ONE HUNDRED AND SIXTH ANNUAL REPORT

OF THE

BUREAU OF WATER

FOR THE YEAR ENDING DECEMBER 31, 1907

AND

FIRST ANNUAL MESSAGE

OF

JOHN E. REYBURN

MAYOR OF THE CITY OF PHILADELPHIA

WITH THE

ANNUAL REPORT

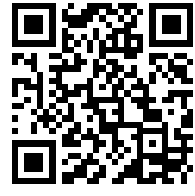
OF

GEORGE R. STEARNS

Director of the Department of Public Works

ISSUED BY THE CITY OF PHILADELPHIA, 1908

PHILADELPHIA
DUNLAP PRINTING CO., 1332-38 CHERRY STREET
1908



ONE HUNDRED AND SIXTH ANNUAL REPORT

OF THE

BUREAU OF WATER

FOR THE YEAR ENDING DECEMBER 31, 1907

AND

FIRST ANNUAL MESSAGE

OF

JOHN E. REYBURN

MAYOR OF THE CITY OF PHILADELPHIA

WITH THE

ANNUAL REPORT

OF

GEORGE R. STEARNS

Director of the Department of Public Works

ISSUED BY THE CITY OF PHILADELPHIA, 1908

PHILADELPHIA
DUNLAP PRINTING CO., 1332-38 CHERRY STREET
1908

OFFICE OF THE MAYOR

PHILADELPHIA

Mayor
JOHN E. REYBURN

Secretary
MAX KAUFMANN

Statistician
GEORGE W. B. HICKS

Chief Clerk
HERBERT M. ORAM

Contract and License Clerk
JOSEPH F. JONES

Confidential Clerk
GERTRUDE O. PRICE

Clerk
WILLIAM F. GLEASON

Stenographer
M. IRENE LOUGHRAN

Assistant Stenographer and Typewriter
CHARLES H. DALRYMPLE

Messenger
WALKER B. WEBB

FIRST ANNUAL MESSAGE

OFFICE OF THE MAYOR, CITY HALL

Philadelphia, April 6, 1908.

To the Presidents and Members of the Select and Common Councils of the City of Philadelphia.

GENTLEMEN:—In accordance with the provisions of the Act of Assembly of June 1, 1885, I herewith transmit to your Honorable Bodies my First Annual Message, with the reports of the various departments and bureaus as received from the Directors, together with a financial report, as furnished by the Controller, and some suggestions concerning the finances and improvements for the future.

Upon assuming the Office of Chief Magistrate of the City I endeavored to impress your Honorable Bodies and the public at large that it was the purpose and desire of the administration to be marked for progress and economy, and be accredited with expeditiously handling the various problems that developed in the course of official duties.

As to the measure of success that has crowned these efforts you must be the judge. I am not responsible for the various interpretations placed on my actions; but it is the intention, and has been the aim, to treat the affairs of the City with the business thought they required. The true

interpretation of business methods called, first of all, for a personal investigation of the various Departments of the City.

PERSONAL INVESTIGATION.

I therefore proceeded to acquaint myself with the conditions of the various Departments and affairs of this great municipality, before proceeding with any special line of action, inasmuch as I refused to accept the traditions of the Office. It soon became apparent to me that I had to cope with a condition that seldom, if ever, confronted any of my predecessors. The Departments were in a general state of confusion, if not in a chaotic condition; public works had been entirely held up, in some cases contracts annulled and the money appropriated (as indicated in the letter from the City Solicitor to the Controller, of May 15, 1906) for work which the City was subsequently compelled to pay for by order of the Court; thus the City suffered not only by the delay and confusion occasioned by this course of procedure, but by being compelled to pay twice for the same work.

I found a general state of discord existing not only between the City Departments and its Bureaus, but between the departments and the public at large, and the confidence of the public entirely destroyed, which very seriously impaired the progress of this, the first year of my administration.

My investigation, after making a great number of personal visits to the Police, Fire, Highway and School Districts, soon convinced me that the Departments were not in a position to produce the results that the public had a right to expect from them, and I have applied this, my first year in Office, to the re-organization of the various departments.

AN EXPERIENCED CABINET.

In conformity with the thoughts expressed in my inaugural address I counseled not only with my Cabinet, as referred to in the Charter of June 1, 1885, but also conferred with the heads of all Departments, both appointive and elective, together with the Presidents of Select and Common Councils and the Chairmen of their respective Finance Committees concerning the City's financial condition, and the conclusion arrived at was that the City's financial credit was in such condition that there was no necessity for alarm. A strong justification for this conclusion is furnished bv the following quotation from the Controller's Report of August 1, 1907, to City Councils:

> "In conclusion I desire to congratulate your Honorable Bodies on the promptness with which the large, unexpected demands upon the Treasury, not contemplated when the tax rate was reduced Sept. 2, 1903, to $1.50, have been honored. By the passage of the Act of Assembly of April 22, 1905, appropriating to the Board of Education five mills on each dollar of the total assessed valuation of real estate, or one-third of the total revenue from current taxation, the appropriation to the Board was increased for the years 1906 and 1907 over that of 1905, $3,648,628.20, and by the issuing of the mandamus by the Court for the payment due on annulled contracts of the Bureau of Filtration for $2,065,911.65, making a total in three years of $5,714,539.85.
>
> "Few, if any, State, Corporate or Municipal treasuries could have honored these large, unexpected demands without serious financial distress, yet all were promptly paid, and, as the small estimated deficit testifies, without any serious impairment to the Treasury or to the Honor of the City's credit."

UNDUE CRITICISM.

It is doubtful whether any municipality in the world has ever been required to stand the criticism that Philadelphia has been called upon to bear, and yet it is an acknowledged fact that Philadelphia's industrial, commercial and professional position is above reproach; therefore, this wholesale abuse of Philadelphia must resolve itself down to a criticism of her municipal government. and, after a careful examination of the various departments of the City, the results of necessity compel me to state, that the financial affairs of the City of Philadelphia have been and are managed in a manner that reflects the highest credit on those who have been entrusted with the government of the municipality, and, while the public at large have too liberally criticised the Councils of our City, it must be said that the basis of fact upon which this criticism rests is a misconception of the true condition.

PERFECT SYSTEM.

The organization of the Government of the City of Philadelphia makes it almost impossible to illegally extract moneys from the City Treasury. This probably can be better explained by referring to a statement published in the Philadelphia Ledger on Saturday, March 21st. T. A. Cleveland, a member of the Municipal Research Commission of the City of New York, after spending two days in studying the methods of financial bookkeeping in the offices of our City Treasurer and City Controller, is quoted as follows:

> "I am amazed at the splendid system you have in the City. Your Treasurer, among other safeguards, makes a daily accounting, which I venture to say is a thing almost unheard of in other municipalities. He also compels employees to treat women with the

greatest courtesy, and has a special window for their convenience. I do not think that is done in any other City."

This unqualified approval, coming from the representative of another City, cannot be regarded as partial judgment.

CREDITABLE SHOWING.

This City has borrowed $136,049,920.22 in fifty-two years, and has a net debt to-day of but $63,343,920.22; thus showing that there has been paid off during the same period $72,706,000, possibly unknown to the majority of the public, many of whom fail to realize the difference between a common mortgage, that bears interest, the principal of which falls due at a given time, and a municipal loan.

The public cannot realize that the taxes paid by them include not only the interest, but the principal, that must by law be used for liquidating the debt obligation. This is forcibly illustrated by the circumstance as shown above, where, of the total amount borrowed, there is to-day less than 50% unpaid, which of itself is a very small item in comparison with what the City owns, as follows:

Property in the custody of the Department of Public Safety, including Buildings, Fire Apparatus, etc., ...	$ 58,796,031.00
Department of Public Works, ...	165,701,791.00
" " Health and Charities, ...	3,620,900.00
" " Wharves, Docks & Ferries,	2,629,000.00
" " The Mayor, ...	2,887,591.00
Board of Education, ...	18,091,125.00
Fairmount Park Commission, ...	23,786,695.00
Department of Prison Wardens, ...	1,741,543.00
Making a total of, ...	$277,294,676.00

This after the debt has been deducted leaves a credit to the City of $213,950,745.88; thus showing that through

the judicious handling of the City's affairs the taxes have enabled the City to acquire a vast amount of property in addition to paying the current expenses of the City and liquidating the debt as referred to. The significance of these figures is emphasized when one realizes that neither New York, Chicago, St. Louis nor Boston have a comparative credit as high as $100,000,000, and indeed one of them has a credit of less than $20,000,000; thus indicating that the management of the affairs of the City of Philadelphia is not only equal to, but far superior, to any municipal government in the United States.

The present debt of the City shows a much less per capita debt than the average since the Act of Consolidation of 1854. Since this date there has been a period of thirty years during which time the per capita debt was higher than it is at present, ranging from $92.51 per capita to a fraction more than $43.79, which is the present per capita debt; two when it was over $90; six when it was between $80 and $90; six between $70 and $80; five between $60 and $70; nine between $50 and $60, and the lowest that the City has ever enjoyed was $31.08.

This statement should set at rest any alarm concerning the City's finances. Taxes in Philadelphia are not as high as in many of the leading cities whose assessed valuation is based on the same ratio of 100%; in fact, taxes in Philadelphia have been as high as $4.00. At that time $1.54 of each $4.00 was set apart for interest and sinking fund, which is four cents more than is charged to-day for total taxes. The present rate of tax, with the present rate of assessment, is not as high as a $4.00 rate of tax, with the assessment as it was at that time.

ALL INCOME NOT FROM TAXES.

I would not, however, mislead by having the public assume that this vast accumulation of wealth has been entirely due to taxation. At the time legislation passed Councils for the introduction of the trolley system, the Company acquiring the privileges was compelled to repave with improved pavement and maintain all the streets they occupied, and from that time until the present time they have contributed $22,000,000 worth of improvements the property owners would have been compelled to pay for had Councils not forced the Company to assume these obligations. Considering the subject from a financial standpoint, we have a private corporation building and maintaining a subway within the City limits—a public utility that we have partially enjoyed, and one which, by the end of Summer, will be completed—that has not cost the taxpayer one dollar.

This is the first undertaking of the kind that has ever been required of a private corporation. The New York subway was built by the City, and that City is now carrying a debt of $52,000,000 borrowed for that purpose. A similar condition exists in Boston. Both Cities were compelled not only to lend their credit, but to float the debt and pay interest. This City was relieved of such burdensome conditions.

Had the City of Philadelphia been compelled to build its subway as were New York and Boston, before enjoying the privileges that a subway affords, the Company would have had money that they have been required to spend on improvements; the benefits of which the public would now be enjoying.

The present annual income of $500,000 for maintaining of streets, removal of snow and licenses increases $50,000 after the first ten years, $50,000 after the second ten years,

$50,000 after the third ten years, $50,000 after the fourth ten years; thus making an increase that varies from $500,000 to $700,000, which is an average of $600,000 per annum; thus giving a direct revenue of $30,000,000 for street maintenance, etc., during the term of the lease.

The lease also provides through a sinking fund for the accumulation of $30,000,000, that reverts to the City, which the City can have the use of at stated intervals.

Further provision is made that all earnings in addition to 6 per cent. on the stock shall be divided between the stockholders and the City, thus showing a total stipulated income of $60,000,000, and any value that the franchises may have over $30,000,000 at the expiration of the lease also reverts to the City.

Legislation of this character I consider the most equitable from the fact that the public at large are compelled to participate in paying for facilities which otherwise the property owner would be responsible for. By this means we are enabled to levy an indirect tax upon those living in adjacent counties and States, who earn their living in the City, and yet live beyond the range of a direct taxation.

OTHER SOURCES OF REVENUE.

The renewal of the United Gas Improvement Company's lease has made it possible for the City to not only receive an income, but courteous and prompt treatment of their patrons, a condition that is universally appreciated, and the financial benefits are made clear by the following statement:

In compliance with the lease that the City has with the United Gas Improvement Company, this City has received as rentals, up to December 31, 1907	$5,224,934.73

Value of gas consumed for street lighting purposes, at $.45 per thonsand feet, which is probably a fair estimate for the City's consumption to December 31, 1907.....	$2,234,535.80
Value of gas consumed in public buildings, at $.45 per thousand feet to December 31, 1907	434,213.64
Amount expended on betterments, in actual cash payments, by this Company, that revert to the City, without cost, according to the terms of the lease, to December 31, 1907	13,454,844.31
The cost of lighting, cleaning and extinguishing gas lamps throughout the United States varies from $6.00 to $9.00 per annum, according to whether lamps are scattered or concentrated. Assuming that $7.00 was the average cost per annum, the City is also saved on this character of work, to December 31, 1907	1,456,560.00
Total value to the City to December 31, 1907	22,805,088.48
If gas consumed by City was valued at $.90 it would be an additional saving of ..	2,668.749.44
The cost of lighting, cleaning and extinguishing street lamps in the City of Philadelphia for the year 1896 was....	$10.56 per lamp
For the year 1897	10.68 per lamp
The above item does not include the income or improvements of the future. Improvements for 1908 estimated at.....	$1,200,000.00

The endowments, such as public libraries, etc., are also included in the total accumulation of wealth, which was not paid for by taxes.

ADMINISTRATION INHERITANCE.

When the present administration assumed office it was soon discovered that materials had been ordered and goods delivered pending supplementation of contracts to such a degree that our streets were filled with materials that I would not have contracted for or accepted if it had not been for the conditions that existed—conditions that were brought about by what appears to have been the hasty action of the previous administration in trying to fill all contracts and orders that it was possible for them to fill prior to the expiration of their term.

In saying this I mean that I have signed contracts for material that was delivered before the term of this administration had begun, for pipes, etc., amounting to hundreds of thousands of dollars, and the goods were delivered by a verbal agreement between the contractors and those in authority at that time, and *I was opposed to signing these contracts until they were verified to me from authoritative evidence.*

Notwithstanding the signing of these contracts as indicated this administration will not be responsible for the results that follow the use of such material.

This state of affairs unquestionably made a splendid financial showing concerning the balance that the former administration left in the Treasury. But, had that administration been compelled to settle the contracts and debts, which they left as a legacy to this administration the public would not have been so readily deceived concerning the creditable balance.

SUPPLEMENTAL CONTRACTS.

The question of contracts is very easily misunderstood. There have been over 1,050 contracts acted upon in the past year; of this amount 70, at a total cost of $2,059,154,29,

are known as supplemental contracts, all of which were merely carrying out and completing contracts for which legislation had been passed by the previous administration, leaving their completion merely perfunctory work. There is another class of about 85 per cent. of the total number of contracts that have been in the nature of ordinary routine, for the maintenance of the various departments, materials, etc. Neither of the above classes reflect the policy of the present administration.

In a class of cases a supplemental contract is not only a direct saving to the City, but a benefit by having work started and partially completed that could not have been done if it was necessary to have the entire amount available before the contract was started.

To illustrate, a supplemental contract was given under the following conditions:

A piece of work was advertised and proposals received according to specifications and plans requiring $10,000 worth of grading. The public were invited to bid so that the City might receive the advantages of low prices a contract of this size frequently affords and, at the same time it was understood that there were but $4,000 available for use on the contract. The fortunate bidder accepted the contract, giving the City the advantage of his low price, and agreeing to proceed immediately with the work, that not only the property holders but the department were anxious to have completed. The contractor proceeded with the work, and, when the $4,000 was consumed continued at his own expense, in order that the work might be completed in the shortest possible time. Subsequently, a supplemental contract, including a portion of the balance, was given.

Another case in question: The firm that bid on supplying coal for the Municipal Hospital bid to supply the institution for the entire year, and this gave the City

the advantage of prices quoted on the entire contract. The amount of $5,000 was appropriated by Councils on account of this contract. Up to March 24th they supplied over $4,000 worth of coal at the estimated price; this together with the coal furnished to date will leave but $200 for coal to be supplied in April.

The sum of $5,000 will be exhausted the first week of April, thus leaving no money to supply the institution for the balance of the year, to December 31, 1908, unless a supplemental contract is entered into with the firm having a contract to supply for the year.

While these are but illustrations of many similar conditions I believe such supplemental contracts are justifiable.

MONEY FOR FUTURE IMPROVEMENTS.

The annual increased borrowing capacity of the City is about $6,000,000, and there are at least two ways for increasing the borrowing capacity if legislation is passed:

1. To have excluded from the loan item money that has been, or may be, expended on improvements which have an income that makes them self-sustaining, for it seems to me that business prudence should dictate the classification of City property, excluding from the loan item all properties with an income which renders then self-sustaining.

If such legislation is enacted it would give Philadelphia an immediate increased borrowing capacity of $26,500,000 at least. This, together with the natural increase of $6,000,000 per annum, in ten years would make the increased borrowing capacity $86,500,000, in addition to the present borrowing capacity of $4,666,178.59.

New York, with her present debt, is endeavoring to have excluded from her loan item the cost of her Water Plant and the Subway, which would then give her an increased borrowing capacity of approximately $148,000,000.

2. The second proposition is to raise the borrowing capacity from 7 per cent to 10 per cent. While legislation would make this possible, it does not seem to be as consistent with business methods as the first proposition.

ADDITIONAL INCOME.

In considering the condition of finances considerable thought has been given to two classes; one, immediate necessity; the other, future requirements.

Immediate revenues can be more readily obtained by the exercise of strict economy than by any other means.

I would suggest, where the City is sued for acquiring or damaging property that remaining property left in the name of the party bringing suit should be assessed according to the price placed on it by evidence submitted to road jurors. This can be done without creating hardship to the owners of property adjacent thereto.

There have been numerous cases in the City where excessive damages have been paid and adjoining properties assessed benefits. This is largely brought about by testimony which indicates excessive valuation; and, if the City is compelled to pay high prices for property taken, it would seem that property remaining, belonging to the same owner, should be valued at the same price. It is not inconsistent to assess property high if testimony substantiates the value placed on it; if this recommendation is not in keeping with the law, laws should be enacted to prevent conditions existing to-day, that savor very largely of conspiracy.

On investigation I learned that it was not considered to the best interest of the City to appeal cases from the decision of road jurors, and after having an investigation of the subject and learning of the amounts saved by appealing cases, I recommended that all cases, particularly those involving large amounts of money, be appealed, and

this action has been more than justified, not only by the records of the Law Department, but by the settlements that have been made this year, which have resulted in large sums of money being saved to the City.

Further, I would recommend that your Honorable Bodies have legislation so worded, when land and buildings thereon are taken for streets or other City improvements, that involve expense or damage, a detailed explanation concerning the necessity for such legislation, including whatever benefit may reasonably be expected from such a course of action.

I also recommend legislation requiring all streets to be dedicated to the City before they are legally opened, thus preventing vast expenditures of money that the City is required to make to-day for this purpose.

REORGANIZATION NECESSARY.

After making a thorough investigation of the Department of Public Safety, with Director Henry Clay, it was found that the Police Department was inadequate to give proper protection to life and property, which is of vital necessity in such a City as Philadelphia, and while the individual policeman was probably the most efficient in the United States, yet the number employed, taking into consideration the vast area to be covered, had not been increased in proportion to the increased demand for police protection, hence rendering the police force as a whole incapable of performing the services that the public of a City like this have a right to expect. For that reason I assumed the responsibiliity of increasing the number of policemen, and sanctioned the reorganization of that Department along lines that give promise, not only of a greater Department, but one of such a character as will meet the reasonable demands of the public.

This Department is to be congratulated upon its effi-

ciency as shown in the report of the Department of Public Safety concerning the number of arrests and percentage of commitments, as compared to the same period of the preceding year. These comparative figures clearly demonstrate the wisdom of humane treatment of criminals at large, which is by far the better means of handling this class of people. The administration of this office, under the present Director, has been particularly conspicuous for its absence of raids, and, in this connection, is a direct contrast to the previous administration of that office, and yet the comparative statistics of the department show that a greater percentage of commitments were made during the present Director's incumbency than during the period when an epidemic of public raids was prevalent.

The Department is also to be congratulated for its efficiency, more particularly the use of the traffic squad, which has been so effectively in command of the highways in the business section of the City, and the public has unquestionably appreciated this feature as a direct benefit.

In company with Director George S. Stearns a thorough investigation was made of the Department of Public Works. The Bureau of Highways and the Bureau of Street Cleaning had been operating independently; the bureaus differing so materially concerning their duties that there was continual discord.

This investigation of the Bureau of Highways and the Bureau of Street Cleaning demonstrated the inability of these Bureaus, as then constituted, to perform the duties required of them. A reorganization was therefore decided upon, such reorganization incorporating the Bureau of Street Cleaning with that of the Bureau of Highways.

This administrative change necessitated an increase in the force of the combined bureaus, an increase absolutely necessary if the public are to be given the service they have

a right to expect in the maintenance and cleaning of the 1,700 miles of City streets and roads.

The Department, as now organized, is not only able to render better service than the old, but is in a position to cope with the growing needs, without additional expense for some time to come.

BUSINESS METHODS APPLIED.

For the first time, under the efficient management of Chief James F. McLaughlin, the City has been able to connect, by an emergency main cable, the City Hall with additional service and to-day can be lighted independent of the City's Plant, so that an accident would not prevent the lighting of municipal departments.

A municipal telephone exchange has been established, being the finest municipal exchange in the United States. It has been erected entirely at the expense of the telephone companies. The police telephone exchange is a wonderful innovation.

The head of this Department is also to be congratulated upon his action in forcing payment of the delinquent corporate taxes. By this act the City has been enabled to receive money that has been long overdue.

JUSTIFIABLE EXPENDITURE.

The investigation of the Fire Department permits me to say that I believe we have a higher standard of efficiency in this Department than is to be found in any Fire Department in the United States.

This Department, working in conjunction with the High Pressure Service, justifies the statement that Philadelphia is in less danger of conflagation than any City in this country.

The High Pressure Service referred to has caused a reduction of 25% on the Insurance Premiums within that

District. When the Cross Street High Pressure Mains are completed and the present appropriations for the Kensington High Pressure Service is used another reduction is promised by the Fire Underwriters, which will make a total saving of $350,000 annually to the property owners within the Fire District supplied by the High Pressure Service. This saving has no reference to the losses that have been reported since the introduction of the High Pressure Service, which range from thirty to forty per cent., which is far below normal.

Notwithstanding the conditions above referred to the Fire Department of our City should be increased if it is expected to keep pace with the march of improvements, when you stop to consider that the number of buildings built in our City last year was 9,050.

I also recommend as a further means of income and saving to the taxpayer that there should be established a patrol fire service to act in conjunction with the Fire Department, whose duty shall be to make examinations during the day and night of all factories, stores and buildings used for public purposes, to compel the owners to conform to regulations, such as keeping fire buckets filled, waste and other inflammable materials in fire proof receptacles, in such a manner and place as to prevent fire. Under proper regulations of this kind further reduction in insurance will doubtless be made, and the service be considered one of economy. It would not only lessen the number of fires, which would prevent conflagration, loss of life and destruction of property, but would very materially prevent the disastrous results that so frequently happen, caused by trivial fires.

MUNICIPAL ADVANCEMENT.

In company with Director Neff I made an examination of the institutions under his supervision. First of all

it is to be noted that the entire plumbing at the Philadelphia General Hospital has been renovated and replaced, and they have inserted bath showers, steam rooms, and other departments incidental to the various modes of treatment of the Insane second to none in any institution in the country. The new sanitary floors replace the old, board floors. This work is well under completion for the halls, corridors, etc.

It is proposed to make the best use possible of the farm at Byberry, even prior to the completion of the new buildings. A number of patients of the milder type of insanity have been transferred.

Your Honorable Bodies have made appropriation for the employment of a Superintendent of Farms and two assistants, all of whom have been appointed. These new arrangements will provide for the working of the entire 875 acres.

In comparing the cost of maintenance of the City's Institution for the Indigent in West Philadelphia with that of the poor houses of Germantown, Roxborough, Oxford and Lower Dublin Townships, the first mentioned is found to be less than one-half.

This statement justifies the gathering of the poor of the City in one institution as an economic and administrative improvement. Too much credit cannot be given the management of this Institution for the change of treatment of the Insane from the old system of violence, such as locking them in cells and isolation, to the present system of liberal treatment and merit.

The padded cells, with heavy doors, that were formerly used as a means of punishment are now used as a means of reward for those who properly conduct themselves, allowing each person who behaves himself to have a room of his own, etc., thus doing away with the restraint and isolation that was formerly considered necessary.

The improvement in these cases is so noticeable that the character of treatment in this institution has become noted throughout the world, and it is a daily occurrence to have representatives and officials from other cities visit the institution, for the purpose of examining the methods. In every case favorable comment has been made by these visiting inspectors.

Much of this is due to the intelligence and humane methods instituted by Dr. W. W. Hawke.

PRACTICAL SUGGESTIONS.

The Bureau of Surveys, under Chief Engineer George S. Webster, has been able to achieve much good work. The subject of grade crossing has been under consideration for many years, and yet, notwithstanding appropriations have been available, no definite agreement had been reached. This year the plans for elevating the tracks along the Germantown and Norristown branch, and for the same work on the Philadelphia and Trenton branch of the Pennsylvania Railroad, have been definitely agreed upon, and the work is to-day well under way.

The difficulties incident to improvements of this kind are not, I fear, fully appreciated by the public at large. Too frequently the public considers work of this class is unnecessarily delayed, when the engineer, with all his force, has been for weeks, and, in many cases months, preparing plans, all of which is necessary after such work has been agreed upon, the plans being, up to that time, very largely in a preliminary state; and, while there is apparently a loss of time, this is the feature that prevents the waste of thousands of dollars. Then, too, there is the time consumed in removing obstacles in the way of such improvements. Frequently this work is entirely finished before the public realizes that it is necessary in connection

with the public improvement they have been criticising as delayed. This preliminary work has to be done before the foundation, which is what the public considers the beginning of work, can be started, and for this reason the Chief of the Bureau is to be congratulated upon accomplishing splendid results.

