From 23 feet 6 inches north of south house line of Market street to 25 feet south of north house line of Market street	10	49

Alterations of Water Pipes—Continued.

Streets.	Location.	Pipe.	
		Size.	Feet.
Third	From 14 feet north of south house line of Market street to 29 feet 6 inches south of north house line of Market street	6	76
Eighth	From 23 feet 6 inches north of south house line of Market street to 23 feet 6 inches north of south curb line of Market street	10	19
Tenth	From 23 feet north of south house line of Market street to 27 feet 6 inches south of north house line of Market street	10	50
Twelfth	From 26 feet north of south house line of Market street to 25 feet 6 inches south of north house line of Market street	10	49
Twelfth	From 26 feet north of south house line of Market street to center of Market street	12	24
Thirteenth	From south curb line of Market street to 26 feet south of north house line of Market street	10	54
Thirteenth, W. S.	From 24 feet north of south house line of Market street to north curb line of Market street	12	59
	Total		10,618

Alterations of Water Pipes Shifted on the Line of the Market Street Subway.

PIPE SHIFTED.

Streets.	Location.	Pipe.	
		Size.	Feet.
Broad	From 18 feet north of south curb line of Filbert street to 119 feet north of north house line of Filbert street	20	82
Filbert	From 10 feet east of west house line of Broad street to 12 feet 6 inches east of east curb line of Broad (W.) street	20	195
Market	From 19 feet east of west house line of Front street to west house line of Second street	20	486
Market	From west house line of Third street to 41 feet 6 inches east of east house line of Eighth street	20	2,174
Market	From 5 feet 6 inches east of east house line of Eighth street to 120 feet west of west house line of Eighth street	20	176
Market	From 152 feet west of west house line of Eighth street to 48 feet 10 inches east of east house line of Eleventh street	20	1,087
Market	From 10 feet east of east house line of Eleventh street to 138 feet west of west house line of Eleventh street	20	198
Market	From 180 feet west of west house line of Eleventh street to 7 feet west of east curb line of Juniper street	20	984
	Total		5,382

	30	36	48	Total Feet and Pounds.
New pipe or feet added.	----------	----------	----------	134,754
	1,562	23	12	8,028
	146	----------	21	247
	----------	----------	----------	203
	17	17	----------	508
	----------	----------	----------	19
	----------	----------	----------	5,570
	----------	----------	----------	485
	----------	----------	----------	427
	----------	----------	----------	11
	----------	----------	----------	583
	1,725	40	33	150,835
	569,250	16,800	21,450	6,830,033
Pipe used, but adding nothing to feet in ground.	262	----------	----------	22,214
	171	35	29	11,874
	----------	----------	9	17,819
	1,078	----------	600	8,855
	204	----------	----------	1,669
	72	----------	----------	10,022
	1,787	35	638	72,453
	589,710	14,700	414,700	4,690,601
	3,512	75	671	223,288
	,158,960	31,500	436,150	11,520,634
	----------	----------	----------	6,043

Total Feet of Pipe in use December 31, 1908.

Size in Inches.	Total in use December 31, 1907.	Extensions and Relays During 1908.		Total.	Deductions During 1908.			Total in use December 31, 1908.
		Laid.	Relaid.		Taken up.	Abandoned	Total.	
1	175	----------	----------	----------	--------	--------	--------	175
1½	3,566	----------	----------	----------	--------	--------	--------	3,566
2	3,655	----------	----------	----------	--------	--------	--------	3,655
3	76,655	252	50	302	15	13	28	76,929
4	175,285	1,357	27	1,384	6,660	1,212	7,872	168,797
6	5,518,214	109,012	8,809	117,821	9,591	4,396	13,987	5,622,048
8	345,229	13,591	1,040	14,631	171	--------	171	359,689
10	503,224	8,682	9,193	17,875	428	163	591	520,508
12	506,527	8,177	1,853	10,030	150	--------	150	518,407
16	181,950	7,658	101	7,759	37	22	59	189,650
18	16,089	----------	----------	----------	--------	--------	--------	16,089
20	276,749	5,140	879	6,019	758	237	995	281,773
22	916	168	----------	168	--------	--------	--------	1,084
23	27	----------	----------	----------	--------	--------	--------	27
24	13,113	7,500	----------	7,500	--------	--------	--------	20,613
30	296,214	1,725	262	1,987	--------	--------	--------	298,201
36	101,372	674	----------	674	--------	--------	--------	102,046
48	197,111	11,864	----------	11,864	9	--------	9	208,966
60	9,500	----------	----------	----------	--------	--------	--------	9,500
Total	8,227,571	175,800	22,214	198,014	17,819	6,043	23,862	8,401,723

Recapitulation of Fire Hydrants, Set, Renewed and Removed.

	Districts.	Style.					
		O. S.	No. 1.	No. 2.	No. 3.	High Pressure.	Total.
Set.	First		19	1			20
	Second		42	1		6	49
	Third		97	15	1		113
	Fourth		33	10	2		45
	Fifth		11				11
	Sixth		59	3			62
	Seventh		107				107
	Total		368	30	3	6	407
Renewed.	First						
	Second		110	11			121
	Third		90	44	7		141
	Fourth		52	30	2		84
	Fifth		23				23
	Sixth		41	5			46
	Seventh		64	13	1		78
	Total		380	103	10		493
	Total new hydrants						900
Removed.	First		1		1		2
	Second		15	9			24
	Third		10	4	1		15
	Fourth	1	7	3	3		14
	Fifth	2					2
	Sixth	1	7	1			9
	Seventh	21	3	1			25
	Total	25	43	18	5		91
	Total added during 1908						316

Fire Hydrants by Wards.

Wards.	Styles.							Total.
	O. S.	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	High Pressure.	
First	2	204	67	8				281
Second	1	133	90	15				239
Third	3	82	42	6				133
Fourth	1	65	34	14				114
Fifth	16	110	58	5			18	207
Sixth	8	94	42	7		1	50	202
Seventh	5	149	81	6				241
Eighth	10	130	93	3		1	24	261
Ninth		147	67	3		1	36	254
Tenth		119	59			4	22	204
Eleventh	4	77	24	1				106
Twelfth	7	69	20	5				101
Thirteenth	23	81	53	8				165
Fourteenth		101	78					179
Fifteenth		241	206	6	1	2		456
Sixteenth	2	85	36	4	1			128
Seventeenth	11	91	27	1				130
Eighteenth	12	204	60	9				285
Nineteenth	31	339	119	6				495
Twentieth	16	143	127	4				290
Twenty-first	36	426	38	7				507
Twenty-second	57	1,198	147	20				1,422
Twenty-third	37	350	79	7				473
Twenty-fourth	22	336	149	11				518
Twenty-fifth		300	62	4				366
Twenty-sixth	1	240	123	14				378
Twenty-seventh	5	190	65	7		1		268
Twenty-eighth		173	133	27				333
Twenty-ninth	1	114	103	5		1		224
Thirtieth	5	130	110	6				251
Thirty-first		253	64	7				324
Thirty-second	5	138	96	7		1		247

Fire Hydrants by Wards—Continued.

Wards.	Style.							Total.
	O. S.	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	High Pressure.	
Thirty-third	15	451	120	10	1			597
Thirty-fourth	6	402	49	9		1		467
Thirty-fifth		162	26	6				194
Thirty-sixth	6	349	101	28				484
Thirty-seventh	2	110	75	5				192
Thirty-eighth	14	476	111	10				611
Thirty-ninth		249	89	7				345
Fortieth	7	326	55	4				392
Forty-first		59	9	11				79
Forty-second		269	10	9				288
Forty-third	7	328	51	7				393
Forty-fourth	6	237	67	9				319
Forty-fifth		324	69	4				397
Forty-sixth		241	53	15				409
Forty-seventh	4	110	104	1				219
Total	388	10,705	3,541	368	3	13	150	15,168

ring 1908, and Total Previous The

	FOURTH DISTRICT.									
	Wards.									W
	15	20	28	29	32	37	38	47	Total.	21
5	----	----	----	----	----	----	----	----	2,085	---
3	3	----	2	13	5	4	10	8	45	9
8	----	----	----	----	----	----	---	----	2,130	---
5	1	----	----	5	3	1	2	2	14	2
	----	----	----	----	----	----	----	----	----------	----

----------	944
----------	18
----------	8
----------	2
----------	1
----------	3
----------	976

Fire Hydrants by Purveyors' Districts.