It is further noted that the present year will show the completion of the great concrete span bridge, the largest of its kind in the world, at Walnut lane, over the Wissahickon. This alone is just cause for commendation of this Bureau.

Considerable attention has been given to the subject of intercommunication with the northeast, southeast, southwest and northwest sections of our City, in order to conceive some plan by which direct routes may be established to the center of the City, and, while not in a position to lay down any definite plan, I desire to quote from a speech of the Chief of the Bureau of Surveys:

> "The proper and healthy growth and development of a great City depends largely upon a well conceived and consistently executed system of Public Highways in which intelligent provision is made for any and all future municipal expansion, and the attractiveness and utility of these highways depend upon their location and width and the grades established upon them. Diagonal avenues, intelligently located form the most convenient and important means of intercommunication between different sections. The City of Philadelphia, as originally laid out between the Delaware and Schuylkill rivers, and extending from Vine to South street, was, when its limited area is considered, fairly well planned and presented a vast improvement over the narrow and winding thoroughfares of the European Cities of that period.

"In extending the City to the northward and southward the original rectangular system was continued and in some cases too rigidly adhered to. A number of old diagonal roads which might have been widened and developed into important avenues were abandoned.

"In recent years in planning the street system in suburban districts it has been the policy not only to widen and improve these old roads, but to lay out additional diagonal avenues, to provide direct communication between local business centers or detached suburban communities, and considerable attention has been given to having the general system conformed, to as great an extent as may be consistent with utility and economy, with a natural contour of the ground, thus introducing a pleasing diversion by placing graceful curves, making beautiful and attractive avenues. Such treatment is especially adaptable to residential districts.

"It is clearly the duty of every municipality to provide an adequate system of main thoroughfares, the lines of which shall be laid out with the sole view of directness, convenience and economy of transportation during the long future of their usefulness, and all questions of land sub-divisions and intermediate or subordinate streets ought to be thrust aside as of secondary importance.

"After the main avenues of communication are determined upon the question of sub-divisions and locations of intermediate streets may, in a measure, be in accordance with the judgment and wishes of the land owner (guided by such advice as the City's experts can offer), subject to the laws and police regulations as to width, extension, from one highway to

another, and buildings and improvements to be erected thereon."

This sentiment I heartily endorse, suggesting that some action be taken that will prevent the continuance of the ruination of many properties, and, in fact, neighborhoods. I refer particularly to the plans that are too frequently adopted by the Board of Surveys, which make unnecessary cuts and fills throughout our suburban sections, ruining the beauty of the neighborhood and causing the City untold expense by making necessary the use of bridges, or fills, thus depriving property owners of valuable frontages, and so establishing grades that for years make it impossible for some properties to be made saleable. This is largely due to the lack of consideration of general beauty and economy by those who establish these lines and grades.

Our suburbs would be developed at less expense if the natural contours were more rigidly conformed to, and this could be accomplished, and yet provide proper sewerage. I believe that the City of Philadelphia has been compelled to pay hundreds of thousands of dollars that might have been avoided.

CITY APPROPRIATES $6.551,172.00 ANNUALLY FOR EDUCATION.

As the City contributes one-third of its total income from taxes direct to the Board of Education, and yet that work was being widely criticised, I considered it necessary to make an early investigation. To that end nearly three score of schools were visited, and our City is to be congratulated upon the efficiency of the service rendered by our public school teachers. In every particular remarkably good results were shown as far as they were concerned, and I particularly noticed the great care displayed by the teachers in training the children, also with what respect the

teachers were regarded by the children; thus indicating a great interest between teacher and scholar, which is the spirit that should prevail and one that speaks louder than words.

It was soon discovered that the criticism which the City has so long suffered concerning the general condition of the school buildings was not the fault of City Councils.

The condition of the school buildings in the City of Philadelphia is not, as is generally understood, attributable to the neglect of Councils or insufficient appropriations. Appropriations made in the past few years were all that were asked for, and recommended, at the time that the present Board of Education was organized.

This Board has received, as the Controller states, nearly one-third of the entire income of the City from taxation since the law creating it went into effect, and the reason that they have been unable to furnish proper accommodations for the children is entirely due to a lack of management on the part of the Board, and not to a lack of appropriation.

The last year that the old Board was in existence nine school houses were completed. During the year 1907, notwithstanding the increase of force and expense due to the new architectural department, the present Board have not been able to complete one school. General repairs are in many cases neglected, and money that has been appropriated is not being used, because the department has not been able to furnish plans, etc. Contracts were made to erect schools on properties of which the City had not acquired title. Ill-furnished and ill-repaired rooms in many of the schools I consider evidences of wilful neglect. I have visited new school rooms, completely furnished (excepting blackboards), that had been locked up for weeks, while children were running the streets, on half time, waiting for admittance.

In other schools children were sitting on soap boxes, while adjoining rooms contained furniture that was not in use. This state of affairs could not have been due entirely to oversight, and this fact impressed me strongly with the idea that it may have been, and I believe was, used for the purpose of agitation, inasmuch as these conditions were improved on the day following my visit, showing that immediate attention could be given, demonstrating that there was no occasion for such conditions as have been referred to, except for the purpose of appealing to the sympathy of the public. I then said, and here reiterate, that there is positively no excuse for a complaint of school conditions in the City of Philadelphia, considering the money that is available for this purpose, and any just complaint or dereliction can only be attributed to one of two things, neglect from inefficiency or neglect deliberately planned.

The overcrowded condition that is so frequently referred to is always found among the first and second grades, which are the younger children, and with judicious locating of school houses, by having four of a lower branch surrounding one of the higher branch, thus enabling the smaller children to attend school in close proximity to their homes, there would be provided adequate accommodations, without a child being required to traverse long distances, until it had become of a more responsible age.

This system of location, already referred to, could be easily accomplished, and numbers of schools be built, if extravagance was not the prevailing theme in the minds of the building committee of this Board.

The public are not prepared to believe the gross extravagance that has been practiced in the awarding of contracts for schools in this City during the time that this tremendous agitation has been going on, and these extrava-

gances have been practiced in isolated districts, where there is comparatively no demand, while the thickly populated districts have not received proper relief. The same money thus expended would have furnished the proper accommodation for three or four times the number of needy children in other sections of the City.

In addition to one-third of the total taxes being annually appropriated to the Board of Education, there are also appropriations to the Philadelphia Museums, Academy of Fine Arts, American Art Society, the Pennsylvania Museum and the School of Industrial Art, amounting to $306,700, all a direct appropriation for educational purposes, thus making a total appropriation in 1907 directly attributable to education of $6,551,172.

The appropriation to the Board of Education for the year 1908, in excess of that appropriated for 1907, is $182,428.75.

The inability of this Department to handle the affairs assigned to them can be told in no better way than to refer to their report that will show the balances that they carry from one year to another. The balance carried from 1906 to 1907 was $1,685,219.17, and from 1907 to 1908, $1,405,093.60.

It was subsequently reported that there were 157 unoccupied school rooms in Philadelphia, a large number of which were furnished. These conditions would not prevail under efficient management, particularly at a time when children are so badly in need of accommodations.

A MUCH NEEDED IMPROVEMENT.

During the year the Department of Docks, Wharves and Ferries was organized by virtue of an Act of the Legislature and Ordinance of Councils and placed under Director John C. Grady and Assistant Joseph S. Hasskarl, for the

purpose of taking entire charge of the River Front properties, construction work and other work incidental to the Port.

This Department has been unable to accomplish a large degree of practical construction work for the reason that work incident to the creation of a new department requires executive action before the subject of contracts can be handled; notwithstanding, the benefits of this department are already manifest, particularly among the shipping interests of our Port. Through the efforts of this department the entire commercial interests of our Port have been harmonized and they are now working in a manner that proves beyond question of doubt the justification for this new department. Several new steamship companies have already applied for admittance into our Port from different parts of the world, and as recently as March 19th Philadelphia witnessed the first Japanese merchantman land at her wharves.

Our new wharves are well suited for the handling of freight and general merchandise, due to the Belt line which allows all railways equal privileges, thus preventing great loss of time and excessive handling, which is a very great economy where the use of lighters is not required.

FREE LIBRARY.

The value of Free Libraries in the City is one that can not be over estimated. There are now 18 branch libraries, with 321,643 volumes, which placed in circulation the past year 1,878,000 books for the reading public.

There will be three additional libraries completed in a very short time, and, if your Honorable Bodies continue to accept Carnegie gifts it will enable the City to have a total of thirty-two (32) Free Libraries. Many lots for library buildings are now at the disposal of the Directors,

merely waiting appropriations from Councils, which I would recommend having acted upon at the earliest possible time.

FILTRATION.

Upon taking office I realized the importance of completing the filtration works at an early date, as the method of purifying water already in operation had demonstrated its efficiency in decreasing the death rate, and as in various portions of the City the death rate is alarmingly high I gave this matter my immediate and almost undivided attention.

The Bureau of Filtration was then in charge of Mr. C. E. Gillette, and after careful investigation I was led to believe that the plans being pursued by him for the ultimate completion of the works would not be successful, and feeling that his management as an Engineer would lead to delay if not entire failure to deliver to the City pure water, a change of engineers was decided upon.

Mr. Gillette resigned; Mr. Fred C. Dunlap, an experienced hydraulic and sanitary engineer, was appointed to the position of Chief of the Bureau of Filtration.

Since Mr. Dunlap's advent to the office the work in connection with the improvement of the water supply has been pushed vigorously. The filter mains in the northeastern section of the City, which were formerly planned and under contract, are practically completed. It was necessary at Torresdale to make changes that would embrace plans whereby the capacity of this station would be doubled; these changes were affected so as not to delay putting these filters into operation.

The work of this Department has enabled the following districts to be supplied with filtered water: Seventeenth, Eighteenth, Nineteenth, Twenty-third, Twenty-fifth, Thirty-first, Thirty-third, Forty-fifth, and a part of the

Twentieth, Thirty-fifth, Forty-first and Forty-third Wards, and it is expected that the section supplied with filtered water will be extended westward and southward at an early date. The increased capacity of filtered water is 65,000,000 gallons per day.

THE FAIRMOUNT PARK PARKWAY.

During the year the construction of the Fairmount Park Parkway, one of the greatest improvements that the City has ever undertaken, has been begun by the removal of buildings on its existing line between Logan Square and the entrance to Fairmount Park. The enthusiasm which the actual beginning of work has created has been deeply gratifying to me. There is much dissatisfaction, however, with the line upon which the Parkway has so far been opened. Too much emphasis cannot be placed upon the importance of undertaking this work on a broad-gauge policy that shall realize all the opportunities that it presents. To this end the administration has welcomed cordially all suggestions that have been made by individuals and organizations looking to the consummation of the work in a way that will inure to the enduring benefit, beauty and reputation of the City.

I want this improvement to be the magnificent work that it ought to be and I know that with the hearty co-operation of your Honorable Bodies, it can be made so.

Arrangements are now being made for the macadamizing of the line upon which the buildings that have already been torn down, in order that there may be a good approach to Fairmount Park during the time that will necessarily be taken in the preparation of the plans for correcting the present line of the Parkway, and for the removal of buildings on the new line. I cannot refrain from repeating that the opportunity presented to us is an opportunity that no other City in the United States can boast, and I am

sincerely desirous that this improvement shall be done promptly and well.

I find, after investigating, if the properties between Green and Market streets, and Broad street and the Schuylkill river were assessed at the present selling price after this Parkway is completed that the increased revenues from these properties would carry and liquidate a loan sufficient to pay for the expenses of the Parkway.

PARKS.

I am in favor of the preservation of the valleys of the Pennypack creek, the Tacony creek and Cobb's creek. As these creeks lie in deep valleys the Chief Engineer of the Bureau of Surveys has estimated that the cost of opening streets across them at the approved grades, with the consequential damages that must be paid abutting land owners, will be much or more than the cost of acquiring the entire valleys as parks. This alone would be a sufficient reason for doing so; but I think the people of the City are entitled to these public places where they may enjoy the beauties of nature and the benefits of recreation.

I have approved the plan for making Broad street from Oregon avenue southward a magnificant approach to League Island Park and League Island Navy Yard. A plaza just south of Oregon avenue has been placed upon the City plan as a formal entrance and it seems to me that it should be acquired now in order to avoid two sets of damages.

For information concerning the Civil Service Commission, Department of Supplies, Department of Law and Bureaus of Correction, Gas, Boiler Inspection, Lighting, Building Inspection and City Property, I most respectfully refer you to the reports of the said Departments.

COMPREHENSIVE PLAN

FOR

FUTURE CITY IMPROVEMENTS.

In addition to the result of my investigation already referred to I desire to call the attention of your Honorable Bodies to what I consider a serious defect in the management of municipal affairs as they have been handled in the past. From what I have been able to learn there has never been any attention given to any comprehensive plan of City developments, and I have therefore given considerable time and attention to the task of formulating a plan for the City's future.

The diagram herein presented will give some idea of what I consider future requirements: namely, extensive improvements along the Delaware river front, such as a complete concrete bulkhead, extending from the present improvement at South street on the Delaware river along the Delaware river to the back channel, thence up the Schuylkill river to present improvements, including a bulkhead on the west side of the Schuylkill river, from the present improvement to the extreme southern limit of the City.

It also includes the construction of a 250-foot Commercial Boulevard along the Delaware River Front, the back channel and the east bank of the Schuylkill river and a 150-foot Commercial Boulevard along the west bank of the Schuylkill river as indicated. This, together with the lowlands adjacent thereto could be readily filled from the dredgings in straightening Delaware river at Horse Shoe Shoals and the Schuylkill river at Passyunk avenue.

The value of straightening these rivers is two-fold:

First.—The advantage of straightening the Rivers as far as the convenience to navigation, and the advantages that a straight stream always affords in keeping the channel clear.

Second.—The value of the dredgings for backing the proposed bulkhead, thus immediately developing the fills required for the Commercial Boulevard as mentioned, that would inevitably enhance the value of properties in that vicinity.

It also includes the erection of bridges that our Survey Department consider necessary to make certain sections of the City accessible.

It further includes the building of numerous main sewers requisite to the development of property that is undesirable to-day, and further to keep free from contamination certain streams along which property has been taken by the City for Park purposes.

It further provides for certain Parks in different sections of the City and includes the completion of the Northeast boulevard and the Parkway from City Hall to Fairmount Park.

This plan further provides for the abolition of numerous grade crossings, the draining of South Philadelphia and South West Philadelphia.

It provides for a belt line along the bulkhead on the east bank of the Schuylkill around the back channel, and thence northward along the Delaware river to connect with the present belt line, with continued Delaware Avenue Improvements as far north as Cumberland street. The use of the belt line referred to would remove the necessity of either depressing or elevating the cross town railroads in South Philadelphia by transferring their business to the belt line and abolishing said tracks.

These concessions, I believe, would be granted by the owners of the railroads referred to, after conferences had been held with the authorities, when the advantages of such a proposition could be shown.

I further suggest that the Pennsylvania, the Philadelphia and Reading and the Baltimore and Ohio Railroad authorities be conferred with on the subject of establishing a continuous electric car service to all points within the City limits, even to the extent of using some of the tracks that are now used for freight only, and, if necessary, to nearby suburban towns. This I believe could be accomplished by utilizing one-half of the tracks in the terminals referred to, using steam for through lines only.

I believe by combining the subway, the elevated railway and the Frankford Elevated, which we will soon enjoy, the combined surface railways, together with the suggestions as mentioned, we would meet that which is of the greatest need to-day, namely, adequate and improved transportation for the public.

It is my ambition, as Mayor of this City, during the second year of my office to establish a healthy and constructive activity not only throughout the Departments under my supervision, but with the help of the public, corporate, industrial and commercial interests, to demonstrate to the world beyond question of doubt that our City is, when measured by world standards, the greatest of all cities in the United States.

The comprehensive plan herewith presented is the result of long and careful consideration of the City's needs, and I state frankly that I believe that the investment of money necessary to complete this work would create a perpetual income that any business man would consider justifiable.

I believe the first cost of these improvements, large as they may seem, would prove a perpetual investment so remunerative as to commend itself to the judgment of

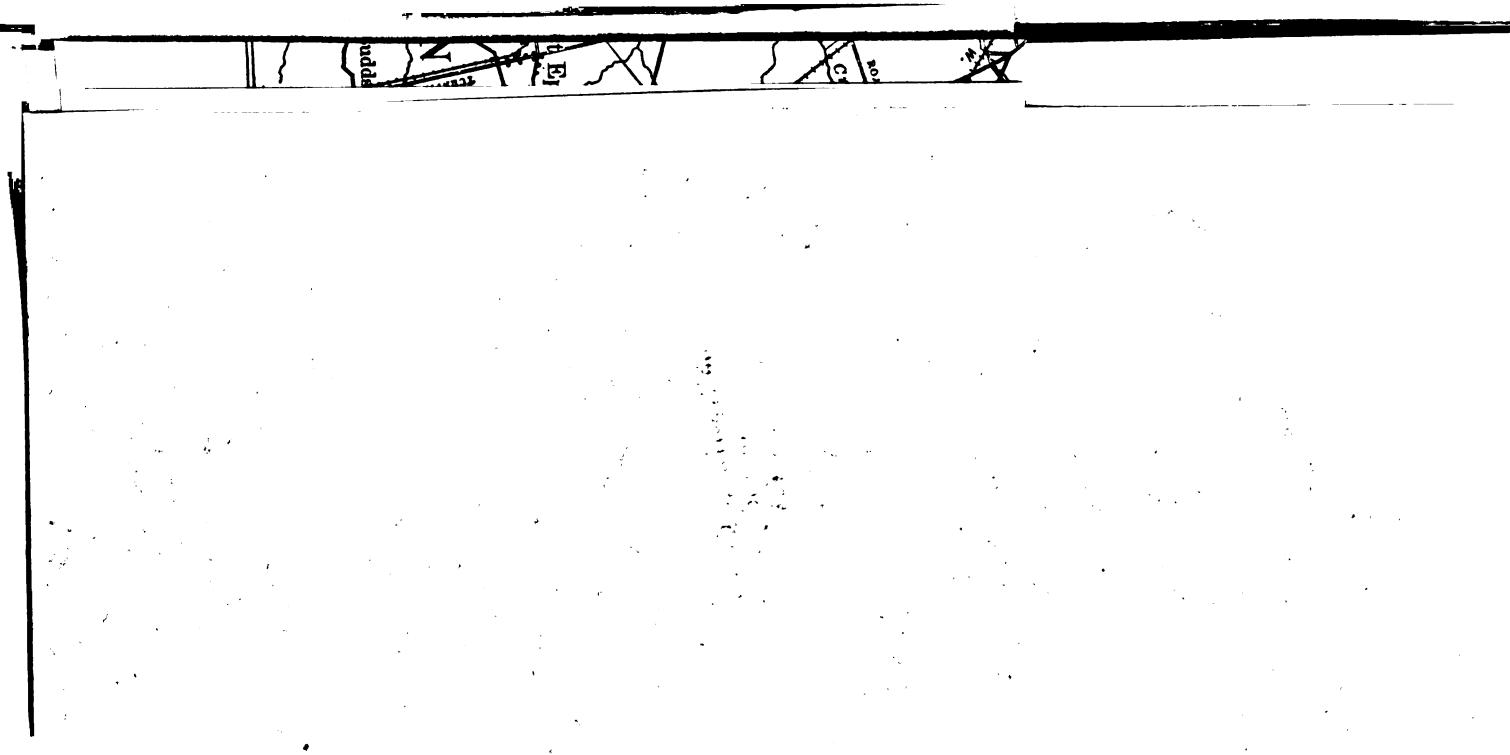
any practical business man, by bringing within the area of increased taxation an extent of property so large as to promise a continually increasing and perpetual revenue to the City, aside from the great convenience that such improvements always afford.

If a plan similar to this was agreed upon, every act of legislation by your Honorable Bodies could be so arranged as to conform thereto.

Yours very truly,

JOHN E. REYBURN,

Mayor.



ANNUAL REPORT

OF THE

DEPARTMENT OF PUBLIC WORKS

FOR THE

YEAR ENDING DECEMBER 31, 1907

4w

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.
MESSENGER—J. J. JOHNSTON.

Chiefs of Bureaus:

CITY ICE BOATS—JAMES S. JEFFERSON.
GAS—DR. N. WILEY THOMAS.
HIGHWAYS—WILLIAM R. BENSON.
LIGHTING—JOHN J. KIRK.
STREET CLEANING—WILLIAM C. FELTON.
SURVEYS—GEORGE S. WEBSTER.
WATER—FRED C. DUNLAP.

TWENTY-FIRST ANNUAL REPORT

OF THE

DEPARTMENT OF PUBLIC WORKS

Philadelphia, January 2, 1908.

HON. JOHN E. REYBURN,
Mayor of Philadelphia.

DEAR SIR:—I beg to submit herewith, the report of the operations of the Department of Public Works for the year ending December 31, 1907—the Twenty-first Annual Report. The reports of the Chiefs of the several Bureaus, which are attached hereto, will give the details of operation.

Since assuming charge of this Department on April 1, 1907, the changes in the executive force have been as follows; April 7, 1907, Mr. Joseph S. MacLaughlin, Assistant Director, resigned and on the same day Mr. William R. Benson was appointed in his place. On August 31, 1907, Mr. Benson resigned to become Chief of the Bureau of Highways and on September 1, 1907, Mr. William R. Knight, Jr., was appointed Assistant Director.

The total amount of money available during the year was $17,454,602.85, of which $10,814,009.17 was obtained from loans and $6,640,593.68 from direct taxation. The expenditures during the year were $9,813,093.49, of which $4,656,943.55 was for current expenses and $5,156,149.94 for improvements and extensions. The total receipts were $4,403,929.86.

Bureau of City Ice Boats.

The weather conditions during the Winter of 1906-07 were not unusually severe and the ice boats experienced no difficulty in keeping the channels open for navigation on the Delaware and Schuylkill rivers, there being little or no detention to shipping.

The new icebreaker, "John Weaver," proved to be a powerful adjunct to the fleet, being able to break through 12-inch field ice at the rate of 10 miles an hour and accomplished more work than the other two boats combined. Some defect having developed in her rudder and steering gear, a contract was entered into during the early summer with the John Baizley Iron Works for general repairs; these repairs included work on the "John Weaver" and Ice Boats Nos. 1 and 2, which were thoroughly overhauled and placed in first-class condition.

At the last session of the State Legislature an Act was passed creating a new Department of Wharves, Docks and Ferries, which took over the Bureau of City Ice Boats and all its belongings. Councils having enacted the necessary legislation for this transfer, the Bureau of City Ice Boats went out of existence as an independent Bureau on October 12, 1907, after a life of 70 years.

Bureau of Gas.

The service rendered by the Bureau of Gas continues to be satisfactory and the City of Philadelphia obtains full value for every dollar of the amount paid into the City Treasury by The United Gas Improvement Company ($10,000) annually, for the maintenance of this Bureau.

The Bureau continues to make daily tests of gas supplied by The United Gas Improvement Company and prove meters, etc.

LIC WORKS, DURING THE YEAR 1907.

	AWN.				
	TOTAL.	Balance Available for 1908.	Amount Merging.	RECEIPTS.	Number of Employes Dec. 31, 1907.
Director's	$27,496 20	.....	$478 80	.....	11
City Ice	15,550 12	.....	.....	.....	.....
Gas.....	10,000 00	.....	.....	$30 00	6
Highway	2,035,946 24	1,848,865 16	84,013 15	193,929 29	195
Board of	.....	.....	.....	20,741 14	13
Lighting	391,795 19	.....	5,448 11	.....	7
Street Cl	1,115,920 20	.....	.....	.....	.....
Surveys	2,088,484 26	3,085,285 98	1,549 70	38,839 99	308
District S	.....	.....	.....	129,570 08	14
Water...	2,297,606 44	2,617,866 50	27,657 08	4,020,819 86	2,200
Filtration	1,830,294 84	.....	.....	.....	.....
To	$9,813,093 49	$7,552,617 64	$69,141 84	$4,403,929 86	2,754

† Ind

* Transferred to Department of Wharves, Docks and Ferries, Oct. 15, 1907.

The following results were obtained from the photometrical readings as to the candle power expressed in monthly averages:

January	22.84
February	22.95
March	22.90
April	22.85
May	22.90
June	22.76
July	22.67
August	22.53
September	22.58
October	22.59
November	22.64
December	22.58
Maximum monthly average	22.95
Minimum monthly average	22.53

The following is the chemical analyses of the gas made during the year:

	Per Cent.
Carbon dioxide	2.90
Illuminants	10.20
Oxygen	1.10
Hydrogen	35.12
Carbon monoxide	26.23
Methane	21.93
Nitrogen	2.52
	100.00

Bureau of Highways.

The amount expended by the Bureau of Highways during the year was $2,035,946.24, of which $1,142,397.53 was for current expenses and $893,548.71 for extensions and improvements. The total receipts were $214,670.43.

During the year 32 miles of new streets were opened and graded, being an increase over 1906 of 14 miles, at an approximate cost of $500,000.

More than 22 miles of streets were paved during the year with sheet asphalt, granite blocks and vitrified fire

clay or shale blocks, upon a six-inch cement concrete foundation. The cost of this work was approximately $700,000, all of which was paid by property owners, with the exception of $89,758.87 paid by the City for paving intersections and in front of unassessable property.

The amount available for repaving with improved pavements was $400,000, but owing to the lateness of the season when this money became available, only 3.28 miles of streets were repaved. During the current year, however, we anticipate repaving a large number of the old cobble and rubble streets with improved pavements, as every preparation is being made to push this class of work and the same will be started as soon as the weather permits.

It is worthy of special note that the work done by the Bureau of Highways in laying new pavements was nearly double that done in 1906, notwithstanding that the appropriation did not become available, nor were proposals received for the work, until very late in the year. During 1906, there were 17.11 miles of new paving laid, while in 1907 it reached a total of 33.25 miles, an increase that speaks well for the methods employed by this Bureau. This increased amount of work is particularly noticeable in the West Philadelphia section, where it has given comfort to thousands of residents in streets where new houses have been erected, but where no improved roadway had been laid.

The new specifications and methods which have been adopted for the work of maintaining unpaved and macadamized public highways during the year 1908 will, no doubt, result in more and better work being accomplished than has heretofore been the case.

I would urge, as has been done by my predecessors in office, the advisability of Councils providing the Department with liberal appropriations for sprinkling macadam

roads, as there is nothing which adds more to the comfort of the citizens of the suburban districts, besides which, the resultant length of life given the roads by this sprinkling makes the expenditure a matter of economy.

The contract for repairs to streets paved with rubble, cobble, etc., was performed in a creditable manner to the extent of the meagre appropriation at our command. To put all the streets of the City not occupied by passenger railway tracks in thorough repair would require an immediate expenditure of not less than $750,000, of which sum at least $500,000 would be required for repairs to asphalt streets alone. The small appropriation provided in 1907 for repairs to asphalt streets would not permit of the repairing or resurfacing of a large number of streets which badly needed it. It would be to the best interests of the City if the Department were furnished with sufficient funds to take care of these repairs as soon as breaks appear.

The work under the annual contract for repairs to sewers has not been satisfactory for several years past and it has been deemed advisable to discontinue this method during the current year and have the work done by day's labor, an experiment which we hope will prove more satisfactory and economical to the City, as the work to be performed will be under the direct supervision of the officials of the Bureau of Highways.

The appropriation of $170,000 for repairs to bridges, which was a more liberal sum than has been provided for a number of years past, enabled us to make much needed repairs to a number of important structures which had been neglected by reason of insufficient appropriation in previous years. When it is taken into consideration that the value of the City's bridges is approximately $21,400,000, the expenditure of only eight-tenths of one per cent. of their valuation for repairs, which were performed in a highly creditable manner, certainly redounds to the credit

of the officials of the Bureau under which this work comes. I doubt very much if any large business firm or corporation can make a better showing. The subject of repairs to bridges is such an important one that Councils should see the wisdom of providing liberally for this branch of the service, for, had the Department sufficient funds to make repairs in their incipiency, the work could be done with greater economy and dispatch. Under existing conditions we are only able to make tentative repairs and depend upon chance that Councils will make sufficient appropriations to enable us to put the structures in a thoroughly safe condition. Thus far, no money has been provided for 1908.

On July 1, 1907, you approved an ordinance which released the Philadelphia Rapid Transit Company from its obligation to pave, repair and repave the streets occupied by its tracks or to remove snow or pay license fees for the running of its cars, in lieu of which the said company agreed to pay annually into the City Treasury the sum of $500,000 for a period of ten years, payments to be made in monthly installments. Unfortunately, no money was available for the use of the Department until October 15, 1907, when an appropriation of $50,000 was made, by which time there were many passenger railway streets in a deplorable condition. Had the Department the use of the money paid into the City Treasury during 1907, the expense of the work would have been considerably less and much more would have been accomplished.

There are 479 miles of streets occupied by passenger railway tracks, nearly all of which are either paved or macadamized and bids will be received for repairs to these streets during this month and the work will be proceeded with promptly when the weather conditions permit.

Work on the Northeast Boulevard is progressing satisfactorily and the damage done to trees and shrubbery by

reason of their neglect during the latter part of 1905 and all of 1906 has been repaired, making the portion completed a beautiful driveway and promenade. The early completion of this boulevard will add to the many attractions of our city and the increased revenue derived from taxation will prove this to be a splendid investment.

Satisfactory progress has been made on the Southern Boulevard on the line of Broad street, from Moyamensing avenue south. The central driveway has been macadamized and curbed and the vitrified brick gutters constructed. Every effort is being made to push this great work to a speedy completion.

Litigation and other unavoidable causes have hindered the removal of all the houses on the line of the Parkway, from Logan square to Spring Garden street, but we hope the year 1908 will see extensive progress being made in the actual construction of the Parkway.

The following statement is a classification of the street pavements laid during the year, and their mileage; also total mileage of street pavements to December 31, 1907.

Kinds of Pavements.	Laid during 1907.		Making Total in City, Dec. 31, 1907.	
	Sq. Yards.	Miles.	Sq. Yards.	Miles.
Sheet asphalt	339,015	18.88	6,088,913	390.92
Asphalt block	.....	.....	178,238	19.
Granite block	53,867	3.79	6,367,002	383.19
Cobble or rubble	.....	.....	1,827,870	57.29
Vitrified brick	51,393	2.96	2,377,433	150.90
Granolithic	.....	.....	72,726	12.77
Slag block	....	.....	71,280	9.82
Macadam	118,221	7.62	2,977,779	283.68
Total	564,496	33.25	19,961,241	1,307.58

Bureau of City Ice Boats.

The weather conditions during the Winter of 1906-07 were not unusually severe and the ice boats experienced no difficulty in keeping the channels open for navigation on the Delaware and Schuylkill rivers, there being little or no detention to shipping.

The new icebreaker, "John Weaver," proved to be a powerful adjunct to the fleet, being able to break through 12-inch field ice at the rate of 10 miles an hour and accomplished more work than the other two boats combined. Some defect having developed in her rudder and steering gear, a contract was entered into during the early summer with the John Baizley Iron Works for general repairs; these repairs included work on the "John Weaver" and Ice Boats Nos. 1 and 2, which were thoroughly overhauled and placed in first-class condition.

At the last session of the State Legislature an Act was passed creating a new Department of Wharves, Docks and Ferries, which took over the Bureau of City Ice Boats and all its belongings. Councils having enacted the necessary legislation for this transfer, the Bureau of City Ice Boats went out of existence as an independent Bureau on October 12, 1907, after a life of 70 years.

Bureau of Gas.

The service rendered by the Bureau of Gas continues to be satisfactory and the City of Philadelphia obtains full value for every dollar of the amount paid into the City Treasury by The United Gas Improvement Company ($10,000) annually, for the maintenance of this Bureau.

The Bureau continues to make daily tests of gas supplied by The United Gas Improvement Company and prove meters, etc.

LIC WORKS, DURING THE YEAR 1907.

	RAWN. TOTAL.	Balance Available for 1908.	Amount Merging.	RECEIPTS.	Number of Employes Dec. 31, 1907.
Director's	$27,496 20	.....	$478 80	.....	11
City Ice	15,550 12	.....	.....	.....	.....
Gas	10,000 00	.....	.....	$30 00	6
Highways	2,035,946 24	1,848,865 16	84,013 15	193,929 29	195
Board of	.....	.....	.....	20,741 14	13
Lighting	391,795 19	.....	5,448 11	.....	7
Street Cle	1,115,920 20	.....	.....	.....	.....
Surveys	2,088,484 26	3,085,285 98	1,549 70	38,839 99	308
District S	.....	.....	.....	129,570 08	14
Water	2,297,606 44	2,617,866 50	27,657 08	4,020,819 86	2,200
Filtration	1,830,294 84	.....	.....	.....	.....
Tot	$9,813,093 49	$7,552,617 64	$69,141 84	$4,403,929 86	2,754

† Inc

* Transferred to Department of Wharves, Docks and Ferries, Oct. 15, 1907.

The following results were obtained from the photometrical readings as to the candle power expressed in monthly averages:

January	22.84
February	22.95
March	22.90
April	22.85
May	22.90
June	22.76
July	22.67
August	22.53
September	22.58
October	22.59
November	22.64
December	22.58
Maximum monthly average	22.95
Minimum monthly average	22.53

The following is the chemical analyses of the gas made during the year:

	Per Cent.
Carbon dioxide	2.90
Illuminants	10.20
Oxygen	1.10
Hydrogen	35.12
Carbon monoxide	26.23
Methane	21.93
Nitrogen	2.52
	100.00

Bureau of Highways.

The amount expended by the Bureau of Highways during the year was $2,035,946.24, of which $1,142,397.53 was for current expenses and $893,548.71 for extensions and improvements. The total receipts were $214,670.43.

During the year 32 miles of new streets were opened and graded, being an increase over 1906 of 14 miles, at an approximate cost of $500,000.

More than 22 miles of streets were paved during the year with sheet asphalt, granite blocks and vitrified fire

of the officials of the Bureau under which this work comes. I doubt very much if any large business firm or corporation can make a better showing. The subject of repairs to bridges is such an important one that Councils should see the wisdom of providing liberally for this branch of the service, for, had the Department sufficient funds to make repairs in their incipiency, the work could be done with greater economy and dispatch. Under existing conditions we are only able to make tentative repairs and depend upon chance that Councils will make sufficient appropriations to enable us to put the structures in a thoroughly safe condition. Thus far, no money has been provided for 1908.

On July 1, 1907, you approved an ordinance which released the Philadelphia Rapid Transit Company from its obligation to pave, repair and repave the streets occupied by its tracks or to remove snow or pay license fees for the running of its cars, in lieu of which the said company agreed to pay annually into the City Treasury the sum of $500,000 for a period of ten years, payments to be made in monthly installments. Unfortunately, no money was available for the use of the Department until October 15, 1907, when an appropriation of $50,000 was made, by which time there were many passenger railway streets in a deplorable condition. Had the Department the use of the money paid into the City Treasury during 1907, the expense of the work would have been considerably less and much more would have been accomplished.

There are 479 miles of streets occupied by passenger railway tracks, nearly all of which are either paved or macadamized and bids will be received for repairs to these streets during this month and the work will be proceeded with promptly when the weather conditions permit.

Work on the Northeast Boulevard is progressing satisfactorily and the damage done to trees and shrubbery by

reason of their neglect during the latter part of 1905 and all of 1906 has been repaired, making the portion completed a beautiful driveway and promenade. The early completion of this boulevard will add to the many attractions of our city and the increased revenue derived from taxation will prove this to be a splendid investment.

Satisfactory progress has been made on the Southern Boulevard on the line of Broad street, from Moyamensing avenue south. The central driveway has been macadamized and curbed and the vitrified brick gutters constructed. Every effort is being made to push this great work to a speedy completion.

Litigation and other unavoidable causes have hindered the removal of all the houses on the line of the Parkway, from Logan square to Spring Garden street, but we hope the year 1908 will see extensive progress being made in the actual construction of the Parkway.

The following statement is a classification of the street pavements laid during the year, and their mileage; also total mileage of street pavements to December 31, 1907.

Kinds of Pavements.	Laid during 1907.		Making Total in City, Dec. 31, 1907.	
	Sq. Yards.	Miles.	Sq. Yards.	Miles.
Sheet asphalt	339,015	18.88	6,088,913	390.92
Asphalt block	.....	.....	178,238	19.
Granite block	53,867	3.79	6,367,002	383.19
Cobble or rubble	.....	.....	1,827,870	57.29
Vitrified brick	51,393	2.96	2,377,433	150.90
Granolithic	.....	.....	72,726	12.77
Slag block	....	.....	71,280	9.82
Macadam	118,221	7.62	2,977,779	283.68
Total	564,496	33.25	19,961,241	1,307.58

Summary of work done in Improved Pavements—New Streets.

	Square Yards.	Linear Feet.
Granite blocks	12,760	4,300
Asphalt	335,581	98,456
Vitrified bricks	50,943	15,260
Macadam	118,221	40,268
Total	517,455	158,284

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

	Square Yards	Linear Feet.
Granite blocks	41,107	15,702
Asphalt	3,484	1,272
Vitrified bricks	450	300
Total	45,041	17,274

Total amount of new pavements, 175,558 linear feet, equal to 33.25 miles.

Statement of Work Done.

New paving	118,016	linear feet
Repaving with improved pavement	17,274	linear feet
New macadamizing	40,268	linear feet
Grading	1,062,949	cubic yards
New footway paving	88,786	square yards
Repairs to paved streets	311,009	square yards
Footways repaved	22,636	square yards
Crossing stone laid	6,239	linear feet
Curbstone reset	79,863	linear feet
Wooden trunks	9,148	linear feet
Hand railings	4,958	linear feet
Curved curb corners	8,114	linear feet
New curbstone set	143,138	linear feet
Vitrified brick and stone gutters	53,720	linear feet
Resurfacing, sheet asphalt	56,599	square yards
Resurfacing, broken stone	61,949	square yards
Repairs to passenger railway streets	149,790	square yards
Footway, curb, railroad notices served	22,235	

Bureau of Street Cleaning.

On October 26, 1907, an ordinance was approved by you repealing the ordinance of September 6, 1887, creating the Bureau of Street Cleaning and effecting the consolidation of the Bureaus of Highways and Street Cleaning. Inasmuch as this consolidation was authorized so late in the year, I have deemed it advisable to present the report of the Bureau of Street Cleaning separately in so far as it relates to the work performed.

The total amount appropriated for cleaning streets, removal of ashes, garbage, etc., was $1,348,982.20 and the total amount expended up to November 1, 1907, when the Bureaus were consolidated, was $1,115,920.20.

The comprehensive report of the Assistant Chief of the Bureau of Highways gives in detail the amount of work performed and his recommendations for the betterment of the service have my hearty approval.

On November 29, 1907, proposals were opened for the collection and disposal of garbage during the year 1908. But two bids were received and the contract was awarded to the Penn Reduction Company, the lowest bidders, for the sum of $488,988. This is an increase in cost over 1907, which is to be attributed to the large increase in population, as well as the large number of new buildings.

On December 16, 1907, proposals were opened for cleaning streets, removal of ashes, etc., and many bids were received for respective districts. The lowest of these bids combined did not meet the best bulk bid for doing the work in the entire City and the contract was awarded to Mr. Edwin H. Vare for the price of $1,087,000. The radical changes made in the specifications for doing the work in 1908 will result in cleaner streets and more efficient service in the collection of ashes and garbage.

Total Amount of Work Done During the Year 1907.

	CLEANED.						REMOVED.					Number of Complaints of all kinds.
								NUMBER OF LOADS.†				
	Squares.*	Alleys.	Inlets.	Cross-ings.	Market Houses.	Snow from Fire Plugs.	Number of Dead Animals.	Dirt	Ashes.	Dry Waste.	Garb-age.	
Total 1907.....	2,630,3 9	242,367	734,481	534,924	1,343	63,245	17,640	197,039	874 398	53,403	378,964	6,585

*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.

Expenditures from January 1 to November 1, 1907.

Item 1.	For Salaries	$18,800.13
Item 2.	For Horsekeep	4,497.97
Item 3.	For Incidentals	278.60
Item 4.	For Cleaning Streets, Removal of Ashes, etc.	703,729.30
Item 5.	For Removal and Disposal of Garbage, etc.	347,490.00
Item 6.	For Removal of Snow, etc.	41,124.20
		$1,115,920.20

Deducted from pay of contractors during 1907, for violation of contracts, and which sums reverted back to the City Treasury $10,311.00

Board of Highway Supervisors.

The receipts of the Board of Highway Supervisors during the year amounted to $20,741.14 and the expenditures $10,183.87, an excess of receipts over expenditures of $10,557.27. A number of plans have been added to the records during the year, making 1800 plans now on file, covering 380 miles of streets.

The many statements written in former reports as to the extreme value of this branch of the service can be but reiterated and demonstrates more each year the value of the records that have been compiled.

In this connection I would recommend that the salary of the Chief Draughtsman be increased to $1800 per annum, as the Department requested in December, 1907.

Transactions of the Board of Highway Supervisors, 1907.

Pneumatic tubes	9
For vaults	10
For railroad tracks, curves and turnouts	41
For underground pipes	570
For electrical conduits	1859
For erecting bridges	7
For drinking fountain	1
For subway	15

STATEMENT OF WORK DONE.

New street record plans prepared	17
Blue print plans placed on file	185

RECEIPTS AND EXPENDITURES.

Receipts	$20,741.14
Expenditures	10,183.87
Excess of receipts	$10,557.27

RECAPITULATION.

Amount of earnings		$15,618.53
Amount outstanding from previous years		7,645.03
		$23,263.56
Amount received and deposited with City Treasurer.		$20,741.14
Amount outstanding		$2,522.42

Bureau of Lighting.

The appropriation to the Bureau was $397,243.30, of which $391,795.19 was expended and $5,448.11 merged and reverted to the City Treasury.

The following table shows the total number of lamps maintained and under the supervision of the Bureau during the year 1907; also a statement of expenditures:

	1907.	
	Number of Lamps.	Cost during the year.
Gas lamps maintained by the United Gas Improvement Company	22,348	
Gasoline lamps	14,432	$380,053 25
Gas lamps supplied by the Northern Liberties Gas Company	73	1,474 56
Gas lamps maintained by the Bureau of Correction.	231	
Salaries and office expenses		10,267 38
Total	37,079	$391,795 19

	1907.
Of the gas lamps maintained by the United Gas Improvement Company there were not lighted, because of their proximity to electric lights.....	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
	229

The three hundred new gas lamps which The United Gas Improvement Company is required to erect annually under the terms of its lease of the Philadelphia Gas Works is totally inadequate to meet demands and it will be necessary for Councils to make some provision for the erection of additional lamps; otherwise a large number of new streets will be without necessary illumination.

The work of the Keystone Contracting Company, which held the contract for furnishing and lighting naphtha lamps during the year 1907, was so unsatisfactory that when proposals were opened on September 19, 1907, for the year 1908, the contract was awarded to the Welsbach Street Lighting Company of America at their bid of $29 per lamp per year, an advance of 60 cents per lamp per year over the bid of the Keystone Company.

It is confidently expected that with the work awarded to this reliable and thoroughly equipped company, there will be a marked decrease of complaints and a corresponding increase of service and efficiency.

Bureau of Surveys.

The expenditures of this Bureau during the year 1907 were $2,088,484.26, of which $280,926.62 were for current expenses and $1,807,557.64 for extensions and improvements. The total receipts were $168,410.07, being an increase over 1906 of $1,330.10.

There was available for main sewers $257,400.00, practically all of which was placed under contract. There is still due the Bureau out of the loan of February 9, 1907, the sum of $804,000 for main sewers and as soon as this amount is available it will enable the Department to provide proper drainage facilities to a large territory now being developed by real estate operators.

During the year there were constructed 21.299 miles of branch sewers at a cost of $580,878.77. Included in this expenditure was the sum of $20,000 for the construction of inlets, curved curbing, manholes, etc., as well of $5,000 for the reconstruction of inlets.

The total length of all sewers constructed during 1907 was 34.701 miles, divided as follows:

	Miles.
Main sewers	2.761
Branch sewers	21.299
Private sewers	8.797
Market street subway sewer	1.545
Grade crossing sewers	.299
	34.701

The total length of all sewers built to January 1, 1908, is as follows:

	Miles.
Main sewers	171.996
Branch sewers	810.733
Market street subway sewers	4.011
Private sewers	116.381
Grade crossing sewers	.299
	1,103.420

All sewers constructed during the year have required the use of Portland cement, which change from the use of both Portland and natural cements has been satisfactory, without any appreciable advance in the cost of construction.

Increases in amounts received from taxation depend

largely upon the development of our sewage system, as it is one of the chief factors in the building up of new sections, and where there are sewers, houses and other improvements will naturally follow.

On July 20, 1907, Councils made an appropriation to the Bureau of Surveys for the purpose of making an investigation and report upon a comprehensive plan for the collection, purification and disposal of the sewage of the City, together with such alterations and extensions of the existing sewerage system as may be necessary. Extensive studies are being made, in conjunction with the State Board of Health, and a number of the most important disposal works in the eastern portion of the country have been visited and examined and a large amount of important data collected. The old testing station near the Spring Garden Pumping Station, which was formerly used by the Bureau of Filtration, has been turned over to the Bureau of Surveys and after the necessary repairs and changes are made, will be used to carry on experiments that will enable the Department to reach a conclusion as to the best methods to be adopted in treating the average Philadelphia sewage.

In the loan of February 9, 1907, of $13,500,000.00 there was included an item of $150,000 for the erection of a sewage disposal plant. This money has not yet been made available

The extensive work accomplished on the intercepting sewer systems has served not only to improve the sanitary condition of the immediate neighborhoods, but will preserve the purity of streams, which, under ordinary conditions, would have been polluted by the sewage emptying into them.

This system of drainage, first applied to the Schuylkill river, is being extended to Cobb's creek, Little Tacony creek and its tributaries, Wissahickon creek and its tributaries and the Pennypack and Frankford creeks.

The subject of providing proper drainage for the southern section of the City has been receiving the attention of the officials of this Department and work of quite an extensive nature has been carried on to the limit of the appropriation.

One of the most urgent main sewers in this section is that proposed on Shunk street, from Front to Broad street, which will give relief, when constructed, to a large, growing territory.

Under grave engineering difficulties, the Market street subway sewer on the south side of Market street has been practically completed between the Delaware river and Thirteenth street and on the north side, between Delaware river and Tenth street.

Work of great importance affecting a vast population was begun during the past year, when the change in sewers made necessary by the abolition of grade crossings on the line of the Philadelphia, Germantown and Norristown Railroad (P. & R.) was started. Work on these sewers is now well advanced.

Detail plans have been prepared for the actual work of elevating the tracks on Ninth street and on December 17, 1907, bids were received for a large amount of masonry, trestle and embankment work, bridges and for a temporary engine yard at Wayne Junction. The work contracted for will involve an expenditure of approximately $1,200,000, of which, under the terms of the ordinance authorizing the abolishment of these grade crossings, the City will pay one half and the railway company one half.

Satisfactory arrangements as to the methods to be employed in maintaining traffic during the progress of the work have been adopted.

Contracts for the construction of two sewers on Huntingdon street, from Amber street to Frankford avenue, and on Lehigh avenue, from Frankford avenue to west of "B"

street, have been awarded. This work is in connection with the abolishment of grade crossings on the Richmond Branch of the Philadelphia & Reading Railway.

Work has also been started on Trenton avenue on the line of the Pennsylvania Railroad, where the company is now elevating its tracks and constructing the masonry of the abutments for the bridges over the streets and the masonry for the retaining walls. This work is being done under the supervision of the Bureau of Surveys and in accordance with plans approved by the Department. The City will pay to the railroad company upon the completion of this work the sum of $750,000, to be taken from the appropriation of $900,000 out of the loan created by ordinance of Councils approved July 16, 1896.

The close of the year 1908, it is anticipated, will see a vast amount of work performed under the various contracts in connection with the abolishment of grade crossings in the different sections of the City and give to the citizens a substantial example of the elimination of a nuisance which has menaced many lives.

During the past year, the total acreage of ground secured for the purpose of small parks was 561.8 acres and 156.7 acres additional have been placed on the City plan to be secured at some future time. Much of the property acquired during the past year is wooded and ideally located for park purposes and its value will be appreciated more highly in later years.

An ordinance approved July 10, 1907, authorized the condemnation of 44 acres of land between Hoffman and Woodland avenues, along the line of the Cobb's creek park. This park will eventually include 129 acres and leading thereto will be a parkway 100 feet wide along the east side of Cobb's creek, between Market street and Woodland avenue.

On the same day that Councils took action on the Cobb's

creek proposition, there was an ordinance approved authorizing the taking of 477 acres of property lying on both sides of the Pennypack creek, between Welsh road and Bustleton avenue. This covers about one-third the total area of the park, and in its natural advantages rivals the wondrous Wissahickon valley.

During the early portion of March, 1907, cars were operated through the completed portion of the Market street subway, from Fifteenth street westward to Sixty-ninth street, over the elevated structure and its value as an artery of travel was instantly recognized by the vast numbers of people who used this comfortable and swift method of passage to and from the centre of the City. The benefits that will accrue to the population of this City when the work is finally completed from Fifteenth street eastward to Delaware avenue and South street cannot, at this time, be overestimated and will overcome the congested condition to which the cars on the surface lines on Market street are now subjected. Judging from the ratio of work performed, it is expected this welcome improvement will be completed and in operation near the close of the current year.

During the year there were fourteen bridges under construction, nine of which were completed and final payment made before December 31, 1907. In a number of instances these bridges will do away with grade crossings and help vastly the development of outlying territory that was waiting for the construction of these connecting links.

Now nearing completion will be one of the greatest pieces of engineering work in the line of concrete bridges that has been attempted—the Walnut lane bridge over the Wissahickon valley. The main span is the longest concrete arch ever constructed, and, in fact, only two stone arches exceed it in size. This great work has interested and brought to this City eminent engineers and editors and

when the work is finally completed, which it is hoped will be during the early Summer months, it will be a source of pride to the constructive ability of our engineering force and proof of the able manner in which the Bureau of Surveys is conducted.

Under the Ordinance of December 30, 1907, Councils authorized the construction of thirteen additional bridges, all but two of which will open up new avenues of traffic between outlying sections and bring into the market land which is now beyond the pale of development. There is no doubt that the City will receive back in taxes in a few years, the wise expenditures it makes for the building of bridges.

During the past year, vast progress has been made in the dredging of the channel of the Delaware river and the combined forces of the United States Government and the City contractors have faithfully carried on this work. The report of the Chief Engineer of the Bureau of Surveys enters fully into detail on this important work.

The work performed by the assistants in the testing laboratory has been maintained at the high standard which it reached many years ago and is an invaluable adjunct to the various bureaus of the City Government in determining the qualities of materials which enter into municipal construction. Too much praise cannot be given to the corps engaged on this work for the painstaking care that is always evidenced by the splendid grade of materials that enter into our city work and upon which the testing laboratory is required to pass judgment and test.

The Board of Surveyors and Regulators during the past year held 23 stated meetings for the transaction of general business, 17 special meetings and four road day meetings. The total cash receipts and credits of the Board amounted to $170,416.14, being $105,616.16 in excess of the total expenses of the several districts.

The following is a summary of the receipts and expenditures of the District Surveyors for the year 1907:

Summary of Receipts and Expenses of District Surveyors for the year 1907.