Districts.	STYLE.							Total.
	O. S.	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	High Pressure.	
First	16	1,462	687	101	-----	-----	-----	2,266
Second	79	1,263	635	46	1	7	150	2,181
Third	104	2,692	627	69	1	-----	-----	3,493
Fourth	32	1,134	896	49	1	4	-----	2,116
Fifth	38	542	38	8	-----	-----	-----	626
Sixth	73	1,780	220	40	-----	-----	-----	2,113
Seventh	46	1,832	138	55	-----	2	-----	2,373
Total	388	10,705	3,541	368	3	13	150	15,168

Attachments, etc., Made by the Purveyors in Accordance with Permits Issued by the Bureau of Water—Arranged by Districts.

Districts.	NEW ATTACHMENTS.											SHUT OFF BY PERMIT.							WORK DONE WITHOUT PERMIT.					
	SIZE.															REPAIRS.			DRAWN.					
	½-inch.	⅝-inch.	¾-inch.	1-inch.	1¼-inch.	1½-inch.	2-inch.	3-inch.	4-inch.	6-inch.	Total.	Reamed for Larger Attachments.	Redriven.	Discontinued.	Transfer.	Not Drawn.	Drawn and Redriven.	Total.	Discontinued and Abandoned.	Delinquent.	Leak.	Transfer.	Total.	Drawn and Redriven.
First	626	42	29	12	2	4	11	2	3	----	731	------	189	62	------	------	56	307	------	------	244	------	244	
Second	213	67	59	46	14	11	26	----	----	----	436	16	89	67	------	------	117	289	17	------	42	------	59	23
Third	1,514	21	15	15	8	3	13	1	4	9	1,603	------	6	------	7	61	84	158	112	3	302	23	440	279
Fourth	804	13	19	9	3	2	15	2	2	2	871	26	126	1	------	12	112	277	56	2	162	------	220	95
Fifth	165	5	1	2	----	----	1	----	----	----	174	3	15	6	4	26	7	61	2	------	------	------	2	10
Sixth	1,315	89	19	5	5	2	11	2	----	2	1,450	8	40	49	3	10	62	172	------	------	86	------	86	
Seventh	2,327	116	11	6	1	13	16	1	----	1	2,492	19	------	21	2	215	129	386	12	------	85	------	97	27
Total	6,964	353	153	95	33	35	93	8	9	14	7,757	72	465	206	16	324	567	1,650	199	5	921	23	1,148	434

Permits Issued During the Year 1908.

Aquaria	1	Lawn sprinklers	2
Bakeries	23	Laundries	18
Barber shops	68	Laboratories	3
Bars	43	Machines for scouring and rinsing	3
Basins and sinks in dwellings	9,273	Milk houses	14
Basins and sinks in offices and stores	1,123	Motors (beer)	38
Baths in dwellings	9,946	Motors (organ)	13
Baths in hotels, etc.	240	Photograph galleries	3
Baths (shower)	26	Pantry sinks	714
Bidets	2	Pools (swimming)	2
Boats, etc. (supply of)	182	Pools (in churches)	3
Bottling establishments	15	Restaurants and eating saloons	21
Building purposes	300	Slaughter houses	2
Carriages and wagons	523	Stables	100
Cellar drainers	2	Stalls (in stables)	523
Dwellings	10,117	Stalls (cow)	10
Dwellings (half)	7	Steam boilers (number)	177
Drug stores	26	Steam boilers (H. P.)	8,289
Dye houses	2	Steam engines (number)	45
Factories	3	Steam engines (H. P.)	301
Ferrules (number)	8,062	Street sprinklers	183
Filters	4	Tubs, vats and tanks	3
Fire hydrants (use of)	183	Urinals in dwellings	5
Fish troughs and stands	3	Urinals in stores, offices, etc.	160
Forges	5	Urinal troughs	56
Fountains (counter)	14	Wash paves and screw nozzles	2,181
Fountains (garden)	10	Wash paves for watering horses	25
Greenhouses	13	Wash tubs (stationary)	10,155
Heating boilers	96	Water closets in dwellings	17,406
Hydrants in new dwellings	9,617	Water closets in stores, etc.	821
Hydraulic elevators	14		
Ice-cream saloons	20		

Premises Supplied and Appliances in Use January 1, 1909.

Aquaria	38
Arsenals	2
Asylums	7
Bakeries	1,375
Barber shops	2,021
Bars	1,955
Basins and sinks in dwellings	118,651
Basins and sinks in offices and stores	37,192
Baths in dwellings	331,012
Baths (public)	3,711
Baths (shower)	433
Baths (foot)	100
Beam houses and tanneries	35
Bidets	480
Bottling establishments	755
Brick yards	17
Brick yards (gangs of men)	835
Breweries	95
Barrels (brewed)	3,351,814
Cars (steam and electric)	2,185
Carriages and wagons	10,321
Cellar drainers	66
Cemeteries	29
Churches	770
Coal yards	275
Coloring rooms	135
Condensers	87
Depot and railway stations	102
Dwellings (with water)	292,565
Dwellings (without water)	2,123
Dwellings (half without water)	9,798
Dyers	790
Drug stores	511
Dye houses	700
Engines (railroads)	470
Factories, foundries and mills	2,200
Filters	45
Fire stations	85
Fountains (garden)	72
Fountains (counter)	561
Forges	1,300
Furnaces	25
Gas works (holders)	14
Glass works	13
Greenhouses	1,143
Grindstones	125
Halls and club houses	280
Hatters' planks (per set)	30
Hydrants	299,581
Hospitals	80
Hotels	90
Hydraulic elevators	308
Ice-cream saloons	177
Institutions	160
Ice machines	185
Laundries	791
Lawn sprinklers	285
Laboratories	50
Machines for washing and scouring	225
Marble yards	72
Malt houses	580
Market houses	55
Milk houses	589
Mint	1
Motors (beer)	2,034
Motors (organ)	270
Photograph galleries	154
Photograph galleries (operators)	200
Polishing wheels	30

Premises Supplied and Appliances in Use—Continued

Police stations and patrols	80	Steam engines (H. P.)	36,102
Pools (swimming)	85	Steam saws	60
Pools (in churches)	95	Steam presses and hammer	65
Printing establishments	181	Shops and stores (with water)	6,600
Prisons	4	Shops (without water)	950
Rectifying establishments	10	School houses	350
Restaurants and oyster saloons	1,224	Theatres	35
Shot towers	1	Tubs, vats and tanks	2,703
Slaughter houses	494	Turbine wheels	39
Soap-boiling establishments	16	Urinals in dwellings	300
Stand pipes for watering engines	80	Urinals in stores, offices, etc.	5,437
Stables	8,600	Urinal (trough)	880
Stalls (in stables)	56,570	Vinegar establishments	13
Stalls (cow)	340	Wash paves and screw nozzles	98,710
Stalls (fish and trough)	128	Wash paves for watering horses	485
Steam boilers (number)	4,447	Wash tubs (stationary)	78,194
Steam boilers (H. P.)	159,305	Water closets in dwellings	348,009
Steam boilers (heating)	1,306	Water closets in stores, etc.	32,619
Steam boilers (heating, H. P.)	6,900	Wool washers	160
Steam engines (number)	2,512		

Repairs to Mains, Stops and Fire Hydrants, also Stops and Fire Hydrants Removed during 1908.

Districts.	Repairs to Mains.	Stops.			Fire Hydrants.		
		Repaired.	Renewed.	Removed.	Repaired.	Renewed.	Removed.
First	64	1,362	1	1	885	----	2
Second	107	307	29	77	493	121	24
Third	358	327	85	13	151	141	15
Fourth	171	745	4	8	279	84	14
Fifth	128	25	3	5	4	23	2
Sixth	80	36	5	14	28	46	9
Seventh	423	401	56	13	2,072	78	25
Total	1,331	3,203	183	131	3,912	498	91

Total Number of Stops and Valves Arranged by Districts.

Pattern.	Size.	Outlets.	Districts. 1st.	2nd.	3rd.	4th.	5th.	6th.	7th.	Total.
	3	2-way.	1	185	4	23	2	19	13	247
	4	2-way.	108	261	62	160	51	89	86	817
	6	2-way.	3,962	2,629	4,921	3,293	790	2,807	3,763	22,165
	8	2-way.	172	129	221	125	11	89	384	1,121
	10	2-way.	252	459	340	247	34	211	256	1,798
	12	2-way.	146	227	347	168	51	262	223	1,424
Single Gate.	16	2-way.	38	50	64	21	5	40	38	256
Bureau of Water	18	2-way.	------	------	6	18	------	1	------	25
	20	2-way.	25	40	20	37	14	16	33	185
	30	2-way.	8	9	29	27	19	3	3	98
	36	2-way.	3	2	7	12	11	------	8	43
	48	2-way.	------	------	3	9	------	------	------	12
	Total.		4,715	3,991	6,024	4,140	988	3,537	4,806	28,201
	20	2-way.	------	1	5	8	4	4	5	27
	30	2-way.	2	2	7	7	9	2	4	33
Butterfly.	36	2-way.	------	------	5	17	2	------	------	24
Bureau of Water.	48	2-way.	------	2	7	30	22	------	1	62
	Total.		2	5	24	62	37	6	10	146
	6	4-way.	3	3	------	12	------	------	12	30
	8	4-way.	------	------	------	5	------	------	------	5
Barton.	6	5-way.	12	21	------	------	------	------	------	33
	6	6-way.	------	1	------	------	------	------	------	1
	Total.		15	25	------	17	------	------	12	69

Total Number of Stops and Valves—Continued.