Districts.	Surveyors.	Cash Receipts.	Credit for Work done for the City.	Total Credit.	Expenses.				Balance Profit to the City.	Profit to the City in 1906.	Increase.	Decrease.
					Salaries.	Pay of Assistants.	Miscellaneous.	Total.				
1	John M. Nobre.....	$6,607 35	$11,006 49	$17,613 84	$3,500 00	$8,592 00	$1,380 95	$13,472 95	$4,140 89	$9,327 61	.....	$5,186 72
2	R. A. McFadden.....	8,296 65	5,611 16	13,907 81	3,500 00	5,319 27	1,215 81	10,035 08	3,872 73	9,998 24	.....	6,125 51
3	W. C. Cranmer.....	6,826 14	9,857 39	16,683 53	3,500 00	7,939 70	1,177 94	12,617 64	4,065 89	4,400 71	.....	334 82
4	F. Bloch.....	3,682 83	11,221 35	14,904 18	3,500 00	6,877 95	1,221 69	11,599 64	3,304 54	2,859 38	$445 16	.....
5	Walter Brinton.....	19,398 11	10,093 00	29,491 11	3,500 00	10,575 96	1,817 25	15,893 21	13,597 90	8,409 41	5,188 49	.....
6	Joseph Mercer.....	10,973 64	16,503 99	27,477 63	3,500 00	9,775 01	1,874 71	15,149 72	12,327 91	4,684 25	7,643 66	.....
7	W. K. Carlile.....	2,317 00	10,036 24	12,353 24	3,500 00	4,160 00	1,141 33	8,801 33	3,551 91	2,499 27	1,052 64	.....
8	C. A. Sundstrom.....	3,940 14	14,760 13	18,700 27	3,500 00	12,179 08	1,969 39	17,648 47	1,051 80	1,983 97	.....	932 17
9	Joseph C. Wagner....	14,885 73	11,690 23	26,575 96	3,500 00	10,107 76	1,724 67	15,332 43	11,243 53	5,414 83	5,828 70	.....
10	John H. Webster, Jr..	7,811 45	12,743 63	20,555 08	3,500 00	9,163 16	1,277 77	13,940 93	6,614 15	5,809 81	804 30	.....
11	Joseph Johnson.....	11,751 66	11,893 07	23,644 73	3,500 90	10,297 09	1 906 66	15,703 75	7,940 98	4,765 77	2.575 21	.....
12	J. H. Gillingham.....	21,302 75	16,242 16	37,544 91	3,500 00	12,769 01	1,661 69	17,930 70	19,614 21	25,355 56	.....	5,741 35
13	H. M. Fuller.....	9,607 02	13,203 15	22,837 17	3,500 00	8,228 11	1,845 96	13,574 07	9,263 10	7.554 87	1,708 23	.....
14	C. B. Webster.....	2 769 61	15,527 15	18,296 76	3,500 00	7,555 80	1,614 34	12,670 14	5,626 62	5,333 69	292 93	.....
	Total, 1907.....	$129,570 08	$170,416 14	$299,986 22	$49 000 00	$123,589 90	$21,880 16	$194,470 06	$105,615 16	$98,397 37	$25,539 86	$18,320 57

The following is a statement of the operations of the Registry Division of the Bureau of Surveys during the year 1907:

Registry Division.

	1907.
Number of certificates of registered owners issued	5,010
Number issued for use of Law Department	463
Receipts from certificates of registered owners	$1,251 25
Receipts from miscellaneous sources	$273 10
Number of original lots plotted	11,520
Number of transfers registered	47,559
Number of plans made or use of City Departments, Bureaus, etc.	702
Number of examinations of registry plan books made by the public	71,056
Number of descriptions of property filed for registry	70,346
Number of titles perfected	2,715
Number of certificates of legal opening of streets issued to Bureaus, etc.	2,778
Number of certificates of registered owners in municipal lien cases for Law Department	686
Number of certificates of registered owners in municipal lien cases for Receiver of Taxes	343

Statement of Main Branch and Private Sewers Built During the Year 1907.

	No.	Linear feet.
Intercepting sewer extensions	5	3,460
Main sewers	19	11,119
Branch sewers	147	112,463
Private sewers	75	46,445
Market street subway sewers	2	8,162
Grade crossing sewers	7	1,578
Totals	255	*183,227

* Equal to 34.701 miles.

Statement of Work Upon Bridges During the Year 1907.

Finished	9	Authorized	5
Begun	7	Planned	10

Statement of Receipts.

Year.	Receipts of Bureau.	Receipts of District Surveyors.	Total.
1907	$38,839 99	$129,570 08	$168,410 07

Statement of Expenditures.

	1907.
Current expenses	$280,926 62
For extensions	1,807,557 64
Total	$2,088,484 26

Bureau of Water.

The work for which the temporary Bureau of Filtration was created having been practically completed, on October 15, 1907, you approved an ordinance combining the Bureaus of Filtration and Water and Mr. Fred. C. Dunlap, Chief Engineer of the former Bureau, was appointed Chief of the combined Bureaus, now known as the Bureau of Water.

Previous to this consolidation, the Bureau of Water had been under the able supervision of Mr. Allen J. Fuller, General Superintendent.

The expenditures of the combined Bureaus were $4,127,901.28, of which $1,672,867.69 was for current expenses and $2,455,043.59 for improvements and extensions. The total receipts were $4,020,819.36.

Computed by plunger displacement, there were consumed during the year 1907, 100,389,374,085 gallons of water,

or an average of 302,436,641 gallons daily, a decrease from the previous year of 17,377,622 gallons daily. The per capita consumption per day was 201.7 gallons, a decrease from the previous year of 16.1 gallons. This decrease in the consumption of water was due entirely to the increased efficiency of our pumping plant.

The water levels in the several storage basins were maintained at almost the maximum heights throughout the year and no deficiencies in the supply occurred, except in some few instances, due to local causes.

The quantity of filtered water now being furnished is about 112,000,000 gallons daily. Of this amount 11,500,000 gallons daily was filtered at Upper Roxborough, 8,500,000 gallons at Lower Roxborough, and 32,000,000 gallons at Belmont. This supply was derived entirely from the Schuylkill river. At the Torresdale plant, approximately 60,000,000 gallons of water from the Delaware river is filtered daily.

The quality of the filtered water during the past year has at all times been satisfactory and up to the high standard adopted by the German Government. The estimated capacity of the filters has been obtained without any difficulty in their operation. The satisfactory results thus far obtained are a tribute to Mr. John W. Hill, who prepared the original designs, plans and specifications and superintended the construction of the work up to the time of his resignation.

On or before May 1, it is anticipated that the supply of filtered water from Torresdale will be increased to 100,000,000 gallons daily, to be increased as soon as the first pumping engine for House No. 3 is completed, about July 1, to 120,000,000 gallons. The full capacity of the filter beds at Torresdale cannot be attained until the pumping machinery is installed, which will not be until the early part of 1909.

The supply of filtered water from the Roxborough plant will be increased 10,000,000 gallons daily through the transfer of a pumping engine from Spring Garden to the Roxborough Pumping Station and the laying of certain additional mains. Through this method, the district of Tioga will receive the benefits of filtered water.

The contract for the preliminary filters at Torresdale was awarded at an approximate cost of $1,000,000 and comprises 120 filter tanks, with accessories, that will filter 240,000,000 gallons daily. Considerable work has been done on this contract and it is expected the contract will be completed during the summer of 1908. Through the installation of these preliminary filters, it is anticipated that the rates of the slow sand filters will be increased to 6,000,000 gallons per acre per day.

Much work has been accomplished during the past twelve months in the laying of mains to connect with the present distributing system from Lardner's Point Pumping Station, there having been some 20½ miles of pipe laid, equivalent to 108,775 linear feet, divided between 60-inch, 48-inch, 24-inch and 20-inch cast iron pipe and 48-inch and 36-inch steel pipe. The work under these contracts will be completed about May 1, 1908.

Very satisfactory progress is being made on existing contracts and we expect a vast amount of work to be accomplished during the present year, so that the completion of this stupendous undertaking may be confidently looked for in the early part of 1909. This, of course, does not include the Queen Lane Filters, tentative plans for which have been made and for which additional funds must be provided if the work is to be undertaken.

It is worthy of note that the Torresdale Conduit, which received so much adverse criticism in the newspaper press of this City, was subjected to a thorough examination as to character and quality of work performed and the results

secured from this investigation proved this conduit to be a splendid piece of masonry work and the City might well have saved the sum of $184,301.27 which was expended in so-called repairs.

In the plan looking to the improvement, extension and filtration of the water supply, it is proposed to abandon the Spring Garden Pumping Station; consequently the repairs to machinery at this station were limited to only such work as was absolutely necessary to keep the engines and pumps in running condition. The pumping apparatus at the various other stations of the Bureau is in excellent condition, due to the close supervision exercised by the officials of the Bureau. Only at the Belmont Station did the pumps fail to register an approximate full duty, which was due to defects which developed in the pump chambers in the old engines at this station, three of which were installed in 1869.

A great many accidents happened to the machinery at the Queen Lane Station, all of which were happily repaired without any serious difficulty arising, although these repairs were a sad drain upon our financial resources.

The consumption of coal at the several pumping stations aggregated 209,000 tons, a decrease as compared with the previous year of about 7,000 tons.

In connection with this subject I would call attention to the fact that considerable trouble has been experienced in obtaining a satisfactory quality of coal, and as this is a question of serious importance, I would respectfully request that you give this subject your earnest consideration, with a view to having the Department of Supplies furnish the Bureau with coal of a quality which experience has demonstrated to be best suited for our requirements.

For many years the work of repairing boilers in the Bureau of Water has been done under an annual contract and much satisfactory work has been accomplished; but it

has been deemed advisable, during the current year, to see if it would not be more economical to have the work done by City employees under the direct supervision of the officials of the Bureau. It is to be hoped that this departure from past custom will prove satisfactory in its final results and be the means of saving considerable money to the City.

The total quantity of pipe laid during 1907 was 260,675 feet for distribution purposes, service and supply mains, making the total length of pipe now in use 1578.89 miles, to which are connected 14,852 fire hydrants.

A close study of the tables submitted by the Chief of the Bureau of Water, as to the cost of the various branches of operation and maintenance, will prove instructive and interesting to anyone who cares to follow up the subject of economics in the administration of such a large plant as that possessed by the City of Philadelphia.

Statement of Receipts and Expenditures for the Year 1907.

	Receipts 1907.
Receipts from water rents	$3,710,187 53
Receipts from fractional rent	92,649 45
Receipts from water pipes	107,071 85
Receipts from City Solicitor's office	39,176 74
Receipts from penalties	80,160 39
Receipts from delinquent rent	28,721 55
Receipts from Chief Engineer's office	8,917 72
Receipts from searches	3,996 00
Receipts from delinquent penalties	4,988 13
Total	$4,020,819 36

	Expenditures 1907.
Current expenses	$1,358,934 15
For extensions	938,672 29
Total	$2,297,606 44

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										
		Miles.	Feet.	Feet.	New Style.	Old Style.	Total.	New Style.	Old Style.	Total.		
1907.....	151,900	28	4,060	*5,910	308	.....	308	316	.....	316	14,852	9,167

Total pipe laid, 1,558.25.

* Pipe taken up exceeds quantity relaid 720 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	
Old Station	6	Simpson Compound Rotary	10,000,000	
Old Station	7	Marine Compound Rotary	20,000,000	
Old Station	8	Worthington Duplex	10,000,000	
Old Station	11	Gaskill	20,000,000	
New Station	9	Worthington Duplex	15,000,000	
New Station	10	Worthington Duplex	15,000,000	
New Station	2	Holly	30,000,000	
New Station	3	Holly	30,000,000	170,000,000
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	1	Worthington Duplex	4,500,000	
Belmont	2	Worthington Duplex	4,500,000	
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	62,500,000

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	Worthington	2,000,000	
Belmont High Service	1	Worthington	5,000,000	7,000,000
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	31,500,000
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 Station.	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	177,000,000
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
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	120,000,000
Total				732,040,000

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
East Park.. Section 1	East Fairmount Park	1887	133 " ...	62,738,000
East Park.. Section 2		1888		306,400,000
East Park.. 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 Year 1907.

	Gallons.
Pumped to reservoirs	116,882,212,622
Equal to gallons pumped 100 feet high	242,285,589,708

NOTE.—"The pumped to reservoirs" includes 6,475,854,615 gallons repumpage to higher levels at Belmont, Roxborough, Roxborough Annex, Mt. Airy and Frankford High Service Stations, which, deducted from the total pumped, gives a total pumped from rivers of 110,406,858,007 gallons.

The quantity stored in reservoirs on December 31, 1907, was 17,483,922 gallons more than that stored on December 31, 1906. This quantity deducted from the total pumpage from rivers makes the total consumption for 1907, 110,389,374,085 gallons. The cost of pumpage is based on the total pumpage. The consumption per capita is computed from the average consumption during 1907 of 302,436,641 gallons per day.

	Gallons.
Pumped by water power	8,183,114,825
Pumped by steam power	108,749,097,797
Largest quantity pumped in 24 hours	368,585,438
Smallest quantity pumped in 24 hours	199,486,931

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

* Estimating the population 1907 at 1,499,747.

The increased cost of pumpage per million gallons raised 100 feet high is $.62 or about 12 per cent. more than that of the preceding year. This large increase was mainly

due to additional cost of repairs to machinery, buildings and ground, and to the increase of wages authorized by Councils.

Director's Office.

With the force of employees practically the same for the past ten years, the work has increased, it is safe to say, at least two hundred per cent. The labor necessary to carry on the work in this office has been faithfully and diligently executed and has received the entire time and attention of the employees, whose hours of duty are not regulated by any set time, it being the unwritten law that the work of each day must take care of itself.

The work performed by the Official Photographer demonstrates its value more each year, not only in saving of cost but in the expeditious manner in which the work is executed. The services of this official have been requisitioned by nearly every municipal department under the City Government.

The following is a summary of the expenditures of the Director's office for the year 1907:

Item 1.	Salaries	$25,369.96
Item 2.	Horsekeep	400.00
Item 3.	Incidentals	1,726.24

In closing this report, I desire to testify to the aid you have always given me in the performance of my official duties and to acknowledge the able assistance rendered by the Chiefs and employees of the Bureaus of the Department of Public Works.

Yours very truly,

GEO. R. STEARNS,

Director.

ANNUAL REPORT

OF THE

BUREAU OF WATER

FOR THE

YEAR ENDING DECEMBER 31, 1907

8w

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 Filters—Cheston M. Stuart.
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—Peter Carrigan.

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—David A. Craig.
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—Jos. 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—Chas. S. Teal.

Paymaster—A. J. Flomerfelt.

Foreman Machinist—James Barbour.

Foreman Bricklayer—Jos. F. Ogden.

Foreman Carpenter—Henry Guest.

Foreman Plumber—Chas. H. Green.

Foreman Stonemason—Michael Farrell.

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 1907

TWENTY-FIRST ANNUAL REPORT

OF THE

BUREAU OF WATER

ONE HUNDRED AND SIXTH ANNUAL REPORT

OF

OPERATIONS CONNECTED WITH THE CITY WATER SUPPLY

Philadelphia, January 25, 1908.

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

DEAR SIR:—I respectfully submit the following report of the work performed by the Bureau of Water (and of Filtration) during the year ending December 31, 1907:

The Bureau of Water was conducted under the direction of Mr. Allen J. Fuller as General Superintendent in Charge up to October 15, 1907, and the excellent showing made during the past year is due to his good management.

Mr. Cassius E. Gillette, Chief Engineer, Bureau of Filtration, resigned April 25, 1907, and on May 1st, I was appointed by you as Chief of that Bureau.

On October 15th His Honor, the Mayor, approved an ordinance of Councils combining the Bureaus of Filtration and Water, to take effect from the preceding August 1, and on the date of the approval of the ordinance, I assumed charge of the combined forces of both Bureaus.

Consumption.

The consumption of water during 1907, computed from plunger displacements, was 110,389,374,085 gallons, or at an average rate of 302,436,641 gallons per day, a decrease, as compared with that of the preceding year, of 17,377,622 gallons daily.

The per capita rate was 201.7 gallons, a decrease, as compared with that of 1906, of 16.1 gallons.

This apparently large decrease in the consumption of water, as registered by the engine counters, does not mean that less water was consumed throughout the City, but that the pumping facilities were in a very much improved condition and fewer revolutions of the engines were required to meet the demands.

At the same time the water levels in the several storage basins were maintained at almost the maximum heighth throughout the year, and no deficiency in the supply occurred in any distribution district except in some few instances, due to local causes.

The following table shows the estimated average daily consumption of water from the Delaware and the Schuylkill rivers to the several distribution systems named:

Distribution Systems.	Average Daily Consumption in Gallons
East Park	134,022,128
Belmont	32,926,072
Queen Lane	63,174,814
Roxborough	21,330,452
Frankford	16,476,165
Total	267,929,631

of which 112,000,000 gallons per day at the present time are filtered water.

The Belmont and Roxborough quantities given above are by meter measurements, also that supplied from Queen Lane, but to which has been added the estimated pumpage of Nos. 8 and 10 engines at the Spring Garden works, which, during part of the year, pumped to the Queen Lane district.

At the present time filtered water is being supplied to all or parts of the following Wards: 17, 18, 19, 21, 22, 23, 24, 25, 27, 31, 33, 34, 35, 40, 41, 42, 43, 44 and 46, and to part of the 16th, 20th, 32d and 38th Wards the population of which is about 650,000. The quantity now supplied is about 112,000,000 gallons daily, or 175 gallons per capita per day. Of the above amount 11,500,000 gallons daily is filtered at Upper Roxborough, 8,500,000 gallons at Lower Roxborough, and 32,000,000 gallons at Belmont. These three plants are supplied from the Schuylkill river, making the quantity of water filtered from this source 52,000,000 gallons daily. At the Torresdale plant approximately 60,000,000 gallons of Delaware river water are filtered daly.

The quality of the filtered water supplied during the past year has at all times been good and up to the high standards adopted by the German Government, particularly the water supplied from the Roxborough and Belmont Filters, and it should be noted that the estimated capacity of these filters has been obtained without giving difficulty in their operation. The effluent from the Torresdale Filters, although being started and operated under adverse conditions, was also good.

The above should be particularly gratifying to the citizens of Philadelphia, as demonstrating that the plans of this vast filtration system as designed and developed by former Chief Engineer John W. Hill, and costing some

$26,000,000.00, will when completed give to the people pure water, equal to that filtered at any place in the world, and which has been secured from water as poor as that supplied to any Christian city on the globe, and furthermore, that his plans as to quantity of output of the various filter stations will be realized.

During 1908 it is expected that the filtration system will be almost completed with the exception of the pumping machinery at Frankford or Lardner's Point, which according to the contract time will not be in place before March, 1909.

On or before May 1st, the supply from Torresdale will be increased to 100,000,000 gallons per day, to be later increased to 120,000,000 gallons upon the completion of the first pumping engine in House No. 3, which has been promised by the builders before July 1st.

The supply from the Roxborough filters will also be increased by the addition to the Roxborough Pumping Station of one 10,000,000 gallon pump to be removed from the Spring Garden Station and by the completion of distributing mains being laid in this district, through which the Tioga section of the city is to be supplied.

The Torresdale Conduit having been opened or emptied on December 23, 1905, was closed or filled on June 12, 1907. A very careful examination was made of the interior of the conduit and no defects whatever, either as to material or workmanship, could be discovered. The examination further disclosed the fact that the so-called repairs were not repairs in any sense and of no benefit to the structure whatever; in fact, they would have caused serious damage had not the conduit been well constructed, and the fact that no damage was sustained is a fine testimonial to the superior quality of the material and workmanship of this structure. The cost of this unnecessary work was

$184,301.27, from which the city obtained no benefit whatever.

The contract for the completion of the intake at the Torresdale Station was awarded August 22, 1906, to the Bennis Construction Company, since which date work has been in progress continuously. Considerable trouble was experienced from leaks in the cofferdam, but progress is so far advanced that I believe the work will be completed about May 1st. In order to supply water to the pumps in the Torresdale Pumping Station, a temporary channel was dredged to Gate House No. 2 and the intake bulkheaded beyond this point.

On May 6, 1907, the Supreme Court reversed the decision of the lower Court, in refusing to grant an injunction against the award of Contract No. 51, Filtering Materials for the Torresdale Filters, to Messrs. Norcross and Edmunds. This action by the higher Court made it necessary to re-advertise and re-award this work, which was done; bids were received on May 31, 1907, and the above firm being the lowest bidder again received the award. The work has been in active progress and will be completed on January 20, 1908.

The contract for preliminary filters at Torresdale, Contract No. 102, was awarded to the Millard Construction Company on August 22, 1907. The cost of the work on this contract will approximate $1,000,000, and comprises 120 filter tanks with accessories, and will filter 240 million gallons per 24 hours. Provision has been made to wash with both air and water. It is expected that by the preliminary filtration of the water the rates of the slow sand filters will be increased to 6,000,000 gallons per acre per day. Considerable work has been done and material furnished, and the plant will be completed during the summer of 1908.

The laying of mains to connect the Lardner's Point

Pumping Station with the present distribution system has been in active progress during the past year, some 20¾ miles having been laid, divided as follows:

10,925	lin. ft.	60-inch cast iron pipe.
16,400	" "	48-inch cast iron pipe.
73,150	" "	48-inch steel pipe.
4,200	" "	36-inch steel pipe.
3,100	" "	24-inch cast iron pipe.
1,000	" "	20-inch cast iron pipe.
108,775	" "	Total.

The contracts for the above work will be completed by about May 1, 1908.

Revenue Collected.

The total collections during 1907 and the amounts for the several items, as compared with those of the preceding year, were as follows:

	1906.	1907.	Increase.	Decrease.
Water rents	$3,385,343 44	$3,496,430 00	$111,086 56	
Meter rents	338,567 38	323,890 53		$14,676 85
Frontage	193,164 30	107,071 85		86,092 45
Amount collected by City Solicitor	43,725 05	39,771 06		3,953 99
Penalties	37,956 75	34,504 20		3,452 55
New connections	15,193 00	11,238 00		3,955 00
Searches	3,610 00	3,996 00	386 00	
Miscellaneous	2,944 51	3,917 72	973 21	
Totals	$4,020,504 43	$4,020,819 36	$112,445 77	$112,130 84
			112,130 84	
Increased collections, 1907			$314 93	

The above table shows a decrease in all but three items of receipts.

There is a gratifying increase of $111,086.56 in the receipts of water rents, but meter rents have fallen off $14,676.85, due principally to discontinuing the use of meters in some instances, and to the settlement of disputed meter charges in 1906, which increased the collections during that year from this source.

The collections for laying pipe, or frontage charges, were less than those of the preceding year by $86,092.45, due mainly to the delay in obtaining pipe castings, in consequence of which very little pipe laying was done until some time after the middle of the year, and as the property owners have four months in which to make payments, many of these charges remain over, to be paid during 1908.

Another reason for a reduction in this item was a falling off in building operations, which is shown by a decrease of $3,955.00 in the receipts for new connections.

The reduction of $3,452.55 in the receipts for penalties and an almost corresponding amount, $3,953.99, in the amounts collected by the City Solicitor, show that a greater number of water consumers have settled their accounts without waiting for the penalties to accrue.

Expenditures.

The expenditures for maintenance, service mains, etc., from appropriation to Bureau of Water were.....	$1,199,175.08	
The expenditures for maintenance, service mains, etc., from appropriation to Bureau of Filtration were...	29,617.65	
The expenditures for maintenance, service mains, etc., from appropriation to Department of Supplies were	961,536.28	
Total		$2,190,329.01
Expenditures for maintenance, Bureau of Filtration	$71,219.90	
Department of Supplies	33,796.43	
Total		$105,016.33

Total expenditures for maintenance, Bureau of Water, Filtration and Department of Supplies	$2,295,345.34
Expenditures for Extension, Bureau of Filtration	2,315,588.24
Total	$4,610,933.58

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, 1907	$81,754,519.68

Net Earnings of the Bureau of Water.

Total revenue from water rents, etc., from the installation of the water works in 1799 to December 31, 1907	$99,274,092.44

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, 1907	$17,519,572.96

Coal.

The consumption of coal at the several pumping stations aggregated 208,582 tons, a decrease, as compared with that of the preceding year, of 6,896 tons. The total cost of the coal consumed was $625,402.99, a decrease, as compared with that of 1906, of $22,405.13.

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

Stations.	Increase, Tons.	Decrease, Tons.
Spring Garden	.....	1,693
Frankford	4,974	.....
Belmont	.....	2,727
Queen Lane	.....	6,941
Roxborough	.....	626
Totals	4,974	11,987
		4,974
Net tons decrease		7,013

In the latter part of September the northeastern section of the district supplied from the Spring Garden works was furnished with filtered water from the Frankford works, which partly accounts for the decrease at the former and the increase at the latter stations in the quantity of coal consumed.

The decrease at the Belmont works was wholly due to the better condition of the pumping machinery and steam boilers, and, to a very large extent, to the improved management and discipline maintained by having one engineer in charge instead of, as has been heretofore the case, being under the management of three engineers, who took turns as executive officers.

While the water supply furnished to the district from the Belmont works has been ample at all times throughout the year, this work was accomplished at a reduction of over $7,900.00 in the cost of the coal.

The same remarks apply to the conditions existing at the Queen Lane works, where the decreased consumption of coal resulted in a saving of nearly $22,000.00, part of which, however, was due to less water pumped from this station; but the management and improved condition of the boilers and machinery should be credited with a net saving of at least $8,000.00.

The Roxborough works have been in charge of one engineer for the past two years. He was credited with a saving, in 1906, of $17,440.72, and by the better handling of his station has further improved the conditions, resulting in saving in the cost of coal, during the past year, of $2,071.02.

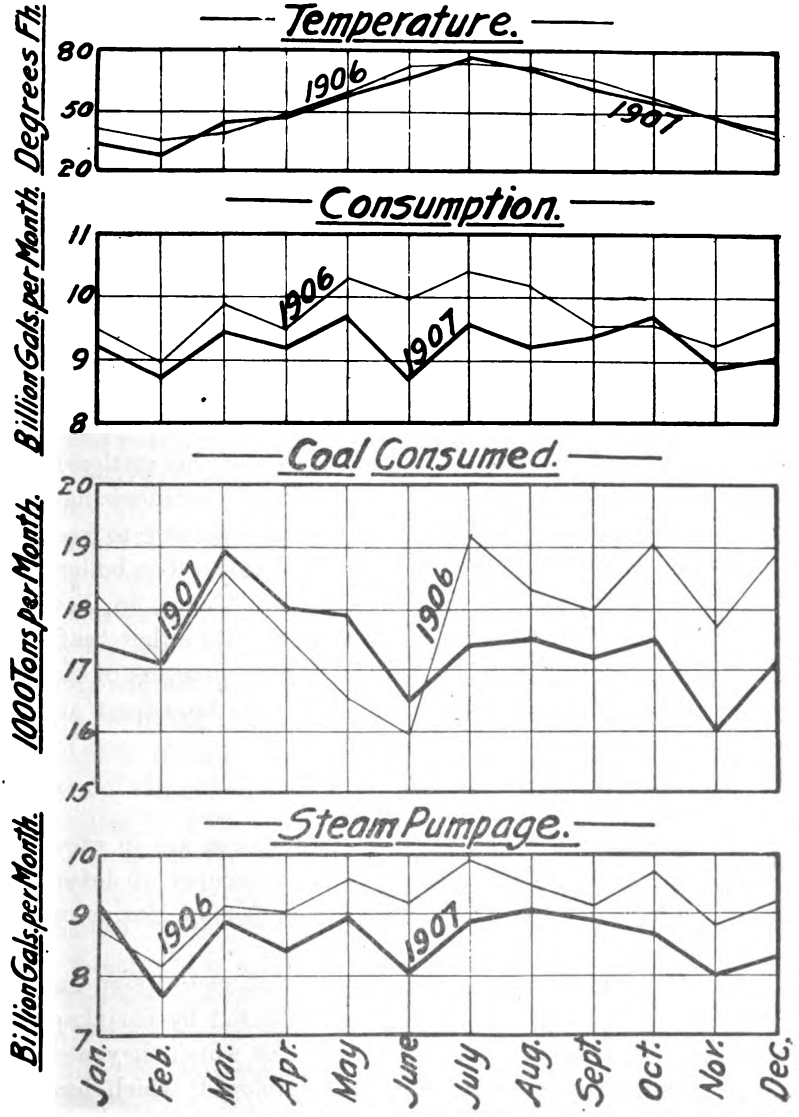
There was an increase in the consumption of coal at the Frankford works, which was partly due to the operation of the old pumping station, but principally to increased pumpage at Lardner's Point Pumping Station No. 2.

The increase in cost of coal consumed at these two sta-

tions was $14,120.72 and the increase in water pumped was 2,493,000,000 gallons.

Considerable trouble has been experienced in obtaining a satisfactory quality of coal, and an effort is being made to purchase it according to its heat value, such value to be determined by test and to be restricted within certain limits.

This matter is of growing and serious importance, for it not infrequently happens (as the capacity of the boilers is limited) that, with a very poor quality of coal, it is impossible to keep the engines in operation continuously, and should interruptions from this cause occur during seasons of drought, when the consumption is the greatest, it would be difficult to maintain a sufficient supply.



9w

Pumping Stations.

Fairmount.

Only minor repairs were required to the machinery at this station, with the exception of No. 3 pump, which received a thorough overhauling.

The average level of the water in the Fairmount pool was higher than usual, and for this reason the pumpage was increased over 18 per cent.

The total quantity of water pumped was 8,133,114,825 gallons, an increase of 1,487,971,141 gallons, or over 4,000,000 gallons per day.

Spring Garden.

In view of the prospective abandoning of this station in the near future, repairs to the pumping machinery have been limited to only such work as was necessary to keep the engines and pumps in running condition. The boilers, however, with the exception of Nos. 27, 37 and 38, have been thoroughly overhauled and retubed with either "safe-ended" or with new tubes, and during the progress of this work the boilers were scaled and cleaned throughout and are now in excellent condition.

Belmont.

The machinery and boilers at this station are in excellent condition, with the exception of a number of defects which have developed in the pump chambers of Nos. 5 and 7 engines.

It appears that these chambers are of such design and proportions that they are seriously affected by shrinkage strains and will not stand the work for which they were intended. Numerous cracks have developed, which have been patched, but such work on pump chambers is seldom, if ever, effective, except as a temporary expedient; and to

make satisfactory repairs it will be necessary to furnish new back chambers for these two pumps.

The total quantity of water pumped, as registered by the engine counters, was 13,383,266,869 gallons, all of which was discharged through meters, which recorded 12,018,016,207 gallons, showing a "slip" or excess, registered by the engine counters, of 10.32 per cent.

The slip for the old pumps, Nos. 1, 2, 3 and 4, was 17.72 per cent., and that for the new Holly engines, Nos. 5, 6 and 7, 5.28 per cent.

The quantity of water pumped by engines Nos. 1, 2, 3 and 4, and measured by meter, was 5,516,592,000 gallons.

The quantity of water pumped by engines Nos. 5, 6 and 7, and measured by meter, was 7,884,963,000 gallons.

The coal consumed by the old pumps amounted to 19,102 tons.

The coal consumed by the new pumps amounted to 16,478 tons.

The excess of coal consumed by the old engines, pumping 40 per cent. less water, as compared with the new Holly engines, was 2,624 tons, or, in other words, it would have required 7,573 less tons of coal, approximating $22,200, if new pumps of modern design were used in place of the old engines at this station, three of which were installed in 1869.

The seven Hilles & Jones boilers, condemned by the boiler inspector in the latter part of 1906, were sold and removed by the Department of Supplies, and the space they occupied is available for new boilers when needed.

The ten new boilers in the south house have been in continuous service since their erection and have required nothing but minor repairs.

The sixteen boilers in the old house have been overhauled, the tubes of Nos. 1, 2, 3, 4, 5 and 21 have been

"safe-ended," and all the boilers have been thoroughly scaled and cleaned.

On June 16, a serious fire, which was undoubtedly of incendiary origin, destroyed the men's dressing rooms back of the boiler house and also a large section of the boiler house roof, thereby endangering the operation of the works. The roof has been repaired and a new building erected for the dressing rooms. This building is two stories in height, fireproof, and provided with iron stairways and metal lockers for the men. There is, however, a coal shed adjoining this building, and to avoid danger of fire from this source the woden roof should be replaced with one of galvanized iron.

Queen Lane.

The operation of the machinery at the Queen Lane station was considerably handicapped by serious accidents, involving heavy expense for repairs to both engines and boilers.

At the beginning of the year the low pressure cylinder lining of No. 1 engine cracked and was replaced with a new one.

The low pressure piston of No. 2 engine broke and a new one was required for the repairs. Later, the low pressure connecting rod of No. 1 engine became badly bent. This was repaired, and shortly afterward the intermediate crank pin of No. 4 engine broke. The latter engine is receiving an extensive overhauling, including a new crank pin, suction and intermediate pump chambers, new plungers, valve stems, suction air chambers and discharge air chamber base casting. The valve gear is being repaired and placed in good condition. Upon completion of all this work the engine will be in perfect order and do effective service during the coming season. All three of the other engines require, to a more or less degree, similar repairs,

and the work will proceed immediately upon the completion of the repairs to No. 4 engine.

While these engines were undergoing repairs it was necessary to pump into the Queen Lane distribution system from the Spring Garden Station, and throughout the year the estimated quantity pumped from this source was 4,600,825,680 gallons, which, added to the quantity pumped through the meters at the Queen Lane Pumping Station—18,457,981,562—makes a total of 23,058,807,242 gallons, or upward of 63,000,000 gallons per day to supply the present Queen Lane system.

Early in the year the Chief Inspector of Steam Boilers reported that the back tube sheets of all the boilers were cracked at the bottom flange. These cracks were from two to three feet long, but did not extend entirely through the sheet. Repairs were made by a reinforcement plate about 4 ft. by 2 ft. by $\frac{5}{8}$ inch thick, overlapping the bottom and end of the boiler. These plates were bent to conform with curves at the bottom and the flat ends of the boilers. They were both difficult and expensive to make. Two additional stay rods, extending from end to end of the boilers, were put in, and the front heads showing signs of weakness were further reinforced with weldless crow-foot braces. All the tubes were "safe-ended" and the boilers thoroughly cleaned, so that they are now in first-class condition.

Roxborough.

The engines and boilers at this station have given no serious trouble throughout the year, the only repairs required being those of a minor character. All items of expense for maintenance at this station have decreased with the exception of that for wages, which exceeds the amount for the preceding year by $10,373.85. The net decrease for all items was $5,884.94.

The total pumpage was 8,346,342,945 gallons, and the average daily pumpage was 22,866,693 gallons.

High Service Stations.

The total pumpage at the High Service stations was 6,475,354,615 gallons, a decrease of 101,304,234 gallons, as shown by the following table:

Stations.	Pumpage, Gallons.	Increase, Gallons.	Decrease, Gallons.
Belmont	900,778,185	54,927,815	
Roxborough	1,198,457,309	159,358,689	
Roxborough Annex	3,794,198,000		586,749,000
Mt. Airy	36,610,000	28,420,000	
Chestnut Hill	Out of service		
Frankford	545,311,071	242,863,672	
Totals	6,475,354,615	485,570,226	586,874,460
			485,570,226
			101,304,234

Lardners Point Pumping Station.

(Formerly designated as Frankford Pumping Station.)

During the past year Pumping Station No. 1 was used but a short time owing to the completion of certain parts of Station No. 2.

The six Holly vertical triple-expansion pumping engines in the No. 2 pumping station have been completely installed and are in operation. Owing to the non-completion of the distributing mains only about 60,000,000 gallons of water are being pumped, but it is expected that this amount will be increased to 100,000,000 gallons within the next three months. Six 500-horsepower Edge Moor

water tube boilers have been installed in Boiler House No. 2 and are in operation.

For Pumping Station No. 3 contracts have been let for six pumping engines similar to those in Station No. 2, and the contractor is about to begin the erection of the first engine.

In the boiler house for this station foundations are being built for six 500-horsepower boilers. Owing to the long time required to build the pumping engines, the station will not be completed before about June, 1909.

During the past year 14,972,000,000 gallons of water were pumped from Station No. 2 with a coal consumption of 17,412 tons, and 705,000,000 gallons from Station No. 1, using 1,922 tons of coal.

Since July 15, 1907, filtered water only has been pumped from this station.

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
Total	$26,500,000.00

From the amount appropriated on May 10, 1907, but $1,512,500.00 has been received.

On November 5, 1907, a loan was authorized which in-

cluded $800,000.00 for the Improvement, Extension and Filtration of the Water Supply, making the total amount authorized to date for this work $27,300,000.00.

Of the fund provided there has been paid out and charged off on contracts to December 31, 1907, the following amounts:

Paid on completed contracts	$16,773,944.10
Paid on uncompleted contracts	2,737,774.67
Limits of uncompleted contracts less payments	1,760,399.55
Land damages	876,485.55
Expenses, supplies, advertisements, etc.	350,111.43
Inspections	21,186.88
Salaries and wages	1,252,366.51
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	308,575.88
Balance available from ordinance of May 10, 1907, when remainder of bonds are negotiated	1,287,500.00
Total	$26,500,000.00

Appropriation for Operation and Maintenance of Filters and Laboratory, 1907.

Item 25:

For salaries of the men employed in the maintenance and operation of the Upper Roxborough, Lower Roxborough and Belmont Filter Stations, and the Laboratory		$36,980.00
Expended for salaries		33,416.61
Amount merging		3,563.39

Item 26:

For wages of laborers and other workmen employed in the maintenance and operation of the Upper Roxborough, Lower Roxborough and Belmont Filter Stations, and the Laboratory		$41,000.00
Transferred November 9, 1907	$4,000.00	
Expended for wages	26,689.05	32,689.05
Amount merging		$8,310.95

Item 27:

For resanding the filters and incidental expenses for operating Upper Roxborough, Lower Roxborough and Belmont Filter Stations and the Laboratory		$17,000.00
Transferred November 9, 1907	$1,500.00	
Expended for resanding filters and incidentals	9,114.24	10,614.24
Amount merging		$6,385.76

Land Appropriated.

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

Contracts under Construction and Let during 1907.

No.	Contractor.	Description.	Limit.	Amount Paid to Dec. 31, '07.	Bids Opened.	Work Begun.	Percentage of Work Done.
35	Stuart Wood	Pumping machinery at Torresdale Filters	$210,000	$138,645 00	April 26, 1906	June 23, 1906	66
36	David Peoples	Pumping Station at Torresdale Filters	127,000	125,312 24	June 20, 1906	July 2, 1906	100
43	Alphons Custodis Chimney Const. Co	Chimney at Torresdale Pumping Station	7,500	7,433 90	June 20, 1906	Oct. 29, 1906	100
47	Carl Bajohr	Lightning rods at Torresdale and Lardner's Point	1,700	1,662 00	July 5, 1906	Oct. 8, 1906	100
51	Norcross & Edmunds	Filtering materials for Torresdale	315,000	145,142 55	Sept. 6, 1905	May 31, 1906	100
53	M. & J. B. McHugh	Cleaning George's Hill Reservoir	26,500	26,342 82	July 5, 1906	----------	100
57	North Penn Iron Co	Electric traveling crane for Torresdale Pumping Station	3,800	3,652 00	July 13, 1906	----------	100
58	Builders' Iron Foundry	Repairs to D'Auria Pump at Wentz Farm Reservoir	2,250	1,771 95	July 18, 1906	Aug. 10, 1906	100
60	Osborn Engineering Co	Inspecting steel pipe and structural steel	6,000	5,473 23	July 25, 1906	Aug. 10, 1906	100
61	R. P. Bennis	Completing Torresdale Intake	160,000	102,117 62	Aug. 22, 1906	Oct. 1, 1906	64
69M	John McMenamy	Laying pipe and valves	165,000	140,860 60	Aug. 8, 1906	Sept. 24, 1906	85
69R	Roe-Stephens Mfg. Co	Furnishing valves	3,000	----------	Aug. 8, 1906	----------	100
69U	U. S. Cast Iron Pipe & Foundry Co	Furnishing cast iron pipe	135,000	131,513 65	Aug. 8, 1906	Oct. 5, 1906	100

Contracts under Construction and Let during 1907—Continued.

No.	Contractor.	Description.	Limit.	Amount Paid to Dec. 31, '07.	Bids Opened.	Work Begun.	Percentage of Work Done.
69W	Stuart Wood	Furnishing cast iron pipe and specials	82,000	82,000 00	Aug. 8, 1906	Sept. 24, 1906	100
69XK	E. Keeler Co	Furnishing riveted steel pipe	6,642	6,642 00	Oct. 3, 1906		100
69XW	Walter Wood	Furnishing cast iron pipe and specials	7,500	7,002 11	Oct. 3, 1906		100
70A	J. Alfred Clark Co	Furnishing grey iron castings	1,900	1,645 20	July 5, 1906	Sept. 1, 1906	100
70C	Carroll-Porter Co	Furnishing riveted steel pipe	240,000	231,577 37	June 12, 1906	Aug. 29, 1906	100
70E	East Jersey Pipe Co	Furnishing lock bar pipe	499,000	492,029 66	June 12, 1906	Oct. 16, 1906	100
70F	Fairbanks Co	Furnishing stop valves	30,000	25,015 74	June 12, 1906	Oct. 15, 1906	100
70M	Cunningham & Murray	Laying pipe and valves—Schedule No. 3	310,000	267,027 53	June 12, 1906	Oct. 8, 1906	87
70N	Jas. McNeil & Bro. Co	Furnishing riveted steel pipe	284,000	279,087 52	June 12, 1906	Aug. 18, 1906	100
70P	American Paving and Construction Co	Laying riveted steel pipe—Schedule No. 4	102,000	78,977 25	June 12, 1906	Oct. 2, 1906	78
70S	R. C. Storrie	Laying pipe—Schedules Nos. 1 and No. 2	374,000	309,541 03	June 12, 1906	July 28, 1906	83
70W	Walter Wood	Furnishing cast iron pipe	112,000	109,570 66	June 12, 1906	Oct. 26, 1906	100
81	D'Olier Engineering Co	Pumping out Torresdale Conduit	80,000	76,867 68	Oct. 3, 1905	Oct. 20, 1905	100
86	Arthur Koppel Co	Tram track and cars for Torresdale Conduit	4,928	4,835 00	April 26, 1906	May 25, 1906	100

Contracts under Construction and Let during 1907—Continued.

No.	Contractor.	Description.	Limit.	Amount Paid to Dec. 31, '07.	Bids Opened.	Work Begun.	Percentage of Work Done.
89	P. A. Maignen	Completing preliminary filters at Belmont	155,000	122,398 49	Nov. 7, 1906	March 22, 1907	100
90	H. B. Underwood & Co	Repairs to Wetherill Pump at Frankford Station	1,700	1,051 00	Oct. 30, 1906		100
92	Edgemoor Iron Co	Boiler equipment, Lardner's Point Station No. 2	63,000	52,836 93	Nov. 30, 1906	March 26, 1907	100
93	Holly Mfg. Co	Pumping engines, Lardner's Point Station No. 3	600,000	143,323 91	Jan. 4, 1907	March 26, 1907	24
95E	Edge Moor Iron Co	Boiler equipment, Lardner's Point Station No. 3	73,000		Feb. 5, 1907	Aug. 22, 1907	
95F	Edward Fay & Son	Foundations for same	12,000	975 80	Feb. 5, 1907	Nov. 13, 1907	8
95G	Green Fuel Economizer Co	Economizers for same	18,500		Feb. 5, 1907		
96	Just Mfg. Co	Boiler repairs at Frankford Station	3,300	3,299 83	Nov. 22, 1906		100
97	David G. Gray	Completing Main Collectors, Torresdale	5,000	4,591 72	Nov. 14, 1906	Feb. 24, 1907	100
98	Edward Fay & Son	Wooden floor, Lardner's Point Station No. 2	7,500		July 8, 1907	July 23, 1907	100
100	Penn Steel Casting & Machine Co	Furnishing steel castings for Torresdale pipe distribution	2,000	1,464 42	Dec. 19, 1903	March 14, 1907	100
101	Bennis Construction Co	Pipe connections at Torresdale	54,000	53,256 46	Jan. 23, 1907	Jan. 28, 1907	100

Contracts under Construction and Let during 1907—Continued.

No.	Contractor.	Description.	Limit.	Amount Paid to Dec. 31, '07.	Bids Opened.	Work Begun.	Percentage of Work Done.
102	Millard Construction Co	Preliminary Filters at Torresdale	500,000	44,072 14	Aug. 22, 1907	Sept. 24, 1907	9
103B	J. F. Buchanan & Co	Electric wiring, Torresdale Pumping Sta'n	2,500	724 14	May 2, 1907	Aug. 7, 1907	29
103F	Edward Fay & Son	Completing Court No. 3, and interior work at Torresdale Pumping Station	40,000	26,868 62	May 2, 1907	May 27, 1907	67
103W	West End Heating & Engineering Co	Steam heating, Torresdale Pumping Sta'n	5,500	3,048 97	May 2, 1907	Aug. 7, 1907	56
106B	Bennis Construction Co	Wharf, Torresdale, coal handling machinery	36,000	14,967 50	March 28, 1907	July 8, 1907	42
106F	Filbert Paving & Construction Co	Crane and cars for same	10,000		March 28, 1907	July 31, 1907	------
106L	W. W. Lindsay & Co	Coal storage tower for same	28,000	18,779 41	March 28, 1907	May 28, 1907	67
106LB	Link Belt Engineering Co	Coal and ash handling machinery for same	15,000		March 28, 1907	June 27, 1907	------
108M	M. & J. B. McHugh	Roxborough pipe extension, laying pipe	41,000	8,017 95	Aug. 22, 1907	Oct. 15, 1907	20
108W	Walter Wood	Roxborough pipe extension, furnishing pipe	55,000	26,671 30	Aug. 22, 1907	Oct. 22, 1907	48
109	D'Olier Engineering Co	Electric wiring, Torresdale	40,000	2,213 85	Oct. 22, 1907	Dec. 4, 1907	5
110	Dravo, Doyle & Co	Electric machinery, Torresdale Pumping Station	30,000		Aug. 29, 1907	Nov. 27, 1907	------

Contracts under Construction and Let during 1907—Continued.

No.	Contractor.	Description.	Limit.	Amount Paid to Dec. 31, '07.	Bids Opened.	Work Begun.	Percentage of Work Done.
113	H. F. Murphy & Co	Feed water heater, Lardner's Point Station No. 2	2,500		July 8, 1907	Oct. 22, 1907	100
115	Henry Goldner & Son	Closure pieces for steel pipe	3,000	2,260 28	May 16, 1907	May 17, 1907	100
118	Norcross & Edmunds	Filtering materials and under-drains for Torresdale	215,000	161,607 60	May 31, 1907	June 9, 1907	75
119	Dravo, Doyle & Co	Sand washer pumps, Torresdale	8,000		Aug. 29, 1907	Nov. 27, 1907	
120	J. K. Dimmick & Co	Furnishing breeches pipe	1,800	1,292 20	July 8, 1907		100
121	Mack Paving Co	Extension of injection pipe at Lardner's Point	7,000	5,442 05	July 8, 1907	Aug. 8, 1907	100
122	R. A. & J. J. Williams Co.	Furnishing lumber, Torresdale	5,000	4,932 75	July 8, 1907	Sept. 20, 1907	100
123	M. & J. B. McHugh	Furnishing flange pipe	1,500	1,048 70	July 8, 1907		100
124	Chas. F. Felin & Co	Furnishing lumber, Belmont	1,800	1,548 67	July 17, 1907	Aug. 7, 1907	100
125	M. & J. B. McHugh	Restoring sand at Belmont and Upper and Lower Roxborough Filters	13,000	8,799 73	July 17, 1907	Aug. 28, 1907	100
126	Holly Mfg. Co	Pumping engines at Lardner's Point Station No. 3	60,000		Oct. 22, 1907	Dec. 1, 1907	
127	D'Olier Engineering Co	Boilers, Torresdale Pumping Station	25,000		Oct. 22, 1907	Dec. 15, 1907	
128	Allis Chalmers Co	Centrifugal pumping engine for Torresdale Pumping Station	20,000		Oct. 22, 1907		

Contracts under Construction and Let during 1907—Continued.

No.	Contractor.	Description.	Limit.	Amount Paid to Dec. 31, '07.	Bids Opened.	Work Begun.	Percentage of Work Done.
129	J. K. Dimmick & Co	Furnishing special castings and breeches pipe for 1907	7,000	700 08	Aug. 22, 1907		100
131	Millard Construction Co	Third street pipe extension system	100,000	45,622 54	Sept. 17, 1907	Oct. 1, 1907	45
132	Thos. F. Reilly	Sewer connections at Upper Roxborough	16,000	3,875 10	Sept. 17, 1907	Nov. 8, 1907	24
134J	John Jameson & Son	Painting at Lardner's Point Pumping Sta.	800		Oct. 22, 1907	Dec. 5, 1907	100
134JM	H. W. Johns-Manville Co	Magnesia covering at Lardner's Point Station	6,000		Oct. 22, 1907	Dec. 5, 1907	100
84BW	Holly Mfg. Co	Removal of pumping engine from Spring Garden Station	42,000		Dec. 12, 1906		
90BW	Allis Chalmers Co	Six-million-gallon pumping engine for Belmont High Service Pumping Station	36,000		Nov. 4, 1907		
136	Pitometer Co	Furnishing and installing apparatus for measuring discharge of central pumps at Torresdale	3,000		Nov. 21, 1907	Dec. 4, 1907	

Operation of Filters.

Lower Roxborough Filters.

This station consists of a storage reservoir of 12,838,000 gallons capacity, giving a period of 1.4 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 3,206,137,000 gallons of water, or a daily average of 8,785,000 gallons, corresponding to an average rate of 3.3 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 $16,126.72, or $5.03 per million gallons filtered, of which the laboratory cost was $0.51 per million gallons filtered. The laboratory charge was not included in the costs of 1906.

The preliminary filters are operated at rates approximately 35,000,000 gallons per acre per twenty-four hours, and cost $0.40 per million gallons for washing ,and some 20 cents for sponge, making the total cost $0.60 per million gallons filtered. The average reduction in turbidity was 50.3 per cent., and the reduction in bacteria somewhat higher.

The total number of runs or washings of the slow sand filters during the year was 42; an average of eight runs to each filter; the average time between scrapings was 40.8 days, and the average amount filtered between cleanings was 79.6 million gallons, or 143 gallons per acre.

In the following table the costs of scraping, removing and washing the sand in the final filters for the years 1904, 1905, 1906 and 1907 are given.

Cost of Cleaning.

	1907.	1906.	1905.	1904.
Number of runs	42	40	46	26
Average cubic yards of sand scraped, per run	69.28	75.33	66.65	120
Average M. G. filtered, per run	76.91	80.46	75.36	123.7
Average M. G. filtered per acre, per run	143.06	149.18	141.15	233.4
Average cubic yards of sand scraped per million gallons of water filtered	.90	.94	.88	.97
Average cost to scrape per cubic yard of sand	$0.19	$0.18	$0.19	$0.21
Average cost to remove per cubic yard of sand	.24	.26	.25	.27
Average cost to wash per cubic yard of sand	.14	.14	.15	.20
Total cost per cubic yard of sand	.57	.58	.59	.68
Average gallons of water used per cubic yard of sand to remove	1,560	1,645	1,583	1,766
Average gallons of water used per cubic yard of sand to wash	1,596	1,936	1,819	2,501
Average cost per M. G. to scrape, remove and wash sand	$0.52	$0.54	$0.52	$0.67
Cost per M. G. of water to scrape, transport, wash and restore sand	.78	.82	.79	1.13

Average length of runs, 40.82 days.