Pattern.	Size.	Outlets.	Districts.							Total.
			1st.	2nd.	3rd.	4th.	5th.	6th.	7th.	
Viney.	6	2-way.	5	------	5	3	------	------	------	13
	6	3-way.	49	52	21	231	5	9	15	382
	8	3-way.	------	------	------	------	------	------	5	5
	10	3-way.	------	------	------	3	------	------	------	3
	12	3-way.	------	1	------	3	------	------	1	5
	6	4-way.	22	26	18	98	4	8	9	185
	8	4-way.	1	------	1	------	------	------	5	7
	10	4-way.	------	------	------	13	------	------	------	13
	12	4-way.	------	------	------	------	------	2	------	2
	6	5-way.	24	5	1	26	------	------	3	59
	Total.		101	84	46	377	9	19	38	674
Smith's Patent.	3	2-way.	2	49	4	12	------	------	11	78
	4	2-way.	5	51	3	12	------	------	5	76
	6	2-way.	4	86	32	46	13	18	25	224
	8	2-way.	1	1	13	------	------	------	------	15
	10	2-way.	------	7	12	2	2	7	5	35
	12	2-way.	1	11	9	------	------	------	4	25
	16	2-way.	4	2	2	------	------	2	------	10
	20	2-way.	------	1	2	------	------	------	6	9
	Total.		17	208	77	72	15	27	56	472
Ludlow.	3	2-way.	------	------	13	1	------	2	22	38
	4	2-way.	------	------	------	1	------	------	------	1
	6	2-way.	------	------	------	------	5	------	8	13
	Total.		------	------	13	2	5	2	30	52

Total Number of Stops and Valves—Continued.

Pattern.	Size.	Outlets.	Districts.							Total.
			1st.	2nd.	3rd.	4th.	5th.	6th.	7th.	
Eddy.	6	2-way	------	11	1	6	33	10	15	76
	8	2-way	------	------	1	------	1	5	------	7
	10	2-way	------	8	------	1	8	11	21	49
	12	2-way	------	5	1	------	2	2	4	14
	16	2-way	------	2	1	------	2	15	15	35
	20	2-way	1	5	------	1	2	17	9	35
	24	2-way	------	------	------	------	4	5	------	9
	30	2-way	------	3	4	1	14	4	3	29
	36	2-way	------	3	8	------	4	------	8	23
	48	2-way	------	------	18	------	------	------	------	18
	Total		1	37	34	9	70	69	75	295
Eddy Rotary.	20	2-way	------	------	2	------	------	------	------	2
	30	2-way	------	------	------	2	------	1	------	3
	Total		------	------	2	2	------	1	------	5
Rensaeler.	8	2-way	------	------	4	16	------	13	------	33
	12	2-way	------	------	------	3	------	------	1	4
	16	2-way	------	------	2	4	------	------	------	6
	20	2-way	------	------	------	2	------	2	------	4
	24	2-way	------	------	------	------	------	2	------	2
	30	2-way	------	------	------	1	------	------	------	1
	Total		------	------	6	26	------	17	1	50
Rensaeler Rotary.	30	2-way	------	------	1	------	------	------	------	1
Pratt & Cady.	16	2-way	1	------	------	------	------	------	------	1
	20	2-way	1	1	1	------	------	------	------	3
	30	2-way	------	1	1	------	------	------	------	2
	36	2-way	1	------	6	1	------	------	------	8
	Total		3	2	8	1	------	------	------	14

Total Number of Stops and Valves—Continued.

Pattern.	Size.	Outlets.	Districts. 1st.	2nd.	3rd.	4th.	5th.	6th.	7th.	Total.
Van Winkle.	3	2-way	------	2	------	------	------	------	------	2
Water Equipment Company.	20	2-way	1	------	------	------	------	------	------	1
HIGH PRESSURE STOPS.										
Williamsport.	8	2-way	------	190	------	------	------	------	------	190
	12	2-way	------	54	------	------	------	------	------	54
	16	2-way	------	19	------	------	------	------	------	19
	Total		------	263	------	------	------	------	------	263
Chapman.	8	2-way	------	12	------	------	------	------	------	12
	12	2-way	------	3	------	------	------	------	------	3
	16	2-way	------	3	------	------	------	------	------	3
	Total		------	18	------	------	------	------	------	18
Smith.	16	2-way	------	1	------	------	------	------	------	1
Ludlow.	20	2-way	------	4	------	------	------	------	------	4
Total number stops			4,855	4,640	6,235	4,708	1,124	3,678	5,028	30,268
Check Valves. Bureau of Water.	12		------	1	------	------	------	------	------	1
	20		------	------	------	------	1	------	2	3
	30		------	------	1	------	5	------	3	9
	36		------	------	1	------	4	------	2	7
	48		------	------	4	4	6	------	------	14
	Total		------	1	6	4	16	------	7	34

TABLE "A."

Service Attachments Laid to the Curb by the Bureau of Water on the Streets to be Paved or Repaved.

Districts.	NUMBER OF CONNECTIONS.			LENGTH IN FEET.		
	SIZE.		Total.	SIZE.		Total.
	½-inch.	1-inch.		½-inch.	1-inch.	
First	321		321	3,822		3,822
Second.						
Third	773	1	774	11,576	15	11,591
Fourth	80	1	81	1,253	20	1,273
Fifth	107		107	1,657		1,657
Sixth	507		507	7,644		7,644
Seventh	1,481		1,481	31,750		31,750
Total	3,269	2	3,271	57,702	35	57,737

Account of Iron Stop Boxes, New Stops and Check Valves.

Districts.	Iron Stop Boxes.	STOPS.									Total.
		Department Bureau of Water.	Smith.	Eddy.	Pratt & Cady.	Van Winkle.	Water Equipment Co.	Rensaeler.	Chapman.	Check Valves.	
First	----	39	2	1	1	----	1	----	----	----	44
Second	----	149	20	6	----	2	----	----	18	----	195
Third	5	240	4	11	3	----	----	----	----	----	258
Fourth	----	73	9	----	1	----	----	----	----	----	83
Fifth	----	25	2	----	----	----	----	----	----	----	27
Sixth	6	136	8	11	----	----	----	----	----	----	155
Seventh	143	216	4	1	----	----	----	1	----	2	224
Totals	154	878	49	30	5	2	1	1	18	2	986

Number of Valves Raised in the Several Districts During the Year 1908.

Districts.	Barton.	Viney.			Single Gate—Bureau of Water.					Total.
	4-way.	3-way.	4-way.	5-way.	6-inch.	10-inch.	12-inch.	20-inch.	30-inch.	
Second	1	2	1	------	35	2	3	1	------	45
Fourth	----------	------	------	------	6	------	------	------	------	6
Seventh	----------	------	------	1	------	------	------	------	1	2
Total	1	2	1	1	41	2	3	1	1	53

Number of Complaints and Examinations During 1907 and 1908.

Months.	Hydrants.		Service Pipes.		Wash Paves.		Spigots.		Water Closets.		Horse Troughs.		No Leaks.		Total.	
	1907	1908	1907	1908	1907	1908	1907	1908	1907	1908	1907	1908	1907	1908	1907	1908
January	167	173	208	135	6	4	35	36	74	54	5	2	15	12	510	416
February	113	197	188	286	2	19	22	43	75	91	1	5	10	11	416	652
March	162	129	244	189	6	4	55	28	96	78	5	--------	7	4	575	432
April	188	113	220	130	9	3	45	26	84	52	2	2	11	9	559	335
May	165	198	182	227	11	3	35	45	77	132	3	3	4	9	477	617
June	196	220	160	191	7	7	33	71	84	73	5	3	8	8	493	573
July	206	224	178	155	7	8	35	75	88	118	4	2	11	10	529	592
August	192	215	149	185	10	7	58	138	91	123	--------	3	10	7	510	678
September	201	180	164	123	10	8	54	69	59	63	2	1	12	6	502	450
October	269	198	204	176	8	5	44	97	83	104	2	--------	12	10	622	590
November	210	309	227	227	4	9	64	77	110	135	1	1	5	12	651	770
December	150	259	159	206	2	10	42	46	60	115	4	4	7	6	441	646
Total	2,262	2,415	2,283	2,230	82	87	522	751	990	1,138	34	26	112	104	6,285	6,751

New Meters Set, 1908.

Ward.	Occupant.	Location.	Business.	Date When Set.	Name of Meter.	Size. ½ inch.	⅝ inch.	¾ inch.	1 inch.	1½ inch.	2 inch.	3 inch.	4 inch.	6 inch.	Total.	Cubic Feet Consumed.	Meter Rents.	Remarks.
1	Peter Cosgrove	S. E. cor. 7th and McClellan sts	Milk depot	Dec. 16	Crown				1						1	3,000		Experimental.
14	George Abbott	S. E. cor. 11th and Wallace sts	Milk depot	May 4	Empire				1						1	2,100		Experimental.
15	S. B. & B. W. Fleisher	25th and Hamilton sts	Worsted mill	Nov. 30	Gem							1			1	644,000	$193 20	
16	Megargee Estate	912-18 N. Delaware ave		Mch. 27	Empire							1			1	267,500	58 83	
16	Chas. Ehringer	1150 Germantown ave	Cold storage	May 16	Gem						1				1	1,321,200	535 94	
17	O'Neill Brothers	S. E. cor. Hancock and Oxford sts	Carpet yarn	Mch. 7	Gem						1				1	196,100		Experimental.
17	Standard Hosiery Co	1310-12 N. Lawrence st	Hosiery mfrs	Aug. 20	Gem							1			1	226,600	67 98	
19	Beeber Trunk and Bag Co.	S. W. cor. Mascher st. and Columbia ave.	Trunks and bags	Nov. 30	Gem						1				1	657,605	210 24	
20	Phoenix Plumbago Mining Co.	E. side Germantown ave. and Norristown Railroad, 250 feet south of Montgomery ave	Paints, etc	Dec. 1	Crown		1								1	1,100		Experimental.
21	Edward H. Morris	N. W. cor. Walnut lane & Cresson st	Carpet yarns, etc	Nov. 25	Crown			1							1	2,200		Experimental.
22	John T. Morris	Meadowbrook and Stenton aves	Residence	May 12	Empire				1						1	180,000		Experimental.
22	Germantown Cricket Club	Manheim and Morris sts	Tennis court	Sept. 29	Empire					1					1	2,000	24 57	

New Meters Set—Continued.

Ward.	Occupant.	Location.	Business.	Date When Set.	Name of Meter.	Size. ½ inch.	⅝ inch.	¾ inch.	1 inch.	1½ inch.	2 inch.	3 inch.	4 inch.	6 inch.	Total.	Cubic Feet Consumed.	Meter Rents.	Remarks.
23	Globe Foundry and Machine Co.	Church and Tackawanna sts	Iron foundry	Sept. 28	Crown		1								1	9,400		Experimental.
27	University of Penna.	N. W. cor. 33rd and Locust sts	Power house	May 18	Gem							1			1	481,800	144 54	
27	University of Penna.	N. W. cor. 33rd and Locust sts	Power house	May 19	Gem							1			1	26,900	8 07	
29	American Brew'g Co.	N. E. cor. 31st and Master sts	Brewery stables	Mch. 2	Crown				1						1	41,800	12 54	
29	Commonwealth Brewing Co.	S. E. cor. 28th and Cambridge sts	Brewery	May 4	Gem						1				1	339,600	101 88	
29	C. W. Young & Co.	1255 N. 26th st	Soap, etc	Dec. 16	Crown			1							1	91,300		Experimental.
33	C. B. Medford's Sons	Kensington ave., 211 feet south of Sedgley ave	Packers	July 20	Empire					1					1	219,100		Experimental.
36	Atlantic Oil Refining Co.	Old Passayunk ave. and River road	Oil refiners	Feb. 17	Empire			1							1	7,400	3 82	
36	Baltimore & Ohio R. R. Co.	E. side Schuylkill ave., 282 feet south of Reed st	Round house	Dec. 1	Gem						1				1			Paid by schedule, 1908.
38	Murtha & Earley	N. side Butler st., 50 feet east of 17th st	Brick mfrs	April 27	Keystone					1					1	132,200		Experimental.
44	Pennsylvania Railroad Co.	S. E. cor. 48th st. and Parkside ave.	Freight yard, etc.	Jan. 14	Gem									1	1	8,679,000	2,603 70	

New Meters Set—Continued.

Ward.	Occupant.	Location.	Business.	Date. When Set.	Name of Meter.	Size. ½ inch.	⅝ inch.	¾ inch.	1 inch.	1½ inch.	2 inch.	3 inch.	4 inch.	6 inch.	Total	Cubic Feet Consumed	Meter Rents.	Remarks.
44	Pennsylvania Railroad Co.	S. E. cor. 48th st. and Parkside ave.	Freight yard, etc.	Jan. 16.	Gem									1	1	10,894,600	3,268 38	
44	Pennsylvania Railroad Co.	S. E. cor. 48th st. and Parkside ave.	Freight yard and shop	Jan. 22.	Gem						1				1	293,700	88 11	
46	United Gas Imp. Co.	4650 Market st.	Gas	Aug. 1.	Crown					1					1	282,300	84 69	
	Total						2	5	2	4	6	5		2	23			

S.

	Meters Packed.				
	Trident.	Union.	Empire.	Hersey.	Standard.
½-in.					
⅝-in.	11	2	4		
¾-in.	5	3	1		
1-in.		2	8		
1½-in.	2	1	1	1	
2-in.	2	5	1		
3-in.					
4-in.				1	1
6-in.					
	19	13	15	2	1

Statements.
24,890

ONS FOR

	Put In.			Discon		
	Empire.	Columbia.	Total.	Crown.	Gem.	Nash.
½	----	----	----	1	----	1
⅝	2	1	5	----	----	----
¾	1	----	9	9	----	----
1	1	----	13	1	----	----
1¼	1	----	4	1	----	----
2	1	----	28	----	1	----
3	----	----	21	1	3	----
4	----	----	11	2	3	----
6	----	----	1	----	----	----
12	----	----	----	----	----	----
20	----	----	----	----	----	----
30	----	----	----	----	----	----
36	----	----	----	----	----	----
48	----	----	----	----	----	----
	6	1	92	15	7	1

Schedule of Pipe and Material Inspected During 1908.

	Manufacturer.	Size in Inches.		Inspected.	Rejected.	Accepted.
		Pipe.	Special Castings.			
Bureau of Water.	R. D. Wood, Florence, N. J.	6″		12,746	6,228	6,518
		8″		559	292	267
	R. D. Wood, Burlington, N. J.	8″		352	15	337
	R. D. Wood, Florence, N. J.	10″		353	101	252
			Small	1,226	299	927
	R. D. Wood, Camden, N. J.	48″	Small	149	49	100
			Large	11	1	10
	Donaldson Iron Co., Emaus, Pa.		Large	34	2	32
			Small	1,396	177	1,219
	J. A. Clark, Philadelphia, Pa.		Frames and covers	734	34	700
			Covers	134	10	124
			Six-foot grate bars	177	27	150
			Thirty-two-inch grate bars	655	59	596
			Miscellaneous	139	19	120
	Con. No. 102, Millard Const'n Co., Camden, N. J.		Large	4	2	2
	Con. No. 102, Millard Const'n Co., Emaus, Pa.		Large	12	1	11

Schedule of Pipe and Material Inspected—Continued.

	Manufacturer.	Size in Inches.		Inspected.	Rejected.	Accepted.
		Pipe.	Special Castings.			
Bureau of Water.	Con. No. 102, Millard Con. Co., Catasauqua, Pa.	------	Large	813	127	686
		------	Small	6,141	1,371	4,770
	Con. No. 102, Millard Const'n Co., Emaus, Pa.	------	Small	79	2	77
	Con. No. 102, Millard Con. Co., Burlington, N. J.	12"		100	18	82
		24"		43	13	30
	Con. No. 108, R. D. Wood, Florence, N. J.	------	Large	11	1	10
	Con. No. 129, J. K. Demmick, Catasauqua, Pa.	------	Small	13	3	10
		------	Large	23	3	20
	Con. No. 129, J. K. Demmick, Phillipsburg, N. J.	------	Large	42	2	40
	Con. No. 129, J. K. Demmick, Philadelphia, Pa.	------	Large	14	----------	14
	Con. No. 129, J. K. Demmick, Flemington, N. J.	------	Large	35	8	27
	Con. No. 141, Filbert Con. Co., Burlington, N. J.	30"		9	3	6
		42"		45	3	42
		48"		69	3	66
		------	Large	63	3	60

Schedule of Pipe and Material Inspected—Continued.