In the above table no charge is made for interest and depreciation and the cost of water used is taken at $15.00 per million gallons. This is to give a better basis for comparing the costs at the three stations now in operation.

In Filters Nos. 3 and 4, 3,723 cubic yards of sand was replaced at a cost of $0.29 per cubic yard.

Comparing the filtered water and the water flowing from the preliminary filters the reductions for the past year were as follows:

	Per Cent.
Average reduction, turbidity	99.05
Average reduction, bacteria	99.70
Maximum reduction, turbidity	100.00
Maximum reduction, bacteria	99.93
Minimum reduction, turbidity	91.65
Minimum reduction, bacteria	97.13

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	99.69
Average reduction, bacteria	99.91
Maximum reduction, turbidity	100.00
Maximum reduction, bacteria	99.99
Minimum reduction, turbidity	95.45
Minimum reduction, bacteria	96.13

In the following table the results of operation of all the final filters for the year 1907 are given:

Weekly Averages of Bacteria and Turbidity of Filters at Lower Roxborough for Year 1907.

	WEEK ENDING													
	JAN. 5.		JAN. 12.		JAN. 19.		JAN. 26.		FEB. 2.		FEB. 9.		FEB. 16.	
	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.
Applied water	120	17,000	61	9,800	65	15,000	18	4,000	9	6,300	7	21,000	5	53,000
*Pre-Filters	75	11,000	40	7,700	39	9,000	22	4,300	6	3,100	4	16,000	3	38,000
Filter No. 1	0.5	37	0+	19	0+	20	0.5	69	0+	71	0+	22	0+	24
Filter No. 2	0+	36	0.5	31	1	41	0.5	21	0+	13	0+	28	0+	350
Filter No. 3	0.5	67	0+	64	0.5	37	0.5	20	0+	14	0+	46	0+	59
Filter No. 4	1	120	0+	21	0+	24	0.5	76	0.5	320	0+	84	0+	30
Filter No. 5	0+	43	0+	56	1	84	0.5	29	0+	18	0+	14	0+	33
‡Average of Filters	0.5	69	0+	34	0.5	49	0.5	33	0+	89	0+	42	0+	114
Filtered water basin	0.5	†65	0.5	†27	1	†43	0.5	†25	0.5	†16	0+	†16	0+	†23

*Applied to final filters. †Mixed with water from Upper Roxborough Filtered Water Basin. ‡Weighted average.

Lower Roxborough Filters—Continued.

	WEEK ENDING													
	FEB. 23.		MAR. 2.		MAR. 9.		MAR. 16.		MAR. 23.		MAR. 30.		APR. 6.	
	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.
Applied water	5	240,000	5	120,000	31	150,000	75	76,000	99	24,000	22	7,400	14	5,300
*Pre-Filters	3	110,000	2	81,000	17	95,000	41	33,000	65	13,000	15	4,600	8	2,900
Filter No. 1	0+	33	0+	23	0+	170	0.5	1,300	0.5	150	0+	22	0+	12
Filter No. 2	0+	540	0+	25	0+	220	0+	76	0.5	45	0+	22	0+	20
Filter No. 3	0+	59	0+	21	0+	180	0+	180	1	160	0+	44	0+	130
Filter No. 4	0+	250	0+	350	1	6,300	0.5	720	0.5	93	0+	40	0+	84
Filter No. 5	0+	110	0+	34	0+	490	0+	97	0+	17	0+	13	0+	30
‡Average of Filters	0+	207	0+	53	0+	1,816	0+	613	0.5	108	0+	26	0+	48
Filtered water basin	0+	†36	0+	†34	0+	†400	0.5	†240	0.5	†27	0+	†22	0+	†14

*Applied to final filters. †Mixed with water from Upper Roxborough Filtered Water Basin. ‡Weighted average.

Lower Roxborough Filters—Continued.

	WEEK ENDING													
	APR. 13.		APR. 20.		APR. 27.		MAY 4.		MAY 11.		MAY 18.		MAY 25.	
	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.
Applied water	11	6,900	10	7,900	34	14,000	23	6,100	13	6,700	13	8,300	19	7,700
*Pre-Filters	7	3,700	5	4,200	21	8,700	13	4,000	6	4,200	5	5,200	10	4,700
Filter No. 1	0+	21	0+	19	0+	23	0+	14	0+	15	0+	14	0+	25
Filter No. 2	0+	14	0+	21	0+	23	0+	46	0+	28	0+	25	0+	27
Filter No. 3	0+	14	0+	26	0+	70	0+	23	0+	19	0+	19	0+	27
Filter No. 4	0+	48	0+	40	0+	33	0+	40	0+	170	0+	53	0+	60
Filter No. 5	0+	9	0+	12	0+	14	0+	21	0+	24	0+	16	0+	15
‡Average of Filters	0+	17	0+	24	0+	27	0+	27	0+	23	0+	21	0+	28
Filtered water basin	0+	†13	0+	†20	0+	†21	0+	†26	0+	†40	0+	†28	0+	†28

*Applied to final filters. †Mixed with water from Upper Roxborough Filtered Water Basin. ‡Weighted average.

Lower Roxborough Filters—Continued.

	WEEK ENDING													
	JUNE 1.		JUNE 8.		JUNE 15.		JUNE 22.		JUNE 29.		JULY 6.		JULY 13.	
	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.
Applied water	13	6,500	26	8,500	11	5,700	11	4,500	12	3,500	15	3,600	10	2,700
*Pre-Filters	5	3,800	12	3,000	4	2,700	4	2,500	2	1,100	2	1,400	1	1,200
Filter No. 1	0+	26	0+	26	0+	35	0+	34	0+	32	0+	9	0+	3
Filter No. 2	0+	32	0+	58	0+	110	0+	110	0+	21	0+	23	0+	33
Filter No. 3	0+	14	0+	20	0+	28	0+	26	0+	16	0+	88	0+	65
Filter No. 4	0+	24	0+	27	0+	47	0+	20	0+	61	0+	15	0+	8
Filter No. 5	0+	8	0+	12	0+	9	0+	9	0+	7	0+	12	0+	4
‡Average of Filters	0+	20	0+	28	0+	45	0+	31	0+	22	0+	17	0+	15
Filtered water basin	0+	†24	0+	†20	0+	†19	0+	†8	0+	†5	0+	†5	0+	†9

*Applied to final filters. †Mixed with water from Upper Roxborough Filtered Water Basin. ‡Weighted average.

Lower Roxborough Filters—Continued.

	WEEK ENDING													
	JULY 20.		JULY 27.		AUG. 3.		AUG. 10.		AUG. 17.		AUG. 24.		AUG. 31.	
	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.
Applied water	21	5,000	50	13,000	19	5,500	19	8,800	32	9,500	21	3,800	27	13,000
*Pre-Filters	3	900	14	3,000	5	820	5	1,900	10	2,300	4	1,100	8	3,800
Filter No. 1	0+	6	0+	4	0+	5	0+	8	0+	4	0+	4	0+	3
Filter No. 2	0+	35	0+	47	0+	30	0+	2	0+	2	0+	2	0+	2
Filter No. 3	0+	22	0+	13	0+	10	0+	8	0+	8	0+	7	0+	8
Filter No. 4	0+	5	0+	5	0+	4	0+	2	0+	4	0+	5	0+	99
Filter No. 5	0+	4	0+	5	0+	4	0+	2	0+	17	0+	5	0+	4
‡Average of Filters	0+	13	0+	9	0+	7	0+	4	0+	5	0+	4	0+	8
Filtered water basin	0+	†8	0+	†3	0+	†6	0+	†13	0+	†3	0+	†6	0+	†6

*Applied to final filters. †Mixed with water from Upper Roxborough Filtered Water Basin. ‡Weighted average.

Lower Roxborough Filters—Continued.

	WEEK ENDING													
	SEPT. 7.		SEPT. 14.		SEPT. 21.		SEPT. 28.		OCT. 5.		OCT. 12.		OCT. 19.	
	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.
Applied water	19	9,300	26	17,000	26	18,000	100	13,000	53	9,500	31	11,000	18	11,000
*Pre-Filters	5	3,500	10	5,700	12	6,200	55	4,500	34	4,700	17	5,300	7	4,000
Filter No. 1	0+	4	0+	2	0+	29	0.5	26	0.5	35	0+	10	0+	8
Filter No. 2	0+	3	0+	26	0+	19	0+	11	0.5	26	0+	9	0+	5
Filter No. 3	0+	19	0+	26	0+	9	0+	9	0.5	19	------	------	------	------
Filter No. 4	0+	18	0+	7	0+	9	------	------	------	------	0+	1,500	0+	203
Filter No. 5	0+	3	0+	2	0+	3	0+	4	0.5	11	0+	10	0+	3
‡Average of Filters	0+	8	0+	8	0+	11	0+	13	0.5	27	0+	32	0+	42
Filtered water basin	0+	†5	0+	†3	0+	†6	0+	†8	0+	†26	0+	†24	0+	†31

‡Weighted average. †Mixed with water from Upper Roxborough Filtered Water Basin. *Applied to final filters.

Lower Roxborough Filters—Continued.

	WEEK ENDING													
	Oct. 26.		Nov. 2.		Nov. 9.		Nov. 16.		Nov. 23.		Nov. 30.		Dec. 7.	
	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.
Applied water	11	5,800	37	39,000	110	46,000	27	16,000	21	35,000	36	40,000	7	14,000
*Pre-Filters	5	4,000	22	14,000	73	25,000	18	9,200	12	16,000	22	21,000	4	8,100
Filter No. 1	0+	8	0.5	360	1	93	2	91	0+	49	0.5	54	0+	21
Filter No. 2	0+	31	0.5	120	0.5	46	0.5	33	0+	25	1	280	0.5	110
Filter No. 3	0+	400	1	160	1	54	1	34	0.5	60	0.5	43	0+	31
Filter No. 4	0+	29	0.5	91	1	48	1	32	0.5	88	1	53	0+	31
Filter No. 5	0+	5	0+	7	0+	8	0.5	59	.0.5	140	1	90	0+	21
‡Average of Filters	0+	41	0.5	110	0.5	56	1	56	0.5	83	1	66	0+	39
Filtered water basin	0+	†57	0+	†120	1	†87	1	†58	0.5	†33	0.5	†49	0+	†40

*Applied to final filters. †Mixed with water from Upper Roxborough Filtered Water Basin. ‡Weighted average.

Lower Roxborough Filters—Continued.

	WEEK ENDING						AVERAGES FOR THE YEAR.	
	DEC. 14.		DEC. 21.		DEC. 28.			
	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.
Applied water	100	28,000	40	16,000	110	31,000	34	24,380
*Pre-Filters	63	17,000	24	11,000	68	15,000	18	12,780
Filter No. 1	0.5	420	1	660	2	240	0+	85
Filter No. 2	1	200	0.5	63	0.5	69	0+	62
Filter No. 3	0.5	220	0.5	63	0.5	55	0+	56
Filter No. 4	0.5	93	0+	45	0+	37	0+	231
Filter No. 5	0+	53	0+	27	2	660	0+	46
‡Average of Filters	0.5	143	0.5	184	1	220	0+	93
Filtered water basin	0.5	†40	0+	†49	1	†51	0+	38

*Applied to final filters. †Mixed with water from Upper Roxborough Filtered Water Basin. ‡Weighted average.

Upper Roxborough Filters.

This station consists of a storage reservoir of 147,032,000 gallons capacity, giving a period of about ten 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 3,843,070,000 gallons of water; an average of 10,529,000 gallons per day, corresponding to an average rate of 1.9 million gallons per acre per day. These filters have a capacity at a rate of 3,000,000 gallons per acre per day of 20,000,000 gallons, but owing to insufficient pumping machinery and distributing mains, and also its high location, the output has been restricted to the above mentioned amount. A new pump is being installed; specifications are being prepared for two others, and additional mains are being laid, and by May 1st the territory supplied from this station will be enlarged.

The above increase in capacity will also greatly reduce the cost per million gallons of water filtered.

The total cost of operation was $20,926.49, or $5.44 per million gallons, of which the laboratory cost was $0.50 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 the cost of operation of filters for 1906, the laboratory expenses were not included.

In the following tables are given the average costs of scraping, removing and washing sand for the years 1904, 1905, 1906 and 1907.

Cost of Cleaning.

	1907.	1906.	1905.	1904.
Number of runs	35	39	35	43
Average cubic yards of sand scraped per run	111.57	111.36	85.05	117.75
Average M. G. filtered per run	110.67	110.40	105.90	78.34
Average M. G. filtered per acre per run	154.44	156.45	151.00	108.93
Average cubic yards of sand scraped per M. G. of water filtered	1.01	1.01	0.80	1.50
Average cost to scrape per cubic yard of sand	$0 16	$0 16	$0 18	$0 26
Average cost to remove per cubic yard of sand	18	19	22	30
Average cost to wash per cubic yard of sand	07	07	09	15
Total cost per cubic yard of sand	41	42	49	71
Average gallons of water used per cubic yard of sand to remove	1,275	1,464	1,518	1,874
Average gallons of water used per cubic yard of sand to wash	1,305	1,433	1,526	1,443
Average cost per M. G. to scrape, transport, wash and restore sand	$0 79	$0 83	$0 63	$1 85
Average length of runs, 80.44 days.				

In this no charge is made for interest and depreciation and water is taken at $15.00 per million gallons.

In filters Nos. 1, 3 and 8, 5,577 cubic yards of sand were replaced at a cost of $0.375 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	99.33
Average reduction, bacteria	98.46
Maximum reduction, turbidity	100.00
Maximum reduction, bacteria	99.76
Minimum reduction, turbidity	92.85
Minimum reduction, bacteria	86.48

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

	Per Cent.
Average reduction, turbidity	99.82
Average reduction, bacteria	99.92
Maximum reduction, turbidity	100.00
Maximum reduction, bacteria	99.99
Minimum reduction, turbidity	93.75
Minmum reduction, bacteria	99.39

The total number of runs or cleanings during the year was 35; an average of four runs to each filter; the average time between scrapings being 80.4 days. The average amount filtered between cleanings was 110.7 million gallons, or 154.4 million gallons per acre.

In the following tables are given the results of operation of all the filters for the year 1907:

Weekly Averages of Bacteria and Turbidity of Filters at Upper Roxborough, for the Year 1907.

	WEEK ENDING													
	JAN. 5.		JAN. 12.		JAN. 19.		JAN. 26.		FEB. 2.		FEB. 9.		FEB. 16.	
	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.
Applied water	20	1,600	40	1,600	43	2,300	30	2,300	18	690	7	840	7	3,600
Filter No. 1	0.5	110	2	53	2	48	2	36	1	17	0.5	18	0+	20
Filter No. 2	0+	21	0+	13	0.5	15	1	22	0.5	12	0+	12	0+	17
Filter No. 3	0.5	38	0.5	11	0.5	13	1	18	0.5	11	0.5	10	0+	17
Filter No. 4	0+	21	0+	11	0+	13	0.5	16	0.5	11	0.5	28	0.5	40
Filter No. 5	0+	27	0+	10	0.5	12	1	23	0.5	10	0+	14	0+	28
Filter No. 6	0.5	29	0.5	12	0.5	14	1	18	0.5	11	0+	10	0+	8
Filter No. 7	0.5	21	0.5	14	0.5	12	0.5	17	0.5	11	0+	14	0+	27
Filter No. 8	0+	26	0.5	16	0.5	14	0.5	17	0.5	11	0+	11	0+	23
‡Average of Filters	0+	35	0.5	20	0.5	19	1	22	0.5	12	0+	14	0+	20
Filtered water basin	0.5	35	0.5	17	0.5	19	1	27	0.5	14	0.5	15	0+	22

‡Weighted average.

Upper Roxborough Filters—Continued.

	WEEK ENDING													
	FEB. 23.		MAR. 2.		MAR. 9.		MAR. 16.		MAR. 23.		MAR. 30.		APR. 6.	
	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.
Applied water	6	14,000	4	12,000	12	17,000	20	7,600	32	2,700	24	940	14	330
Filter No. 1	0+	26	0+	14	0+	18	0+	67	0+	15	0+	11	0+	14
Filter No. 2	0+	32	0+	20	0+	33	0.5	300	1	62	0+	16	0+	11
Filter No. 3	0+	18	0+	18	0+	23	0+	22	0+	7	0.5	19	0+	7
Filter No. 4	0+	97	0+	57	0+	43	0+	37	0+	9	0+	15	0+	12
Filter No. 5	0+	48	0+	120	0+	2,100	1	470	0.5	16	0+	12	0+	16
Filter No. 6	0+	19	0+	19	0+	26	0+	84	0+	11	0+	11	0+	20
Filter No. 7	0+	69	0+	70	0+	130	0+	90	0.5	14	0.5	13	0+	20
Filter No. 8	0+	83	0+	69	0+	210	0.5	110	0+	20	1	35	0+	15
‡Average of Filters	0+	42	0+	36	0+	501	0+	178	0+	22	0+	15	0+	13
Filtered water basin	0+	39	0+	29	0+	330	0+	150	0.5	27	0+	16	0+	14

‡Weighted average.

Upper Roxborough Filters—Continued.

	WEEK ENDING													
	APRIL 13.		APRIL 20.		APRIL 27.		MAY 4.		MAY 11.		MAY 18.		MAY 25.	
	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.
Applied water	12	340	11	780	11	970	12	910	6	370	6	550	7	380
Filter No. 1	0+	11	0+	10	0+	15	0+	14	0+	14	0+	19	0+	24
Filter No. 2	0+	6	0+	8	0+	11	0+	17	0+	26	0+	20	0+	22
Filter No. 3	0+	5	0+	12	0+	17	0+	30	0+	47	0+	85	0+	110
Filter No. 4	0+	18	0+	24	0+	26	0+	30	0+	30	0+	20	0+	18
Filter No. 5	0+	27	0+	46	0+	48	0+	86	0+	83	0+	69	0+	43
Filter No. 6	0+	9	0+	12	0+	13	0+	21	0+	37	0+	36	0+	27
Filter No. 7	0+	21	0+	25	0+	20	0+	22	0+	27	0+	13	0+	16
Filter No. 8	0+	12	0+	13	0+	17	0+	38	0+	84	0+	52	0+	33
‡Average of Filters	0+	12	0+	19	0+	21	0+	33	0+	43	0+	28	0+	28
Filtered water basin	0+	12	0+	19	0+	25	0+	32	0+	40	0+	29	0+	26

‡Weighted average.

Upper Roxborough Filters—Continued.

	WEEK ENDING													
	JUNE 1.		JUNE 8.		JUNE 15.		JUNE 22.		JUNE 29.		JULY 6.		JULY 13.	
	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.
Applied water	9	350	13	420	11	370	9	460	9	860	9	680	7	350
Filter No. 1	0+	20	0+	27	0+	38	0+	28	0+	11	0+	15	0+	6
Filter No. 2	0+	23	0+	18	0+	14	0+	7	0+	6	0+	6	0+	7
Filter No. 3	0+	17	0+	21	0+	20	0+	14	0+	8	0+	9	0+	6
Filter No. 4	0+	26	0+	26	0+	27	0+	15	0+	7	0+	8	0+	18
Filter No. 5	0+	17	0+	13	0+	16	0+	12	0+	8	0+	23	0+	10
Filter No. 6	0+	17	0+	14	0+	12	0+	10	0+	8	0+	9	0+	7
Filter No. 7	0+	13	0+	15	0+	15	0+	17	0+	11	0+	24	0+	19
Filter No. 8	0+	20	0+	22	0+	19	0+	11	0+	7	0+	11	0+	11
‡Average of Filters	0+	19	0+	19	0+	20	0+	14	0+	8	0+	13	0+	10
Filtered water basin	0+	24	0+	20	0+	20	0+	12	0+	10	0+	12	0+	14

‡Weighted average.

Upper Roxborough Filters—Continued.

	WEEK ENDING													
	JULY 20.		JULY 27.		AUG. 3.		AUG. 10.		AUG. 17.		AUG. 24.		AUG. 31.	
	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.
Applied water	8	480	11	570	14	290	11	290	17	390	12	300	15	430
Filter No. 1	0+	11	0+	9	0+	7	0+	3	0+	4	0+	54	0+	12
Filter No. 2	0+	12	0+	3	0+	2	0+	2	0+	5	0+	5	0+	38
Filter No. 3	0+	6	0+	10	0+	2	0+	2	0+	3	0+	3	0+	5
Filter No. 4	0+	4	0+	4	0+	3	0+	11	0+	3	0+	2	0+	4
Filter No. 5	0+	6	0+	7	0+	9	0+	18	0+	14	0+	4	0+	3
Filter No. 6	0+	6	0+	4	0.5	8	0+	3	0+	2	0+	5	0+	4
Filter No. 7	0+	14	0+	7	1	47	0+	6	0+	5	0+	9	0+	23
Filter No. 8	0+	41	0+	10	0+	4	0+	4	0+	7	0+	11	0+	5
‡Average of Filters	0+	8	0+	7	0+	5	0+	4	0+	4	0+	6	0+	7
Filtered water basin	0+	19	0+	7	0+	7	0+	6	0+	4	0+	11	0+	13

‡Weighted average.

Upper Roxborough Filters—Continued.

	WEEK ENDING													
	SEPT. 7.		SEPT. 14.		SEPT. 21.		SEPT. 28.		OCT. 5.		OCT. 12.		OCT. 19.	
	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.
Applied water	16	390	13	560	13	670	20	760	25	820	23	830	19	1,000
Filter No. 1	0+	3	0+	3	0+	3	0+	9	0+	15	0+	10	0+	7
Filter No. 2	0+	5	0+	3	0+	2	0+	3	0+	3	0+	3	0+	2
Filter No. 3	0+	4	0+	5	0+	5	0+	10	0+	18	0+	11	0+	8
Filter No. 4	0+	6	0+	14	0+	17	0+	7	0+	3	0+	4	0+	3
Filter No. 5	0+	5	0+	5	0+	15	0+	25	0+	10	0+	13	0+	23
Filter No. 6	0+	4	0+	2	0+	5	0+	15	0+	16	0+	11	0+	4
Filter No. 7	0+	8	0+	6	0+	13	0+	15	0.5	30	0.5	25	0+	9
Filter No. 8	0+	6	0+	9	0+	18	0+	28	0+	19	0+	18	--------	--------
‡Average of Filters	0+	5	0+	4	0+	8	0+	13	0+	12	0+	12	0+	8
Filtered water basin	0+	9	0+	5	0+	6	0+	13	0+	14	0+	11	0+	9

‡Weighted average.

Upper Roxborough Filters—Continued.

	WEEK ENDING													
	Oct. 26.		Nov. 2.		Nov. 9.		Nov. 16.		Nov. 23.		Nov. 30.		Dec. 7.	
	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.
Applied water	7	350	7	1,000	18	3,000	24	3,000	10	1,500	7	870	7	1,700
Filter No. 1	0+	5	0+	7	-------	-------	-------	-------	-------	-------	0+	610	0+	260
Filter No. 2	0+	3	0+	2	0+	24	0.5	33	0+	20	0+	11	0+	11
Filter No. 3	0+	10	-------	-------	-------	-------	0.5	370	0.5	170	0+	52	0.5	51
Filter No. 4	0+	8	0+	6	0+	8	0+	10	0+	10	0+	5	0+	11
Filter No. 5	0+	5	0+	3	0+	8	0+	9	0+	11	0+	5	0+	15
Filter No. 6	0+	5	0+	15	0+	11	0+	13	0+	10	0+	8	0+	11
Filter No. 7	0+	6	0+	10	0+	22	0+	21	0+	30	0+	32	0+	67
Filter No. 8	-------	-------	**0+**	**650**	**0+**	**170**	**0.5**	**43**	**0+**	**39**	**0+**	**13**	**0+**	**15**
‡Average of Filters	**0+**	**5**	**0+**	**39**	**0+**	**40**	**0+**	**33**	**0+**	**28**	**0+**	**34**	**0+**	**42**
Filtered water basin	**0+**	**7**	**0+**	**41**	**+0**	**94**	**0+**	**52**	**0+**	**40**	**0+**	**68**	**0+**	**43**

‡Weighted average.

Upper Roxborough Filters—Continued.

	WEEK ENDING						AVERAGES FOR THE YEAR.	
	DEC. 14.		DEC. 21.		DEC. 28.			
	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.
Applied water	13	3,300	32	3,200	38	5,300	15	2,090
Filter No. 1	0.5	140	0.5	110	0.5	82	0+	43
Filter No. 2	0+	14	0+	17	0+	31	0+	20
Filter No. 3	0+	26	0+	34	0.5	41	0+	29
Filter No. 4	0+	17	0+	19	0+	32	0+	18
Filter No. 5	0+	22	0+	48	0.5	130	0+	73
Filter No. 6	0+	19	0+	24	0.5	42	0+	15
Filter No. 7	0.5	61	0+	84	0.5	110	0+	28
Filter No. 8	0+	20	0+	19	0+	26	0+	44
‡Average of Filters	0+	39	0+	45	0.5	57	0+	38
Filtered water basin	0+	39	0+	49	0.5	55	0+	32

‡Weighted average.

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 with 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 11,769,678,000 gallons, at an average yield of 32,246,000 gallons per day, corresponding to an average rate of 2.44 million gallons per acre per twenty-four hours.

The maximum amount of water filtered without the use of the preliminary filters in any one day was 39.6 million gallons, and the filters delivered on many occasions, in fact whenever required, 36 million gallons per day.

The preliminary filters were started on October 23, 1907. They are operated at a rate of 40 million 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.