	Manufacturer.	Size in Inches.		Inspected.	Rejected.	Accepted.
		Pipe.	Special Castings.			
Bureau of Water.	Con. No. 140, M. J. O'Rourke, Addyston, Ohio	8″		1,921	90	1,831
		12″		358	24	334
			Small	2,040	398	1,642
	Con. No. 140, M. J. O'Rourke, Chester, Pa		Small, steel	120	12	108
	Con. No. 140, M. J. O'Rourke, Philadelphia, Pa		Stop boxes	110		110
	Con. No. 138, S. P. Snow Pump Co., Camden, N. J.	10″		7	2	5
		12″		9	1	8
		16″		11	2	9
		20″		5	1	4
		24″		4	1	3
			Large	14	2	12
			Small	29	3	26
	Total			30,809	9,412	21,397

Schedule of Pipe and Material Inspected—Continued.

	Manufacturer.	Size in Inches.		Inspected.	Rejected.	Accepted.
		Pipe.	Special Castings.			
Contractors.	R. D. Wood, Florence, N. J.	6″		115	27	88
	Donaldson Iron Co., Emaus, Pa.	6″		1,427	375	1,052
		4″		45	7	38
			Small	14		14
	Total			1,601	409	1,192
Rapid Transit Co.	Donaldson Iron Co., Emaus, Pa.	20″		54	14	40
			Large	16	3	13
	Total			70	17	53
Bureau of Charities and Correction.	R. D. Wood, Camden, N. J.	6″		66	11	55
	Donaldson Iron Co., Emaus, Pa.	6″		256	60	196
		4″		136	51	85
		3″		765	386	379
	Total			1,223	508	715

New Attachments Made and Delivered to Districts During the year 1908.

Districts.	Number of Attachments Made and Delivered.	Feet of Lead Pipe.		Total.
		⅝-inch.	1¼-inch.	
First	415	5,412		5,412
Second.				
Third	1,030	16,446		16,446
Fourth	214	3,393	21	3,414
Fifth	110	1,970		1,970
Sixth	386	5,915		5,915
Seventh	1,285	29,140		29,140
Totals	3,440	62,276	21	62,297

DISTRIBUTION EXPENSES DURING THE YEAR 1908.

Including Expenses of Main Office, Purveyors' Districts and Meter Shops.

Material and Labor.	First District.	Second District.	Third District.	Fourth District.	Fifth District.	Sixth District.	Seventh District.	Distribution.	Meter Shops.	Main Office.	Totals.
Lead	$1,162 58	$2,256 01	$3,549 25	$3,135 05	$1,152 80	$3,201 25	$1,389 46				$18,846 40
Gasket	56 57	147 55	74 86	43 94		127 90	153 30				604 12
Coke	27 50	165 00	32 50	90 10	58 50	104 00	82 50				560 10
Wood		10 00				57 60	19 20				86 80
Straight pipe								$38,127 27			38,127 27
Small specials								12,303 64			12,303 64
Large specials								2,927 52			2,927 52
Breeches pipe and ¼ turns								42 67			42 67
Frames and covers	4 40	316 08	716 06	862 12		421 63	868 84				3,189 13
Hauling						3 50		10,171 17			10,174 67
Transportation and hotel							25 70	4,057 23			4,082 93
Supplies, tools, small stores, etc.	1,349 46	2,507 49	933 44	2,789 63	939 13	1,866 07	1,576 02	3,100 18	$2,086 20	$111 65	17,259 27
Plumbing and plumbing supplies					790	61 60	112 65	5,138 70	5,952 05		11,272 90
Meters, etc.									215 60		215 60
Bricks, stone, lime and cement	31 25	36 50		43 75	157 50	91 00	705 50				1,065 50
Lumber	10,128 93	133 14	1,490 82	1,604 12	815 77	2,683 95	533 79	87 60	626 00		18,104 12
Hay, feed, etc.	1,159 54	956 12	1,293 79	969 63	367 92	426 82	812 22				5,986 04

Distribution Expenses During the Year 1908—Continued.

Material and Labor.	First District.	Second District.	Third District.	Fourth District.	Fifth District.	Sixth District.	Seventh District.	Distribution.	Meter Shops.	Main Office.	Totals.
Stable supplies	$259 85	$420 48	$578 36	$42 51	$23 52	$514 37	$527 71				$2,366 80
Stable repairs	283 90	392 40	263 95	517 10	38 25	49 05	156 15				1,700 80
Stable medicines	38 25	43 14	17 41			43 03	56 32				198 15
Stable shoeing	245 12	289 00	264 55	176 95	59 00	160 24	112 13				1,306 99
Supplies, stationery	38 66	57 27	54 09	21 75	15 71	15 96	45 08	$167 61	$57 54	$127 31	600 98
Stop boxes		54 45									54 45
Wages—Per diem	37,491 19	51,720 88	98,950 11	37,818 11	29,176 52	62,179 13	58,204 27				375,540 21
Wages—Salary	5,270 00	5,270 00	7,286 58	9,518 50	3,005 75	4,531 75	4,531 11				40,236 39
Total cost of labor and material on account of distribution	$57,547 20	$64,775 51	$115,505 77	$57,633 26	$35,818 27	$76,538 21	$73,735 29	$76,123 59	$8,937 39	$238 96	$566,853 45
Buildings, grounds and reservoirs			$7,473 75	$1,477 19	$3,500 94	$110 00	$11,999 16				$24,561 04
High pressure fire service	$413 38	$8,678 57									9,091 95
Main office			315 00	552 50			67 45				934 95
Repair shop			317 50	63 25							380 75
Total labor and material	$57,960 58	$73,454 08	$123,612 02	$59,726 20	$39,319 21	$76,648 21	$85,801 90	$76,123 59	$8,937 39	$238 96	$601,822 14

APPENDIX D

REPORT

OF THE

OPERATIONS AT THE CONSTRUCTION AND REPAIR SHOP, BUREAU OF WATER, DURING THE YEAR 1908

Philadelphia, January 2, 1909.

FRED. C. DUNLAP, ESQ.,
Chief, Bureau of Water.

DEAR SIR:—I herewith submit the annual report of the operations at the Construction and Repair Shop, Twelfth and Reed streets, for the year ending December 31, 1908.

Very respectfully,

JAS. H. DEAN,
Superintendent of Shop.

MERCHANDISE AND WAGES.		DR.
Inventory, January 1, 1908		$35,453 46
Iron castings	$16,879 12	
Wrought iron	1,286 83	
Cast iron pipe and fittings	40	
Brass castings	6,071 52	
Brass fittings	291 02	
Lead coating	448 84	
Bolts, nuts and washers	1,086 36	
Hardware	1,414 21	
Coal	1,758 01	
Coke	45 75	
Gum goods, packing and leather belting	1,006 11	
Babbitt metal	61 93	
Lumber	1,203 99	
Oils and tallows	130 44	
Paints and oils	110 81	
Steel	1,675 58	
Baskets, brushes and brooms	31 00	
House cleaning supplies	48 76	
Forage	127 09	
Harness and stable supplies	59 28	
Miscellaneous	438 54	
Stationery, blank books and office supplies	43 10	
Letter and note headings	3 50	
Blanks and books	14 62	
Wages	42,916 23	
		$77,153 04
Total		$112,606 50

MERCHANDISE.		CR.
First District	$2,918 82	
Second District	9,431 85	
Third District	12,515 24	
Fourth District	5,975 89	
Fifth District	1,282 80	
Sixth District	6,024 97	
Seventh District	12,259 14	
		$50,408 71
Belmont Machinery	$5,471 79	
Belmont boilers	243 35	
		5,715 14

Fairmount machinery		$82 69
Frankford machinery	1,076 79	
Frankford boilers	216 71	
		1,293 50
Queen Lane machinery	$9,570 02	
Queen Lane boilers	500 08	
		10,070 10
Roxborough machinery	$10,240 90	
Roxborough boilers	869 87	
		11,110 77
Spring Garden machinery	$1,794 18	
Spring Garden boilers	998 79	
		2,792 97
Mt. Airy machinery	56 00	
Mt. Airy boilers	4 77	
		60 77
Torresdale machinery		110 46
General buildings and grounds		$1,010 82
Filtration		147 66
General distribution		816 28
High Pressure Fire Service		1,810 15
Fixed patterns		1,244 44
Construction and Repair Shop		2,860 42
Total		$89,534 88
Inventory, January 1, 1909		29,184 76
Total Cr.		118,719 64
Total Dr.		112,606 50
Balance		$6,113 14

INVENTORY, JANUARY 1, 1909.