Filter No. 4 is being operated at a six million gallon rate per acre with satisfactory results. The first run at the six million rate has not ended, and the time has been too short to give data on operation. The reduction in turbidity and bacteria of the effluent from the preliminary filters has been 60 and 70 per cent. respectively.

Owing to the short time the preliminary filters have been in service no cost of operation can be given. The total cost of operation for the year was $47,843.30, or $4.06 per million gallons filtered, which includes a laboratory cost of $0.51 per million gallons.

There were 197 runs or cleanings during the year; an average of eleven cleanings for each filter; the average length of run was 28.9 days, and the average amount filtered between cleanings was 59.7 million gallons, or 75.6 million gallons per acre.

During the year filtered water was also stored in the George's Hill reservoir, which has a capacity of 39,758,000 gallons. This reservoir is not covered, and determinations made weekly failed to show any ill effects from this open storage.

In the following table are given the average cost of scraping, removing and washing sand for the years 1904, 1905, 1906 and 1907:

Cost of Cleaning.

	1907.	1906.	1905.	1904.
Number of runs	197	116	154	66
Average cubic yards of sand scraped per run	97.11	124.50	98.61	124.10
Average million gallons filtered per run	55.92	79.25	62.87	76.56
Average million gallons filtered per acre per run	75.61	107.76	85.54	104.87
Average cubic yards of sand scraped, per M. G. of water filtered	1.74	1.57	1.57	1.62
Average cost to scrape per cubic yard of sand	$0 23	$0 17	$0 21	$0 27
Average cost to remove per cubic yard of sand	17	17	23	28
Average cost to wash per cubic yard of sand	07	07	09	12
Total cost per cubic yard of sand	47	41	53	67
Average gallons of water used per cubic yard of sand to remove	1,265	1,346	1,608	1,881
Average gallons of water used per cubic yard of sand to wash	1,392	1,581	1,933	1,718
Average cost per M. G. to scrape, remove and wash	$0 81	$0 64	$0 83	$1 09
Cost per M. G. of water filtered to scrape, transport, wash and restore sand	1 28	1 11	1 26	1 89

The filters for 31 of these runs were washed by the Brooklyn method.

In this table no charge is made for interest and depreciation, and the water is taken at $15.00 per million gallons.

Filters Nos. 2, 3, 4, 6, 7, 10, 12, 15, 17 and 18 were resanded during the year by contract at a cost of $0.2675 per cubic yard.

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

	Per Cent.
Average reduction, turbidity	98.97
Average reduction, bacteria	99.39
Maximum reduction, turbidity	100.00
Maximum reduction, bacteria	99.91
Minimum reduction, turbidity	83.35
Minimum reduction, bacteria	94.64

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

	Per Cent.
Average reduction, turbidity	99.46
Average reduction, bacteria	99.50
Maximum reduction, turbidity	100.00
Maximum reduction, bacteria	99.96
Minimum reduction, turbidity	88.90
Minimum reduction, bacteria	97.61

In the following table are given the results of operation for all the filters for the year 1907:

Weekly Averages of Bacteria and Turbidity of Final Filters at Belmont, for the Year 1907.

	WEEK ENDING													
	JAN. 5.		JAN. 12.		JAN. 19.		JAN. 26.		FEB. 2.		FEB. 9.		FEB. 16.	
	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.
Applied water	110	13,000	50	7,700	63	11,000	29	8,400	9	5,900	6	12,000	5	60,000
Filter No. 1	0+	31	0+	17	1	61	0+	38	0+	62	0+	53	0+	79
Filter No. 2	0.5	47	0.5	23	1	65	1	52	0+	28	0+	54	0+	100
Filter No. 3	0.5	42	0.5	24	0.5	86	1	110	0.5	76	0+	37	0+	89
Filter No. 4	0.5	71	0.5	45	1	110	1	70	0.5	36	0+	25	0+	59
Filter No. 5	0+	32	0+	30	0+	46	0.5	80	0.5	36	0+	25	0+	38
Filter No. 6	0.5	71	0.5	99	1	230	1	120	0.5	43	0+	28	0+	160
Filter No. 7	0+	39	0+	32	1	58	0.5	27	0+	21	0+	18	0+	890
Filter No. 8	0.5	36	0+	22	0+	39	0.5	31	0+	19	0+	17	0+	32
Filter No. 9	0.5	46	0.5	21	1	43	0.5	24	0+	20	0+	21	0+	170
Filter No. 10	0.5	56	0.5	20	1	49	0.5	28	0+	40	0+	26	0+	51
Filter No. 11	1	100	0.5	19	1	30	0.5	23	0+	25	0+	19	0+	190
Filter No. 12	1	140	1	52	3	140	1	84	0.5	42	0+	63	0.5	1,200
Filter No. 13	0+	40	0+	28	1	41	0.5	31	0+	24	0+	45	0+	460
Filter No. 14	0+	43	0+	40	1	53	0.5	29	0.5	23	0+	21	0+	55
Filter No. 15	1	72	0.5	31	2	110	1	88	0.5	38	0+	20	0+	45

Belmont Final Filters—Continued.

	WEEK ENDING													
	JAN. 5.		JAN. 12.		JAN. 19.		JAN. 26.		FEB. 2.		FEB. 9.		FEB. 16.	
	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.
Filter No. 16	0.5	62	0+	25	1	41	0.5	24	0.5	17	0+	18	0+	60
Filter No. 17	0.5	58	0+	28	1	45	0.5	19	0.5	13	0+	14	0+	46
Filter No. 18	0.5	46	0.5	31	2	51	1	36	0.5	18	0+	24	0+	44
Average of Filters	0.5	57	0.5	32	1	72	1	51	0.5	32	0+	29	0+	209
Filtered water basin	0.5	51	0.5	23	1	70	1	55	0.5	31	0+	36	0+	320

Belmont Final Filters—Continued.

	WEEK ENDING													
	FEB. 23.		MAR. 2.		MAR. 9.		MAR. 16.		MAR. 23.		MAR. 30.		APR. 6.	
	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.
Applied water	5	360,000	5	110,000	27	170,000	51	68,000	110	27,000	22	5,200	13	6,200
Filter No. 1	0+	46	0+	170	0+	1,400	0+	120	0+	28	0+	23	0+	28
Filter No. 2	0+	300	0+	44	0.5	1,400	0.5	520	0.5	53	0.5	40	0+	71
Filter No. 3	0+	1,400	0+	800	0.5	640	0+	77	0.5	39	0+	25	0+	36
Filter No. 4	0+	210	0+	130	0.5	3,600	0.5	320	0.5	43	0+	32	0+	64
Filter No. 5	0+	310	0+	220	0+	280	0+	46	0.5	23	0+	23	0+	28
Filter No. 6	0+	3,600	0+	220	0+	230	1	400	2	170	0.5	54	0+	82
Filter No. 7	0+	3,300	0+	100	0+	56	0.5	500	1	62	0+	22	0+	32
Filter No. 8	0+	45	0+	19	0.5	2,500	0.5	610	0.5	35	0+	27	0+	65
Filter No. 9	0+	230	0+	52	0.5	1,600	0.5	370	0.5	35	0+	39	0+	49
Filter No. 10	0+	50	0+	24	0+	550	1	1,700	1	84	0+	21	0+	34
Filter No. 11	0+	290	0+	35	0+	840	1	750	0.5	38	0+	16	0+	16
Filter No. 12	0+	2,700	0+	250	0+	230	0.5	81	1	69	0.5	23	0+	34
Filter No. 13	0+	520	0+	530	0+	400	0+	140	0+	23	0+	17	0+	12
Filter No. 14	0+	62	0+	200	0+	720	0+	79	0+	34	0+	20	0+	15
Filter No. 15	0+	65	0+	2,100	0.5	1,500	0.5	93	0.5	30	0.5	24	0+	33

Belmont Final Filters—Continued.

	WEEK ENDING													
	FEB. 23.		MAR. 2.		MAR. 9.		MAR. 16.		MAR. 23.		MAR. 30.		APR. 6.	
	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.
Filter No. 16	0+	350	0+	120	0+	99	0+	92	1	110	0+	13	0+	17
Filter No. 17	0+	79	0+	340	0.5	1,200	0+	110	0.5	22	0+	14	0+	13
Filter No. 18	0+	2,000	0+	510	0+	260	0.5	69	0.5	30	0.5	19	0+	19
Average of Filters	0+	864	0+	326	0+	973	0.5	337	0.5	51	0+	25	0+	36
Filtered water basin	0+	1,500	0+	560	0.5	1,300	0.5	390	1	44	0+	21	0+	32

Belmont Final Filters—Continued.

	WEEK ENDING													
	APRIL 13.		APRIL 20.		APRIL 27.		MAY 4.		MAY 11.		MAY 18.		MAY 25.	
	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.
Applied water	11	3,700	9	5,900	25	11,000	30	4,100	15	6,000	15	5,000	24	8,400
Filter No. 1	0+	52	0+	43	0+	56	0+	67	0+	140	0+	66	0+	32
Filter No. 2	0+	40	0+	53	0+	57	0+	64	0+	90	0+	170	0+	45
Filter No. 3	0+	28	0+	47	0+	59	0+	110	0+	86	0+	65	0+	80
Filter No. 4	0+	52	0+	38	0+	37	0+	57	0+	47	0+	130	0+	51
Filter No. 5	0+	36	0+	58	0+	68	0+	76	0+	79	0+	94	0+	120
Filter No. 6	0+	140	0+	140	0+	150	0+	160	0+	84	0+	170	0+	140
Filter No. 7	0+	69	0+	49	0+	53	0+	81	0+	86	0+	180	0+	62
Filter No. 8	0+	30	0+	35	0+	49	0+	77	0+	85	0+	84	0+	50
Filter No. 9	0+	30	0+	34	0+	44	0+	73	0+	160	0+	60	0+	49
Filter No. 10	0+	66	0+	66	0+	62	0+	110	0+	110	0+	110	0+	79
Filter No. 11	0+	19	0+	32	0+	61	0+	140	0+	150	0+	250	0+	130
Filter No. 12	0+	52	0+	100	0+	160	0+	320	0+	250	0+	280	0+	250
Filter No. 13	0+	13	0+	11	0+	16	0+	22	0+	27	0+	38	0+	80
Filter No. 14	0+	19	0+	18	0+	29	0+	60	0+	46	0+	25	0+	40
Filter No. 15	0+	49	0+	54	0+	94	0+	150	0+	130	0+	94	0+	130

Belmont Final Filters—Continued.

	WEEK ENDING													
	APRIL 13.		APRIL 20.		APRIL 27.		MAY 4.		MAY 11.		MAY 18.		MAY 25.	
	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.
Filter No. 16	0+	12	0+	25	0+	48	0+	130	0+	110	0+	150	0+	130
Filter No. 17	0+	12	0+	22	0+	69	0+	140	0+	270	0+	190	0+	110
Filter No. 18	0+	13	0+	14	0+	26	0+	100	0+	130	0+	140	0+	94
Average of Filters	0+	41	0+	47	0+	63	0+	108	0+	115	0+	127	0+	93
Filtered water basin	0+	44	0+	44	0+	63	0+	130	0+	120	0+	100	0+	75

Belmont Final Filters—Continued.

	WEEK ENDING													
	JUNE 1.		JUNE 8.		JUNE 15.		JUNE 22.		JUNE 29.		JULY 6.		JULY 13.	
	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.
Applied water	17	5,500	23	3,700	13	2,000	14	2,200	17	1,100	14	1,700	14	1,500
Filter No. 1	0+	37	0+	35	0+	44	0+	42	0+	77	0+	8	0+	24
Filter No. 2	0+	39	0+	47	0+	49	0+	32	0+	36	0+	200	0+	7
Filter No. 3	0+	45	0+	57	0+	230	0+	140	0+	22	0+	72	0+	6
Filter No. 4	0+	39	0+	43	0+	43	0+	42	0+	130	0+	16	0+	14
Filter No. 5	0+	32	0+	30	0+	50	0+	61	0+	91	0+	38	0+	5
Filter No. 6	0+	110	0+	110	0+	100	0+	75	0+	140	0+	220	0+	16
Filter No. 7	0+	39	0+	41	0+	45	0+	38	0+	27	0+	10	0+	30
Filter No. 8	0+	34	0+	38	0+	35	0+	33	0+	79	0+	9	0+	10
Filter No. 9	0+	39	0+	41	0+	46	0+	35	0+	68	0+	8	0+	7
Filter No. 10	0+	47	0+	49	0+	54	0+	49	0+	24	0+	42	0+	21
Filter No. 11	0+	62	0+	49	0+	66	0+	39	0+	74	0+	260	0+	33
Filter No. 12	0+	90	0+	75	0+	110	0+	100	0+	86	0+	37	0+	68
Filter No. 13	0+	38	0+	33	0+	37	0+	26	0+	35	0+	25	0+	7
Filter No. 14	0+	32	0+	130	0+	120	0+	36	0+	35	0+	6	0+	6
Filter No. 15	0+	65	0+	63	0+	83	0+	160	0+	30	0+	180	0+	32

Belmont Final Filters—Continued.

	WEEK ENDING													
	JUNE 1.		JUNE 8.		JUNE 15.		JUNE 22.		JUNE 29.		JULY 6.		JULY 13.	
	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.
Filter No. 16	0+	300	0+	100	0+	61	0+	41	0+	21	0+	20	0+	10
Filter No. 17	0+	110	0+	88	0+	100	0+	99	0+	26	0+	300	0+	14
Filter No. 18	0+	78	0+	59	0+	120	0+	82	0+	48	0+	82	0+	18
Average of Filters	0+	69	0+	60	0+	77	0+	63	0+	59	0+	85	0+	18
Filtered water basin	0+	65	0+	58	0+	72	0+	47	0+	59	0+	54	0+	23

Belmont Final Filters—Continued.

	WEEK ENDING													
	JULY 20.		JULY 27.		AUG. 3.		AUG. 10.		AUG. 17.		AUG. 24.		AUG. 31.	
	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.
Applied water	20	1,000	37	2,300	17	420	16	410	30	1,400	22	330	26	1,200
Filter No. 1	0+	7	0+	4	0+	2	0+	4	0+	2	0+	3	0+	16
Filter No. 2	0+	6	0+	9	0+	4	0+	5	0+	7	0+	3	0+	5
Filter No. 3	0+	30	0+	13	0+	11	0+	31	0+	34	0+	5	0+	4
Filter No. 4	0+	13	0+	7	0+	11	0+	48	0+	13	0+	8	0+	62
Filter No. 5	0+	5	0+	7	0+	4	0+	8	0+	3	0+	3	0+	10
Filter No. 6	0+	18	0+	56	0+	11	0+	5	0+	19	0+	9	0+	9
Filter No. 7	0+	7	0+	7	0+	20	0+	6	0+	4	0+	7	0+	5
Filter No. 8	0+	7	0+	7	0+	5	0+	6	0+	4	0+	3	0+	9
Filter No. 9	0+	37	0+	5	0+	4	0+	3	0+	4	0+	6	0+	8
Filter No. 10	0+	5	0+	16	0+	6	0+	6	0+	4	0+	3	0+	7
Filter No. 11	0+	9	0+	7	0+	57	0+	5	0+	4	0+	300	0+	39
Filter No. 12	0+	26	0+	14	0+	14	0+	18	0+	30	0+	11	0+	15
Filter No. 13	0+	11	0+	13	0+	6	0+	4	0+	6	0+	4	0+	5
Filter No. 14	0+	7	0+	6	0+	5	0+	2	0+	3	0+	3	0+	6
Filter No. 15	0+	15	0+	18	0+	14	0+	22	0+	6	0+	8	------	------

Belmont Final Filters—Continued.

	WEEK ENDING													
	JULY 20.		JULY 27.		AUG. 3.		AUG. 10.		AUG. 17.		AUG. 24.		AUG. 31.	
	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.
Filter No. 16	0+	9	0+	7	0+	8	0+	4	0+	4	0+	6	0+	7
Filter No. 17	0+	7	0+	14	0+	7	0+	7	0+	8	0+	7	0+	9
Filter No. 18	0+	12	0+	34	0+	9	0+	4	0+	12	0+	7	0+	15
Average of Filters	0+	13	0+	14	0+	11	0+	10	0+	9	0+	22	0+	13
Filtered water basin	0+	12	0+	10	0+	5	0+	6	0+	9	0+	15	0+	10

Belmont Final Filters—Continued.

	WEEK ENDING													
	SEPT. 7.		SEPT. 14.		SEPT. 21.		SEPT. 28.		OCT. 5.		OCT. 12.		OCT. 19.	
	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.
Applied water	20	800	23	2,700	28	4,800	81	7,200	58	11,000	28	6,900	22	9,500
Filter No. 1	0+	5	0+	4	0+	13	0.5	71	0.5	37	0+	9	0+	8
Filter No. 2	0+	5	0+	3	0+	8	0+	12	0.5	18	0+	11	0+	29
Filter No. 3	0+	13	0+	6	0+	23	0+	25	0.5	28	0+	21	0+	15
Filter No. 4	0+	10	0+	10	0+	19	2	150	1	58	0+	21	0+	21
Filter No. 5	0+	4	0+	3	0+	110	0+	12	0.5	39	0+	13	0+	12
Filter No. 6	0+	16	0+	9	0+	14	------	------	0.5	390	0+	26	0+	15
Filter No. 7	0+	4	0+	20	0+	9	0+	12	0.5	31	0+	39	0+	17
Filter No. 8	0+	4	0+	4	0+	12	0+	7	0.5	19	0+	9	0.5	150
Filter No. 9	0+	5	0+	4	0+	10	0+	7	0.5	18	0.5	110	0.5	110
Filter No. 10	0+	8	0+	8	0+	19	0+	15	1	33	------	------	------	------
Filter No. 11	0+	10	0+	5	0+	6	0+	6	0	36	0+	7	0+	5
Filter No. 12	0+	22	0+	8	0+	12	0+	14	------	------	0+	1,600	0.5	150
Filter No. 13	0+	7	0+	8	0+	5	0+	7	0+	190	0+	47	0+	12
Filter No. 14	0+	5	0+	4	0+	5	0+	6	0.5	19	0+	7	0+	9
Filter No. 15	------	------	0+	990	0+	51	0.5	18	0.5	24	0+	14	0+	47

Belmont Final Filters—Continued.

	WEEK ENDING													
	SEPT. 7.		SEPT. 14.		SEPT. 21.		SEPT. 28.		OCT. 5.		OCT. 12.		OCT. 19.	
	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.
Filter No. 16	0+	8	0+	5	0+	13	0+	10	0+	22	0+	12	0+	24
Filter No. 17	0+	24	0+	12	0+	17	0.5	99	0.5	29	0+	11	0+	8
Filter No. 18	0+	23	-------	-------	-------	-------	0.5	310	0.5	31	0+	12	0+	11
Average of Filters	0+	10	0+	65	0+	20	0+	46	0.5	60	0+	116	0+	38
Filtered water basin	0+	8	0+	8	0+	21	0.5	26	0.5	37	0+	23	0+	32

Belmont Final Filters—Continued.

	WEEK ENDING													
	Oct. 26.		Nov. 2.		Nov. 9.		Nov. 16.		Nov. 23.		Nov. 30.		Dec. 7.	
	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.
Applied water to Pre-Filters	------	------	32	17,000	85	24,000	33	13,000	19	19,000	35	34,000	9	15,000
Applied water to Final Filters	7	2,200	10	3,600	33	3,500	15	1,600	8	4,200	12	7,400	3	1,800
Filter No. 1	0+	7	0+	37	1	33	2	71	0.5	50	1	66	0.5	21
Filter No. 2	0+	18	0.5	63	1	40	4	42	------	------	1	720	1	250
Filter No. 3	------	------	------	------	1	1,800	3	180	1	72	1	52	0.5	26
Filter No. 4	0+	16	------	------	------	------	------	------	0.5	660	2	310	1	130
Filter No. 5	0+	32	0+	37	0+	35	1	34	0+	22	0.5	26	0+	21
Filter No. 6	0+	13	0.5	97	1	30	2	38	0.5	23	0.5	31	0.5	21
Filter No. 7	0+	7	0+	30	1	23	2	25	0.5	20	------	------	0+	2,600
Filter No. 8	0+	13	0+	40	1	26	2	23	0.5	22	0.5	46	0.5	24
Filter No. 9	0+	8	0.5	51	2	36	2	31	0.5	42	1	59	0.5	24
Filter No. 10	0+	1,000	0+	110	1	32	2	28	0.5	21	0.5	31	0.5	16
Filter No. 11	0+	6	0+	18	1	30	3	34	0.5	27	0.5	37	0.5	16
Filter No. 12	0+	15	0+	48	1	23	2	17	0.5	27	0.5	35	0.5	20
Filter No. 13	0+	15	0.5	80	2	52	2	25	0.5	59	0.5	96	0.5	36
Filter No. 14	0+	6	0+	10	0+	8	0.5	16	0.5	44	1	68	0.5	23

Belmont Final Filters—Continued.

	WEEK ENDING													
	Oct. 26.		Nov. 2.		Nov. 9.		Nov. 16.		Nov. 23.		Nov. 30.		Dec. 7	
	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.
Filter No. 15	0+	16	0+	20	0.5	17	1	19	0+	18	0.5	67	0.5	51
Filter No. 16	0+	10	0+	14	0.5	19	1	18	0+	21	0.5	24	0+	15
Filter No. 17	0+	10	0.5	79	3	55	3	27	1	77	2	110	0.5	54
Filter No. 18	0+	9	0+	27	0.5	21	1	23	0.5	38	1	47	0.5	24
Average of Filters	0+	71	0+	47	1	135	2	39	0.5	74	1	107	0.5	187
Filtered water basin	0+	20	0+	51	1	36	2	42	0.5	52	1	82	0.5	63

Belmont Final Filters—Continued.

	WEEK ENDING						AVERAGES FOR THE YEAR.	
	DEC. 14.		DEC. 21.		DEC. 28.			
	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.
Applied water to Pre-Filters	70	23,000	48	17,000	67	29,000	*43	*20,700
Applied water to Final Filters	26	7,000	17	5,100	26	6,600	26	19,600
Filter No. 1	0+	40	0+	38	0+	26	0+	66
Filter No. 2	1	180	0.5	91	0.5	48	0.5	104
Filter No. 3	0+	37	0.5	31	0+	31	0+	140
Filter No. 4	3	380	1	150	1	81	0.5	158
Filter No. 5	0+	46	0+	35	0+	36	0+	51
Filter No. 6	0+	33	0.5	41	0+	35	0+	161
Filter No. 7	0.5	540	1	280	0.5	120	0+	192
Filter No. 8	0.5	46	0.5	68	0+	43	0+	91
Filter No. 9	0+	56	0.5	73	0+	39	0+	80
Filter No. 10	0+	36	0.5	33	0+	35	0+	102
Filter No. 11	0+	24	0+	25	0+	21	0+	86
Filter No. 12	0+	66	0.5	83	0+	58	0.5	185
Filter No. 13	0.5	84	0.5	46	0.5	56	0+	69
Filter No. 14	0+	46	0+	40	0+	36	0+	46

Belmont Final Filters—Continued.

	WEEK ENDING						AVERAGES FOR THE YEAR.	
	DEC. 14.		DEC. 21.		DEC. 28.			
	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.	Turb.	Bact.
Filter No. 15	0+	68	0+	42	0+	27	0+	143
Filter No. 16	0+	40	0+	120	0+	28	0+	51
Filter No. 17	0.5	3,100	0.5	690	0.5	340	0.5	161
Filter No. 18	0.5	45	0+	37	0+	34	0+	99
Average of Filters	0.5	270	0.5	107	0.5	61	0+	109
Filtered water basin	1	160	0.5	90	0.5	110	0+	121

*Average for November and December.

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, and a low lift pumping station equipped with six centrifugal pumps, each having a daily capacity of 40,000,000 gallons, and a full complement of boilers, economizers, mechanical stokers, etc.

In order to place the station in operation at the earliest practicable date, use was made of Gate House No. 2, Torresdale Intake, to which a temporary channel about 300 feet long was dredged through the deposit of river silt which forms the bank of the river at the site of the station.

The water delivered to the filters has had a higher turbidity than the water in the river proper, due to its passing through the temporary channel. Work on the permanent intake has progressed slowly on account of a leaky cofferdam. This has, however, been made tight and if favored by the continuance of the open winter the contractor should complete the intake and Gate House No. 1 before March 1st, at which time the supply will be taken from the main channel of the river, and relieve the filters from the work of removing the mud picked up by the water in passing through the temporary channel.

Water was first pumped to a limited number of beds on July 4, 1907, and between that date and July 15th twenty-five beds, filtering about 40,000,000 gallons daily, were placed in operation. On the latter date the pumping of filtered water into the Frankford distribution was begun at Lardner's Point Pumping Station, and the output of filtered water was gradually increased reaching a daily quantity of 60,000,000 gallons on November 7th, since when an average daily yield of that quantity has been maintained. The output will be increased to 100,000,000 gallons daily within the next three months.

The Torresdale Pumping Station was placed in operation on July 3, 1907, although it was far from being completed, and it has been in continuous service since that date. At the present time the six pumps can be used, but they have not as yet been tested for requirements of the contract under which they were placed.

The total pumpage from this station has been about 9,000,000,000 gallons of water, at a cost of $3.45 per million gallons. The lift is on an average about 25 feet.

About 8,665,000,000 gallons of water has been filtered at this station since July 15th, at a cost of about $3.75 per million gallons. The average reduction in turbidity was 92 per cent., and the average reduction in bacteria 97 per cent.