16 4-inch stop valves at $16	$256 00	
3 6-inch stop valves at $18.50	55 50	
7 8-inch stop valves at $28.50	199 50	
5 10-inch stop valves at $37.50	187 50	
1 10-inch stop valve, special flange, at $38.50	38 50	
29 12-inch stop valves at $48	1,392 00	
6 16-inch stop valves at $80	480 00	
2 20-inch stop valves at $120	240 00	
2 30-inch stop valves at $230	460 00	
		$3,309 00
Finished iron castings for stop valves	201 50	
Finished brass castings for stop valves	351 05	
		552 55

11,582 pounds iron castings for stop valves at 2¾ cents	$318 50	
1,417 pounds brass castings for stop valves at 17 cents	240 89	
		$559 39
Partly finished wrought iron screws for stops		133 12
31 No. 1 Fire Hydrants at $34		1,054 00
Finished iron casting for fire hydrants	135 35	
Finished brass castings for fire hydrants	409 10	
		544 45
23,633 pounds iron castings for fire hydrants at 2¾ cents	649 91	
327 pounds brass castings for fire hydrants at 17 cents	55 59	
		$705 50
Partly finished frost and valve rods and cap bands		435 74
9 leather valves for fire hydrants at $2	18 00	
188 4-inch rubber valves for fire hydrants at 60 cents	112 80	
40 6-inch rubber valves for fire hydrants at $1.25	50 00	
		180 80
284 pounds gum joint rings for fire hydrants at 30 cents	85 20	
22 pounds sole leather at 50 cents	11 00	
1,433 ferrule plugs, various sizes	468 50	
27 fire hydrant risers, various sizes	76 00	
Tools—to distribute to Districts	442 50	
1 partly finished 48-inch rotary valve	536 00	
28 steel plunger rods	1,135 00	
27 quadrants at $10	270 00	
1 plunger, No. 5 Spring Garden, 6,210 pounds at 5 cents	310 50	
1 crosshead guide	42 50	
40 fire hoe heads at $1.75	70 00	
61 fire hoe heads, partly finished at $1.50	91 50	
343 sketch plates for hoe heads at 25 cents	85 75	
3 turntables at $31	93 00	
4 turntable tracks at $6.50	26 00	
2 turntable spiders at $32.50	65 00	
9 coal car pedestals at $2.75	24 75	
15 donkey pump plungers, 1,430 lbs. at 5 cents	71 50	

13	furnace rings	$135 00	
35	air pump valves at $9.00	315 00	
52	air pump brasses at $2.75	143 00	
30	gibs at $2.25	67 50	
51	keys at $2.25	114 75	
11	combination pressure caps at $3.50	38 50	
1	plunger sleeve liner, No. 3 Rox., 702 lbs. Ajax at 24 cents	168 48	
2	liners, Belmont, 494 lbs. Ajax at 24 cts.	118 56	
1	gland bushing, No. 5, 6, 7 Belmont, 153 lbs. Ajax at 24 cents	36 72	
1	bushing, No. 8 Spring Garden, 546 lbs. Ajax at 24 cents	131 04	
3,211	lbs miscellaneous brass rings and bushings at 17 cents	545 87	
349	bell and bead bands, various sizes	1,582 00	
			7,301 12
58	tail ends, various sizes	71 50	
22	lead pots, various sizes	51 50	
6	furnace grates	42 00	
2	street keys and 1 bar	16 00	
69	wrought iron monkey legs at $3.75	258 75	
21	eye bolts	7 25	
86	saddles at 20 cents	17 20	
166	stop screws, various sizes	857 25	
61	stop screws, partly finished	160 25	
53	socket screws	99 50	
22	socket spindles	43 25	
90	old style stop screws, various sizes	470 00	
25	stop screws for fire main	164 25	
13	Barton stop screws	46 50	
83	2-3 and 4 Way-Viney screws	262 00	
6	Barton screws	15 00	
11	independent Viney screws	22 00	
12	6-inch Barton screw and bonnet	102 00	
1	30-inch Eddy valve screw	18 00	
750	wooden plugs, various sizes	375 00	
	Bolts, nuts and washers	1,471 70	
15,215	lbs. pig lead at 7 cents	1,065 05	
5,189	lbs. Ajax metal castings at 24 cents	1,245 36	
16,158	lbs. loam castings for pump machinery at 5 cents	807 90	
3,280	lbs. miscellaneous iron castings at 3 cents	98 40	

10,843 lbs. pump machinery castings at 4 cents	$433 72	
2,078 lbs. miscellaneous brass castings at 17 cents	353 26	
1,050 lbs. non-shrinkable metal at 25 cents	262 50	
3,604 lbs. steel castings at 8 cents	288 32	
		$9,125 41
22,461 lbs. machinery steel at 3 cents	673 83	
1,781 lbs. spring steel at 4 cents	71 24	
5,899 lbs. American cast steel at 8 cents	471 92	
1,706 lbs. English and Swedes cast steel at 18 cents	307 08	
980 lbs. shear steel at 7 cents	68 60	
625 lbs. Muschette steel at 35 cents	218 75	
148 lbs. Unital steel at 50 cents	74 00	
642 lbs. Hex steel at 6 cents	38 52	
1,163 lbs. Norway iron at 4 cents	46 52	
37,932 lbs. refined iron at 3 cents	1,137 96	
1,869 lbs. rolled brass at 25 cents	467 25	
737 lbs. brass spring wire at 30 cents	221 10	
917 lbs. 1-inch copper tubing at 40 cents	366 80	
Hardware	88 95	
Lumber	763 40	
Forage	28 25	
Paints, oils and tallows	121 21	
Coal	108 65	
Coke	965	5,283 68
Total		$29,184 76

Furnished to Districts.

Districts.	Fire Hydrants	Wedge Stop Valves.								Plugs.		Iron Bands.	Stop Screws.
		4-inch.	6-inch.	8-inch.	10-inch.	12-inch.	16-inch.	20-inch.	30-inch.	36-inch.	Wood.	Brass.		
First	25	1	25	----	6	2	----	----	----	----	2	284	------	35
Second	113	6	41	6	61	4	2	3	----	----	177	380	33	100
Third	113	6	244	34	13	9	----	----	----	----	58	378	68	29
Fourth	52	----	62	3	------	----	----	----	4	1	34	398	------	64
Fifth	15	----	20	1	------	----	----	----	----	----	12	------	1	15
Sixth	62	----	102	1	11	14	1	----	----	----	69	72	8	32
Seventh	127	----	208	17	13	5	7	3	1	----	84	261	3	8
Totals	507	13	702	62	104	34	10	6	5	1	436	1,773	108	288

PRINCIPAL ARTICLES MANUFACTURED DURING 1908.

25	4-inch stop valves, at $16.00	$400 00
698	6-inch stop valves, at $18.50	12,913 00
52	8-inch stop valves, at $28.50	1,482 00
96	10-inch stop valves, at $37.50	3,600 00
51	12-inch stop valves, at $48.00	2,488 00
12	16-inch stop valves, at $80.00	960 00
6	20-inch stop valves, at $120.00	720 00
5	30-inch stop valves, at $230.00	1,150 00
1	36-inch stop valves, at $425.00	425 00
516	No. 1 fire hydrants, at $34.00	17,544 00
876	ferrule plugs, various sizes, at 25c	219 00
319	wooden plugs, various sizes, at 50c	159 50
Total		$42,020 50

APPENDIX E

REPORT

OF THE

CHIEF DRAUGHTSMAN

ON THE

HYDROGRAPHIC WORK

FOR THE YEAR 1908

Philadelphia, January 11, 1909.

FRED. C. DUNLAP, ESQ.,
Chief, Bureau of Water.

DEAR SIR:—The following report on Hydrographic work under my charge, and on data collected during the year 1908, is respectfully submitted:

Rainfall observations at twenty-one stations, from which the Bureau obtained these data, have been carried on, completing twenty-six years of continuous records. Nine of these stations are mainained by the Bureau and furnished with instruments, stationery and postage. The observers are paid a small monthly salary for the services rendered.

Three of the stations are furnished with self-registering rain gauges, and at four stations automatic stream gauges are in operation, recording continuously the height of water

flowing in the streams. From the curves traced by these instruments the daily, monthly and yearly flow is computed.

The total observed precipitation for the year ending October 1, 1908, was slightly above the normal for the years during which these observations have been made.

The greatest monthly rainfall on the areas comprising the water sheds of the Schuylkill, Perkiomen, Neshaminy and Tohickon streams, during the year was 6.63 inches, being the average of 19 stations for the month of July.

Not more than twenty per cent. of the precipitation for the months of January, February and March was in the form of snow. The precipitation for November (0.83), was the smallest for the year. No very heavy rainfall, for short periods, occurred during the year.

Tables II, III and IV show the number of rainfalls and give the quantities exceeding .25 of an inch per hour at Philadelphia, Spring Mount on the Perkiomen, and Forks of the Neshaminy, as recorded by the automatic rain gauges at these stations.

Stream flow observations with the automatic gauges have been continued on the Perkiomen, Neshaminy, Tohickon and Schuylkill, making twenty-five years of continuous records relative to stream flow on the three first named streams and ten years on the Schuylkill river. Observations on the Wissahickon were subject to so much interruption that a continuous record for over one year was impossible and the work on this stream was discontinued in 1906.

The automatic gauge at Fairmount records the height of water in Fairmount Dam from zero, City Datum, in feet and decimals of a foot, and records the height of water in inches on the dam above the old comb of the dam, which is given in the records of this Bureau as 4.76 C. D.

The zero of this gauge as shown in the report for 1905 was compared with the City Datum bench marks established by the Bureau of Surveys on both sides of the river and was found to practically correspond with both.

Daily computations of the amount of water flowing over the flash boards were made from the records of the automatic gauge, the known pumpage from the river, the quantity used for power through the wheels, the leakage and lockage (both estimated), which give an approximation of the monthly flow of the Schuylkill river at Fairmount Dam.

A comparison of the inches of rainfall flowing off in the Schuylkill river, with the runoff in inches, on the Perkiomen and Neshaminy creeks, is shown in the following table.

Inches of Rainfall flowing off, January to December.	Perkiomen.	Neshaminy.	Schuylkill.
1898	21.50	22.22	24.39
1899	24.66	21.03	22.29
1900	15.21	17.27	18.23
1901	17.55	22.80	17.80
1902	29.01	30.74	29.02
1903	27.23	26.32	27.79
1904	23.07	23.37	18.84
1905	23.62	17.98	18.95
1906	21.67	24.41	17.31
1907	28.034	30.25	21.72
1908	18.708	20.307	17.096

At present there is no method available by which the low water for periods of less than one month can be determined.

The daily average flow of the Schuylkill river as given in Table IX is computed from the total monthly flow and is often, for several days at a time, much less than shown in the table.

There was high water flowing over the flash boards at

Fairmount Dam during the months of January, February, March, April and May. Water was flowing over the flash boards on only 16 days during the months of June, July, August, September, October, November and December.

The long continued drought extending over the whole eastern portion of the Middle and New England States, during the months of August, September and part of October, caused an extremely low flow in all rivers and streams east of the Blue Ridge.

The water in Fairmount Pool, in September, was lower than ever before noted in the records of this Bureau.

The other streams were also very low, but some previous years have shown a lower rate of runoff.

Notwithstanding the drought, the average flow of all the streams for the year ending October 1 was above the averages for the twenty-five years of observed flow.

Your attention is again respectfully directed to the value of this Hydrographic work: First, in the length of time during which it has been continued, the year 1908 completing twenty-six years of records of rainfall and twenty-five years of stream flow observations. Second, the very favorable conditions under which the observations have been continued for so long a period without any changes in the stream conditions at places selected for the location of the stream gauges, which would affect the original computed stream flow curves. Third, in the fact that the water sheds adjoin each other, thus making it possible that the records of stream flows can be combined to cover one large area on which the observations have been made consecutively, as on small areas the rainfall is much more evenly distributed. The runoff from the small area is also, in all probability, more nearly correct, and shows clearly the amount of water taken from the rainfall by evaporation and vegetation on the surface of the ground at different seasons of the year.

Observations at Philadelphia.

	RE SERIES.		TOHICKON SERIES.			NESHAMINY SERIES.		
	Moorestown.	West Chester.	Ottsville.	Smith's Corner.	Point Pleasant.	Lansdale.	Forks of Neshaminy.	Doylestown.
ELEV	35	455	390	480	119	350	143	405
	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.
Janu	3.91	3.01	3.75	3.32	3.35	3.61	3.28	4.52
Febru	4.07	5.77	5.68	5.17	4.31	5.14	4.87	7.51
March	3.61	3.48	3.22	4.21	3.53	3.12	3.91	4.84
April	3.28	2.54	2.46	3.13	2.46	2.30	3.56	3.41
May-	7.43	5.34	7.48	8.03	7.83	5.97	6.80	7.24
June-	2.55	4.04	2.61	2.42	2.65	1.72	2.32	2.19
July-	5.09	4.03	3.74	3.71	4.27	5.61	6.08	5.70
Augus	5.94	5.40	4.28	5.07	5.46	5.86	8.06	6.75
Septer	2.82	2.23	2.01	2.49	2.70	2.33	2.27	2.25
Octob	3.14	2.15	3.34	3.85	3.56	3.44	4.62	4.26
Noven	1.04	1.19	0.76	0.89	0.85	0.70	1.11	0.96
Decem	3.56	3.41	2.26	2.58	3.07	2.13	3.29	3.92
To	42.44	42.59	41.59	44.87	44.04	41.93	50.17	52.55
Pe	112	112	108	117	115	111	130	134
26	51.39	51.53	47.57	50.92	49.21	45.09	46.87	47.66
	117	127	117	123	121	111	116	118
Averag	—8.95	—8.94	—5.98	—6.05	—5.07	—3.16	+3.30	+4.89
Percent	12	22	15	15	15	7	8	10

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The following named tables, compiled as in previous years, accompany this report:

I. Monthly precipitation on sundry water sheds.

II., III., IV. Rainstorms exceeding ¼ inch per hour. — Philadelphia. Forks of Neshaminy. Spring Mount.

V. Average rainfall flowing in..... — Perkiomen.
VI. Average annual yield of streams..... — Neshaminy. Tohickon.
VII. Comparative stream flow..... — Schuylkill.

IX. Monthly and daily yield of..... — Perkiomen. Neshaminy. Tohickon. Schuylkill.

The Bureau is indebted to the following named persons who have kindly furnished rainfall records:

Mr. Thomas J. Beans, Moorestown, N. J.

Mr. Benjamin H. Shoemaker, Pennsylvania Hospital.

During the years 1907 and 1908, all observations on rainfall were taken uniformly in accordance with the instructions given at the beginning of the year.

Yours respectfully,

JOHN E. CODMAN,
Chief Draughtsman.

TABLE II.

Rain Storms Exceeding in Rate 0.25 Inches per Hour as Recorded by the Automatic Rain Gauge at Phila- for the Year 1908.

Date of Observation.	AUTOMATIC RAIN GAUGE.					Remarks.
	TOTAL FALL.		MAXIMUM FALL.			
	Amount in Inches.	Duration, Hours, Minutes.	Amount in Inches.	Duration in Minutes.	Rate per Hour During Maximum Fall.	
January 12th, rain storm	0.91	5—15				
February 19th, snow and rain	1.25	14—00	0.25	60	0.25	
March 19th, rain storm	1.09	20—10	0.40	20	1.20	
April 8th, rain storm	0.58	6—00	0.30	15	1.20	
April 30th, shower	0.80	3—55	0.45	60	0.45	
May 7th, rain storm	2.43	20—30	0.35	15	1.40	
May 7th, rain storm	------	--------	0.45	60	0.45	
May 22d, shower	1.27	1—00	1.12	25	2.70	
May 30th, rain storm	1.25	7—45	0.26	60	0.25	
June 16th, rain storm	2.19	11—40	0.15	10	0.90	
December 7th, rain storm	1.60	13—30	0.50	25	1.20	

Table III.

Rain Storms Exceeding in Rate 0.25 Inches per Hour, as Recorded by the Automatic Rain Gauge at Forks at Neshaminy for the Year 1908.

Date of Observation.	Automatic Rain Gauge.					Remarks.
	Total Fall.		Maximum Fall.			
	Amount in Inches.	Duration, Hours, Minutes.	Amount in Inches.	Duration in Minutes.	Rate per Hour During Maximum Fall.	
January 12th, rain storm	0.84	5—00	0.40	60	0.40	
February 19th, snow and rain	1.21	14—30	0.35	60	0.35	
March 19th, rain storm	1.34	20—30	0.40	60	0.40	
April 8th, rain storm	0.71	6—00	0.20	20	0.60	
April 19th, shower	0.19	0—30	0.15	10	0.90	
April 30th, shower	1.12	3—40	0.40	30	0.80	
May 17th, shower	0.20	0—35	0.20	20	0.60	
May 26th, shower	0.28	0—30	0.25	20	0.75	
May 30th, rain storm	1.25	5—30	0.35	30	0.70	
June 16th, rain storm	2.13	13—10	0.83	60	0.83	
July 3d, shower	1.06	3—45	0.56	30	1.12	
July 12th, shower	0.55	2—50	0.40	25	0.96	
July 24th, shower	0.75	5—15	0.40	20	1.20	
July 24th and 25th, shower	1.26	28—50	0.40	30	0.80	
August 7th, shower	1.70	—25	1.50	20	4.50	
August 11th, shower	1.15	6—00	0.90	60	0.90	
August 25th and 26th, rain storm	4.29	38—30	3.40	430	0.50	
September 28th, rain storm	1.00	2—50	0.45	15	1.80	
October 24th and 26th, rain storm	0.52	44—50	0.25	25	0.60	
October 26th, rain storm	2.10	3—20	1.70	50	2.24	
December 7th, rain storm	1.52	14—40	0.45	60	0.45	

TABLE IV.

Rain Storms Exceeding in Rate 0.25 Inches per Hour, as Recorded by the Automatic Rain Gauge at Spring Mount, for the year 1908.

Date of Observation.	AUTOMATIC RAIN GAUGE.					Remarks.
	TOTAL FALL.		MAXIMUM FALL.			
	Amount in Inches.	Duration, Hours, Minutes.	Amount in Inches.	Duration in Minutes.	Rate per Hour During Maximum Fall.	
January 12th, rain storm	0.51	5—10	0.25	60	0.25	
February 19th, snow and rain	1.10	20—40	0.30	60	0.30	
March 19th, rain storm	1.34	20—35	0.40	60	0.40	
April 8th, rain storm	0.55	10—50	0.15	20	0.45	
April 19th, shower	0.21	0—20	0.20	15	0.80	
April 30th, shower	0.60	4—20	0.30	60	0.30	
May 17th, shower	1.50	0—55	0.75	30	1.50	
May 30th, shower	0.86	5—50	0.30	30	0.60	
June 16th, rain storm	1.72	11—30	0.50	20	1.50	
July 12th, showers	0.73	2—10	0.63	30	1.26	
July 25th, showers	4.27	5—25	3.27	90	2.18	
August 7th, showers	1.06	20	1.06	20	3.18	
August 11th, showers	0.81	5—15	0.66	15	2.64	
August 25th and 26th, rain storm	2.14	22—20	0.45	30	0.90	
September 28th, rain storm	1.08	2—20	0.58	15	2.32	
December 7th, rain storm	1.13	14—10	0.30	60	0.30	

TABLE V.—*Inches of Rainfall Flowing in the Perkiomen, Neshaminy and Tohickon Creeks.*

Watersheds.	Area in Miles.	Percentage of Total Area.				Average for 25 Years, 1883–1908.												
		Woodland.	Cultivated.	Flats.	Roads.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
Perkiomen, at Frederick, 25 years	152	25	71	2	2	2.91	3.49	3.89	2.18	1.37	0.92	1.10	1.01	1.02	1.07	1.55	2.25	
Neshaminy, below Forks, 25 years	139.3	6	92	¼	1¾	3.15	3.80	3.87	2.13	1.55	0.88	1.02	1.06	0.88	1.11	1.43	2.40	
Tohickon, 25 years	102.2	24	72	2	2	3.73	4.17	4.93	2.41	1.72	0.81	1.05	1.14	1.28	1.11	1.82	2.85	
Perkiomen, at Frederick—Maximum, 25 years	----	----	----	----	----	5.40	9.73	6.68	3.52	6.68	2.65	4.89	2.48	3.68	2.82	6.67	6.45	
Perkiomen, at Frederick—Minimum, 25 years	----	----	----	----	----	0.50	0.85	2.38	0.97	0.46	0.23	0.17	0.28	0.16	0.20	0.24	0.61	
Neshaminy, below Forks—Maximum, 25 years	----	----	----	----	----	6.77	10.41	7.11	4.20	7.41	2.93	5.47	3.37	3.81	4.55	6.31	5.55	
Neshaminy, below Forks—Minimum, 25 years	----	----	----	----	----	1.60	0.90	1.84	1.03	0.35	0.08	0.04	0.14	0.03	0.06	0.11	0.41	
Tohickon—Maximum, 25 years	----	----	----	----	----	7.34	10.41	8.00	4.76	8.56	3.43	6.41	3.75	5.49	4.27	7.07	7.58	
Tohickon—Minimum, 25 years	----	----	----	----	----	0.54	0.62	2.98	0.73	0.10	0.07	0.11	0.04	0.05	0.05	0.14	0.56	

TABLE VI.—*Average Annual Yields of Sundry Watersheds to October 1, 1908.*

Watersheds.	Period covered in years.	Area in miles.	Average rainfall in inches.	Average rainfall flowing off in inches.	Per cent. flowing off.	Average daily yield in gallons.	Average yield in cubic feet per second per square mile of drainage area.	Average yield in cubic feet per second per square mile of drainage area for each inch of rainfall.
Perkiomen, at Frederick	25	152.0	47.179	23.276	49.313	168,000,000	1.7104	0.0360
Neshaminy, below Forks	25	139.3	48.113	23.111	48.033	152,968,000	1.6979	0.0350
Tohickon	25	102.2	48.751	27.264	55.920	132,310,000	2.1963	0.0450
Schuylkill	10	1,915.0	48.139	21.564	44.800	1,960,900,000	1.5842	0.0330
Sudbury, Mass	33	75.2	45.99	22.387	48.680	79,967,600	1.6451	0.0380
Croton, N. Y.								

TABLE VII.—*Comparative Daily Stream Flow, 1907 and 1908.*

Watersheds.	Area of Watersheds.	MAXIMUM.	GALLONS.	Date.	MINIMUM.	GALLONS.	Date.
		Per Day.	Per Sq. Mile.		Per Day.	Per Sq. Mile.	
Perkiomen	152.0	3,601,200,000	23,691,000	February 15	6,592,000	43,370	Sept. 17.
Neshaminy	139.3	1,757,600,000	12,617,000	February 15	8,402,000	60,300	Oct. 13.
Tohickon	102.2	1,791,600,000	17,530,000	February 15	1,421,000	13,910	Sept. 26.
Schuylkill	1,915.0	19,140,700,000	10,000,000	February 16	261,110,000	136,000	Sept. —

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FORKS AT FAIRMOUNT.

QUARE MD, 1,915 SQUARE MILES.

RAGE DAI OF STRE	AVERAGE DAILY YIELD OF STREAM.		Average Yield in Cubic Feet per Second per Sq. Mile.
Feet.	Cubic Feet.	Gallons.	
543,200	305,277,000	2,283,630,000	1.8451
944,800	423,554,000	3,168,400,000	2.5600
989,000	580,970,000	4,346.000,000	3.5113
155,000	320,753,000	2,399,400,000	1.9386
968,000	596,574,000	4,462,700,000	3.6057
798,600	506,580,000	3,789,460,000	3.0617
575,300	236,457,000	1,768,820,000	1.4291
296,600	391,482,000	2,928,500,000	2.3672
013,600	91,221,000	682,380,000	0.5513
796,700	110,090,000	823,540,000	0.6654
720,000	51,597,500	385,980,000	0.3119
595,100	35,216,600	263,439,000	0.2129
037,000	304,556,000	2,278,400,000	1.8412
149,800	53,828,000	402,660,000	0.3253
574,200	40,100,500	299,950,000	0.2423
611,600	71,047,400	531,470,000	0.4294
950,000	207,810,000	1,554,500,000	1.2560

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Inches.		ches.	December.	Inches.
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1½		*8		*12
1¼		*8		*13
1¼		10		*14
1¼		10		*15
¾		10		*18
11¼		10		*9
36¾		12		*3
31		12		*6
21½		10		*6
14½		10		*6
9½		10		*8
7½		10		*8
6¼		10		*10
9½		12		*10
13¼		*8		*12
12¼		*8		*12
13½		10		*12
9½		10		*10
6½		10		*10
6¼		*8		*10
14		10		*10
12½		10		*12
9¼		10		*12
8½		12		*12
5¾		12		*12
4¼		12		*12
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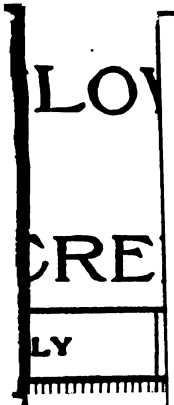

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1¼		10		*15
¾		10		*18
11¼		10		*9
36¾		12		*3
31		12		*6
21½		10		*6
14½		10		*6
9½		10		*8
7½		10		*8
6¼		10		*10
9½		12		*10
13¼		*8		*12
12¼		*8		*12
13½		10		*12
9½		10		*10
6½		10		*10
6¼		*8		*10
14		10		*10
12½		10		*12
9¼		10		*12
8½		12		*12
5¾		12		*12
4¼		12		*12
2¾		12		*8
1¼		12		*8
3¼		12		*10
3¾				*10
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			25,492	

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