In view of the many promises that had been made to the public in the matter of delivering filtered water from Torresdale, it was imperative that operation of the filters should be commenced at a very early date. Sand washers had been provided, but no pumps for furnishing water under pressure for their operation. The method of wheeling the dirty sand scraped from the surface of the filters and storing it in the courts was considered too expensive and undesirable, and recourse was had to the Brooklyn method of cleaning sand. This method was originated in the Department of Water Supply, Gas and Electricity of New York, under the direction of Mr. I. M. de Varona, Chief Engineer, and successfully employed at the filter beds in Hempstead and Forest Stream, Borough of Brooklyn; also at the Jerome Park Experiment Station, Borough of the Bronx.

The Brooklyn method for cleaning filter sand washes the sand in place without removing it from the beds, and consists essentially in allowing the water above the sand to drain until a depth of a few inches remains above the sand surface. Outlets that will permit the water remain-

ing above the surface of sand to flow over it are then opened, and wash water is applied to one end of the bed, and allowed to flow over the surface of the sand. The direction of flow is guided by boards set on edge in the sand layer. As the water flows over the sand, the layer is raked by men standing upon the surface. The flow of water and raking are continued until the water flowing from the surface is practically clear. Water is then applied through the usual inlets and filtration resumed.

The Brooklyn method has been used at Torresdale exclusively; also twelve of the beds at Belmont are equipped for washing by this method.

This method of washing the filters has not proven a success, as the time between scrapings has been very short, and sand washer pumps are being installed, which will be in operation in a short time, after which the filters will be cleaned by being scraped in the usual manner.

The Brooklyn method is being tried at the Belmont filters on pre-filtered applied water and to date has worked very well and the reason of the short runs at Torresdale may be due largely to the quality of the raw water now being applied to these filters.

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	91.48
Average reduction, bacteria	97.07
Maximum reduction, turbidity	96.56
Maximum reduction, bacteria	99.43
Minimum reduction, turbidity	81.51
Minimum reduction, bacteria	91.47

Comparison of Pumpage from the Delaware and Schuylkill Rivers, and Supplementary Pumpage at High Service Stations for 1906 and 1907.

	GALLONS.		GALLONS.	
	1906.	1907.	Increase.	Decrease.
Annual pumpage from rivers	116,732,205,859	110,406,858,007		6,325,347,852
Average daily pumpage from rivers	319,811,263	302,484,542		17,329,721
Pumpage per capita	217.8	201.7		16.1
Maximum daily pumpage from rivers during months of greatest consumption	332,802,571	313,505,007		19,297,564
Pumpage per capita during months of greatest consumption	226.6	209.0		17.6
Total supplementary pumpage at High Service Stations	6,576,658,849	6,475,354,615		101,304,234
Low Service Station, Torresdale, pumpage from the Delaware River		8,740,000,000	8,740,000,000	

Volume and Cost of Pumpage for the Years 1897 to 1907 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.
1897	95,667,466,871	187,371,927,277	$3 16	185	1,385,734
1898	102,241,835,372	210,828,629,625	2 97	196	1,400,000
1899	107,991,371,604	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

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

Cost of Raising 1,000,000 Gallons 100 Feet During 1906 and 1907.

Pumping Stations.	1906.	1907.	Increase.	Decrease.
Fairmount	$3 28	$2 86		$0 42
Spring Garden	5 58	5 83	$0 25	
Belmont	4 91	5 95	1 04	
Queen Lane	3 79	4 80	1 01	
Roxborough	6 58	6 80	22	
Frankford No. 1	530 75	22 63		508 12
Frankford No. 2	2 90	3 88	98	
Average	$4 86	$5 44	$0 58	
High Service Stations.				
Belmont	$14 59	$18 91	$4 32	
Roxborough	14 44	11 25		$3 19
Roxborough Annex	13 02	26 26	13 24	
Mt. Airy	746 73	187 14		559 59
Chestnut Hill*	17,557 55			17,557 55
Frankford	30 64	20 61		10 03
Average	$17 88	$20 12	$3 24	
Total average	$5 06	$5 68	$0 62	

*This station is practically out of service.

Comparison of the Nominal and Average Daily Pumpage for 1906 and 1907.

Pumping Stations.	Nominal.		Average.	
	1906.	1907.	1906.	1907.
Fairmount	33,290,000	33,290,000	18,205,873	22,282,506
Spring Garden	170,000,000	170,000,000	127,771,943	117,691,479
Belmont	65,500,000	62,500,000	42,717,279	36,666,485
Queen Lane	80,000,000	80,000,000	70,621,359	60,027,098
Roxborough	35,500,000	31,500,000	24,376,496	22,866,693
Total from Schuylkill	384,290,000	377,290,000	283,692,950	259,534,261
Increase				
Decrease		7,000,000		24,158,691
Frankford No. 1	57,000,000	57,000,000	95,493	1,931,675
Frankford No. 2	60,000,000	120,000,000	36,025,820	41,018,606
Total from Delaware	117,000,000	177,000,000	36,121,313	42,950,281
Increase		60,000,000		6,828,968
Decrease				
Totals from Delaware and Schuylkill Rivers	501,290,000	554,290,000	319,814,263	302,484,542
Increase		53,000,000		
Decrease				17,329,721
Belmont	7,000,000	7,000,000	2,317,398	2,467,885
Roxborough	10,000,000	10,000,000	2,846,846	3,283,445
Roxborough Annex	30,000,000	30,000,000	12,002,594	10,395,063
Mt. Airy	3,000,000	3,000,000	22,438	100,302
Chestnut Hill	750,000	750,000	344	
Frankford	7,000,000	7,000,000	828,623	1,494,003
Total High Service	57,750,000	57,750,000	18,018,243	17,740,698
Decrease				277,545

Comparison of the Nominal and Average Daily Pumpage for 1906 and 1907—Continued.

Pumping Stations.	Nominal.		Average.	
	1906.	1907.	1906.	1907.
Low Service Station.				
*Torresdale		120,000,000		
Total daily	559,040,000	732,040,000	337,832,506	320,225,240
Increase		173,000,000		
Decrease				17,607,266

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

Distribution.

The total quantity of pipe laid for the distribution of water was 260,675 feet.

Of the above 131,216 feet were service mains from 4 to 16 inches in diameter; 13,787 feet supply mains (including 8,135 feet used in completing the Bustleton supply main); 2,142 feet, 16-inch pipe (part of supply main for the better service of the southern section of West Philadelphia); 3,351 feet 12-inch pipe, for the improvement of the supply in Locust street west of Seventh street, and 108,775 feet, from 20 to 60 inches, to connect the Lardner's Point Pumping Station with the present distribution.

The total length of pipe now in use is 1,578.89 miles, and the total number of fire hydrants, 14,852.

The total number of water meters in use (all sizes) is 1,726, or a decrease of seven since 1906.

Very respectfully yours,

FRED C. DUNLAP,

Chief, Bureau of Water.

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.

APPENDIX A

REPORT OF CHIEF CLERK

Philadelphia, January 22, 1908.

MR. FRED C. DUNLAP,
Chief of Bureau.

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 1907.

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

Yours respectfully,

J. T. HICKMAN,
Chief Clerk.

Detailed Expenditures of the Bureau for 1907.

General Appropriation.		Amount appropriated.	Amount expended.	Amount merging.	Amount not merging.
An ordinance to make an appropriation to the Bureau of Water, approved Jan. 4, 1907	$929,309 00				
Balance from books of 1906	656,872 46				
Increased by additional appropriations and transfers	856,190 10				
	$2,442,371 56				
Diminished by transfer	158,072 95				
Net appropriation		$2,284,298 61			
Item 1—Salaries	$428,513 00				
Increased by additional appropriations	22,481 00				
	$450,994 00				
Diminished	30,000 00				
Net appropriation		420,994 00			
Chief of Bureau		6,000 00	$2,833 33		
Chief clerk		2,000 00	2,000 00		
Assistant clerk		1,200 00	1,200 00		
Correspondence clerk		950 00	950 00		
Time clerk		1,000 00	1,000 00		
Messenger		720 00	720 00		
Draughtsmen		7,200 00	6,293 79		
General superintendent		3,500 00	3,500 00		
Assistant to general superintendent		1,250 00	1,249 98		
Assistant engineer		1,100 00			
Clerks and paymasters		2,100 00	2,099 96		
Assistants to chief		3,600 00	3,600 00		
Pipe inspector and clerk		2,350 00	2,349 98		
Search clerk		1,250 00	1,250 00		
Assistant clerks		4,575 00	4,574 98		
Chief inspector		1,200 00	1,200 00		
Inspectors		22,000 00	21,892 41		
Permit clerks		2,400 00	2,399 96		
Purveyors		10,360 00	10,360 00		
Purveyors' clerks		5,950 00	5,949 72		
Assistant purveyors' clerks		5,425 00	5,375 54		
Hydrant inspectors		7,525 00	7,509 45		
General foremen		7,486 50	7,486 50		
Foremen of repairs		7,335 00	6,318 13		
Superintendent of shop		1,500 00	1,500 00		
Clerk to superintendent of shop		900 00	900 00		
Watchmen, offices and yards		6,277 50	6,181 33		
Storekeepers		2,400 00	2,400 00		
Foreman machinist		1,900 00	1,851 57		
Foreman bricklayer		1,500 00	1,499 96		
Foreman of shop		1,300 00	1,300 00		
Foreman carpenter		1,150 00	1,149 96		
Foreman plumber		1,000 00	1,000 00		
Foreman stonemason		950 00	950 00		
Foreman painter		950 00	950 00		
Foreman rigger		950 00	950 00		
Foreman laborer		870 00	870 00		
Assistant foreman rigger		850 00	849 96		
Janitor, main office		720 00	720 00		
Telephone operators		1,460 00	1,460 00		
Electrician		1,300 00	1,300 00		

Detailed Expenditures of the Bureau—Continued.

General Appropriation.	Amount appropriated.	Amount expended.	Amount merging	Amount not merging.
Item 1.—Continued.				
General storekeeper	$1,000 00	$980 56		
Yard man, Fourth District	915 00	915 00		
Lineman	1,100 00	1,099 98		
Stop attendants	2,750 00	2,500 00		
Total		$133,442 07		
Salaries at Pumping Stations:				
Fairmount	$13,065 00	$13,012 80		
Spring Garden	82,630 00	77,000 23		
Belmont	46,910 00	44,012 03		
Belmont High Service	8,245 00	8,211 40		
Queen Lane	41,700 00	35,080 08		
Roxborough	45,525 00	37,040 80		
Roxborough High Service	11,595 00	10,936 01		
Mt. Airy	4,950 00	4,950 06		
Chestnut Hill	2,250 00	2,014 11		
Frankford	39,270 00	38,794 94		
Frankford High Service	10,795 00	10,192 60		
Uniforms for watchmen and policemen	1,680 00	1,680 00		
Total		$416,367 13	$4,626 87	
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 85,000 00				
Net appropriation	$260,000 00			
Bricklayers		$11,669 22		
Carpenters		13,382 73		
Helpers		7,933 51		
Horses, carts and drivers		2,477 73		
Laborers		143,364 67		
Machinists		59,448 02		
Painters		5,871 00		
Stonemasons		4,376 36		
Transportation		3,229 44		
Improvement		2,115 63		
Second District		2,433 07		
Sixth District		2,791 76		
Total		$259,093 14	$906 86	
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 ex-				

Detailed Expenditures of the Bureau—Continued.

General Appropriation.	Amount appropriated.	Amount expended.	Amount merging.	Amount not merging.
Item 3.—Continued.				
penses of pipe inspectors. Balance January 1, 1907 $6,794 38				
Appropriation 250,000 00				
Increased by additional appropriations and transfers 109,000 00				
Net appropriation	$365,794 38			
Traveling expenses		$598 99		
Transportation		3,762 75		
Repaving		6,356 84		
Wages:				
Improvement		46,653 59		
First District		30,089 49		
Second District		40,856 08		
Third District		89,151 96		
Fourth District		28,756 62		
Fifth District		22,513 63		
Sixth District		35,469 80		
Seventh District		60,705 98		
Total		$364,915 82	$878 56	
Item 4. For the wages of mechanics, helpers and other workmen at the city construction and repair shop $32,500 00				
Increased by additional appropriations and transfers 8,500 00				
Net appropriation	$41,000 00			
Wages		$40,513 97	486 03	
Item 5. For wages of hydrographic corps and expenses incident thereto	1,596 00			
Wages		1,596 00		
Item 6. For repairs to boilers $15,000 00				
Increased by additional appropriations and transfers 24,300 00				
Net appropriation	39,300 00			
Frankford High Service		16 03		
Storehouse (material)		76 99		
Belmont High Service		119 74		
Roxborough High Service		1,589 80		
Frankford		2,369 56		
Roxborough		3,377 63		
Belmont		4,099 90		
Queen Lane		11,024 95		
Spring Garden		15,672 92		
Total		$38,347 52	$952 48	

Detailed Expenditures of the Bureau—Continued.

General Appropriation.		Amount appropriated.	Amount expended.	Amount merging.	Amount not merging.
Item 7. For hauling water pipe and machinery	$5,000 00				
Increased by additional appropriation	1,000 00				
	$6,000 00				
Diminished by transfer	1,000 00				
Net appropriation		$5,000 00	$4,327 48	$672 52	
Item 8. For repairs to roofs	$1,000 00				
Increased by additional appropriations	3,500 00				
Net appropriation		4,500 00			
Sixth District			1 48		
Roxborough High Service			2 95		
Frankford			2 95		
Second District			5 91		
Fairmount			14 75		
Frankford High Service			36 88		
Roxborough			59 00		
City shop			59 00		
Fourth District			113 57		
Queen Lane			135 69		
First District			132 75		
Third District			312 70		
Fifth District			331 88		
Belmont			1,421 86		
Spring Garden			1,867 32		
Total			$4,498 69	$1 31	
Item 9. For clerk hire in writing up duplicates	$500 00				
Increased by additional appropriations and transfers	4,000 00				
Net appropriation		$4,500 00	$2,284 74		$2,215 26
Item 10. For keep of horse for chief of bureau, general superintendent and assistant to chief, four hundred (400) dollars each	$1,200 00				
Diminished by transfer	400 00				
Net appropriation		800 00	800 00		
Item 11. For advertising, postage, horseshoeing, miscellaneous expenses, repairs to wagons, carts, harness, tools, pipe, pavements, ground rent, 918 Cherry street, and electric current	$4,000 00				
Increased by transfers	5,000 00				
Net appropriation		9,000 00			

Detailed Expenditures of the Bureau—Continued.

General Appropriation.	Amount appropriated.	Amount expended.	Amount merging.	Amount not merging.
Item 11.—Continued.				
Advertising		$272 10		
Board for horses		8 50		
Brazing		21 50		
Brushes		3 45		
Badges		12 50		
Binding books		255 29		
Cleaning rooms		60 40		
Cleaning wells		96 00		
Calorimeter		370 00		
Current (electric)		400 55		
Copper dippers		33 50		
Care of clocks		50 50		
Disinfectors (rental)		108 00		
Engineer supplies		37 91		
Electrical supplies		43 14		
Feed shutes		22 00		
Fire extinguishers (rental)		90 00		
Glazing		13 50		
Ground rent		26 66		
Gauges		32 25		
Gasket		45 76		
Hardware		110 65		
Hauling sick horses		15 00		
Hire of wagon		7 00		
Horseshoeing		1,561 92		
Iron fittings		2 60		
Incidentals		41 80		
Incidentals, Hydrographic		98 07		
Money cases		41 25		
Maps		149 00		
Meals for workmen		201 25		
Oil		4 50		
Oil filter		67 50		
Paper hanging		27 00		
Photographic supplies		7 78		
Parts of meters		113 12		
Plating		10 88		
Printing		796 83		
Professional services, V. S		157 75		
Pasturing horse		30 00		
Repairs to stop watch		5 50		
Repairs to gum boots		6 35		
Repairs to awning		7 00		
Repairs to siding		8 03		
Repairs to telephone		12 10		
Repairs to tools		13 05		
Repairs to band saw		20 00		
Repairs to chairs		26 90		
Repairs to pavements		30 50		
Repairs to heaters		42 00		
Repairs to mowers		54 65		
Repairs to tool box		50 00		
Repairs to pipes		99 57		
Repairs to scales		156 70		
Repairs to harness		413 95		
Repairs to wagons		996 96		
Rent of poles		7 00		
Rent of telephone transmitter		13 80		
Rent of stables, 5th District		24 00		
Rent of office, 5th District		32 33		
Screen		9 50		
Serving morning papers		15 60		
Spruce poles		30 00		
Subscriptions (periodicals)		37 25		

Detailed Expenditures of the Bureau—Continued.

General Appropriation.	Amount appropriated.	Amount expended.	Amount merging.	Amount not merging.
Item 11.—Continued.				
Supporting tracks		$47 28		
Steel lockers		90 00		
Stamps (postage)		491 60		
Transportation		6 50		
Typewriter supplies		7 00		
Text books		10 00		
Time stamp		15 00		
Use of dump		18 40		
Total		$8,260 48	$739 52	
Item 12. For emergencies $5,000 00				
Increased by transfer 1,000 00				
Net appropriation	$6,000 00			
Iron fittings		$51 71		
Repairs to conduit and cable		77 54		
Repairs to pavement		90 00		
Packing		91 22		
Supporting tracks		105 01		
Brazing		132 34		
Repairs to siding		151 87		
Steel springs		155 20		
Lumber		167 14		
Repairs to Venturi meter		114 00		
Forged rods		190 00		
Machine work		255 00		
Rods and strap		269 50		
Grate bars		280 39		
Coal-car bodies		330 00		
Crank slab		400 00		
Brass castings		493 39		
Liner for compressor		1,002 00		
Brass fittings		1,502 59		
Total		$4,888 90	$111 10	
Item 13. For hauling ashes from Spring Garden, Queen Lane and Belmont Pumping Stations $7,500 00				
Diminished by transfer 520 00				
Net appropriation	$6,980 00	$6,977 75	$2 25	
Item 14. For the purchase of material connected with repairs to machinery, mains, buildings and sidings $2,500 00				
Balance from books of 1906 8,469 75				
Increased by transfer 2,000 00				
Net appropriation	12,969 75			
Parts of meters		3 60		
Springs		7 50		
Machine work		15 95		
Special die		35 00		
Steel casting		37 00		
Fittings for dynamo		59 00		

Detailed Expenditures of the Bureau—Continued.

General Appropriation.	Amount appropriated.	Amount expended.	Amount merging.	Amount not merging.
Item 14.—Continued.				
Spruce poles		$66 00		
Iron castings		73 50		
Packing		85 85		
Iron fittings		107 30		
Copper pipe		116 20		
Brazing		148 88		
Air chambers		188 00		
Steel guards		188 30		
Brass fittings		221 38		
Hardware		251 31		
Forged rods		395 00		
Plunger and piston rod		550 00		
Cylinder plunger		1,002 40		
Pump plungers		6,207 00		
Total		$9,763 17		$3,206 58
Item 15. Labor in laying main to supply Bustleton. Balance, January 1, 1907 $2,890 25				
Increased by additional appropriation 7,000 00				
Net appropriation	$9,890 25			
Excavating pipe trench		$5,496 98		$4,393 27
Item 16. Improvement, extension and filtration of the water supply. Balance, Jan. 1, 1907	69 30	69 30		
Item 17. For the improvement, extension and filtration of the water supply. Balance, Jan. 1, 1907 $104,693 62				
Increased by transfer 14,136 10				
Net appropriation	118,829 72			
Oak Lane Reservoir		7,121 77		
Wages, Third District		7,117 60		
Cleaning George's Hill Reserv'r		26,342 82		
Pumping Station, Frankford		73,506 65		
Total		$114,088 84		$4,740 88
Item 18. For the completion of the High Pressure Fire Service. Balance, January 1, 1907	$617 37			$617 37
Item 19. Mains for filtered water. Balance, January 1, 1907 $81,123 26				
Increased by transfer 60,000 00				
Net appropriation	141,123 26			
Machine work		$181 13		
Special castings		700 08		
Iron castings		786 65		
Flange pipe		1,048 70		

Detailed Expenditures of the Bureau—Continued.

General Appropriation.	Amount appropriated.	Amount expended.	Amount merging.	Amount not merging.
Item 19.—Continued.				
Breeches pipe		$1,292 20		
Steel castings		1,464 42		
Closures		2,079 15		
Steel pipe		6,642 00		
Iron pipe and specials		7,002 11		
Furnishing and laying mains		18,327 42		
Stop valves		22,330 48		
Steel riveted pipe		63,990 22		
Total		$125,844 56		$15,278 70
Item 20. Sand for filtration purposes.				
Balance, January 1, 1907	$193,193 15	$193,193 15		
Item 21. Sand for filtration purposes, Torresdale beds.				
Balance, January 1, 1907 $200,000 00				
Diminished by transfer 126,379 95				
Net appropriation	73,620 05	20,227 65		53,392 40
Item 22. For repairs to pumping engines.				
Balance, January 1, 1907	59,021 38			
Repairs to governor of engine		129 00		
Brass fittings		338 76		
Pump chambers and plungers		16,229 00		
Total		$16,696 76		$42,324 62
Item 23. For the purchase of and repairs to pumps and machinery.				
Appropriation, May 10, and Dec. 31, 1907	$360,000 00			
Brass castings:				
142 lbs. yellow, @ 18½c		$26 36		
799 lbs. lead coating, @ 5½c		43 95		
313 lbs. Ajax, @ 24½c		76 69		
1,929 lbs. Ajax, @ 24c		463 08		
4,029 ½ lbs. red, @ 21¾c		876 44		
Brass fittings		841 21		
Bed plate		1,785 00		
Grate bars		3,474 00		
Housing leg		521 00		
Iron castings:				
11,892 lbs., @ 4½c		535 14		
35,813 lbs., @ 3¾c		1,343 02		
Intermediate chamber		1,362 00		
Machine work		770 24		
Packing rings		150 00		
Repairs to No. 1 engine, Queen Lane		282 00		
Repairs to No. 2 Engine, Queen Lane		1,315 90		
Total		$13,866 03		$346,133 97

Detailed Expenditures of the Bureau—Continued.

General Appropriation.	Amount appropriated.	Amount expended.	Amount merging.	Amount not merging.
Item 24. For High Pressure Fire System	$150,000 00			$150,000 00
Item 25. For stationery, office supplies, etc., for the proposed branches of the Receiver of Taxes.				
By transfer, October 15, 1907	$500 00	$480 52	$19 48	
Item 33. To complete the retaining wall about the Lehigh Avenue Reservoir.				
Appropriation, Dec. 20, 1907 $9,773 00				
Diminished by transfer 9,773 00				

Appropriations and Expenditures of Bureau of Filtration.

		Amount appropriated.	Amount expended.	Amount merging.	Amount not merging.
Item 1. For salaries of employees at the Upper Roxborough, Lower Roxborough and Belmont Filter Stations, and the Testing Laboratory		$36,980 00	$33,416 61	$3,563 39	
Item 2. For wages of laborers and other workmen, etc.	$41,000 00				
Diminished by transfer	4,000 00				
Net appropriation		37,000 00	28,689 05	8,310 95	
Item 3. For resanding filters and incidental expenses	$17,000 00				
Diminished by transfer	1,500 00				
Net appropriation		15,500 00	9,114 24	6,385 76	
IMPROVEMENT, EXTENSION AND FILTRATION OF THE WATER SUPPLY.					
Item 4. Balance, Jan. 1, 1907	$2,238,961 28				
Diminished by transfer	1,455,006 52				
Net appropriation		783,954 76	783,954 76		
Item 5. Balance, Jan. 1, 1907	$595,941 12				
Diminished by transfer	29,744 65				
Net appropriation		566,196 47	566,196 47		
Item 6	$890,000 00				
Diminished by transfer	457,249 07	432,750 93	432,750 93		
Item 7	$445,000 00				
Diminished by transfer	445,000 00				
Item 8. By transfer	$116,379 95				
Diminished by transfer	116,379 95				
Item 28. By transfer		1,390,870 42	318,814 90		$1,072,055 52
Item 29. By transfer		29,744 65	29,744 65		
Item 30. By transfer	$457,249 07				--
Increased by appropriation	60,000 00	517,249 07	230,303 66		286,945 41
Item 31. By transfer	$445,000 00				
Increased by appropriation	117,500 00	562,500 00			562,500 00
Item 32. By transfer		116,379 95	42,317 43		74,062 52

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

Taken from the Books of the City Controller.	Amount appropriated.	Amount expended.	Amount merging.	Amount not merging.
Item 16. For stationery, office supplies, printing, text books and supplies	$6,000 00	$5,560 28	$439 72	
Item 17. For the purchase of coal	600,000 00	590,645 29	9,354 71	
Item 18. For oil, lubricants, paints, brushes, wood and coke	11,201 39	11,040 58	160 81	
Item 19. For iron water-pipe, special castings and pig lead	12,500 00	11,608 36	891 64	
Item 20. For hardware, bolts, nuts, iron, steel and malleable castings	33,510 00	32,362 18	1,147 82	
Item 21. For gum goods and packing	45,500 00	42,595 58	2,904 42	
Item 22. For chandlery	5,500 00	5,195 19	304 81	
Item 23. For wrought-iron pipe and fittings	5,000 00	1,890 21	3,109 79	
Item 24. For fire brick and fire clay	1,200 00	961 46	238 54	
Item 25. For brass fittings and castings, cocks and valves for steam and water	12,500 00	12,498 76	1 24	
Item 26. For covering for steam pipes and boilers	1,000 00	281 44	718 56	
Item 27. For lumber	18,000 00	17,565 47	434 53	
Item 28. For forage	7,000 00	6,625 22	374 78	
Item 29. For iron and steel	3,544 91	3,347 12	206 79	
Item 30. For cement, bricks, blocks, lime, sand and building stone	6,000 00	5,840 49	159 51	
Item 31. For electrical supplies	1,500 00	1,469 92	30 08	
Item 32. For tapping and pipe-cutting machines	2,000 00	1,864 55	135 45	
Item 33. For horses, wagons, carts, stable supplies and harness	4,000 00	3,185 08	814 92	
Item 34. For donkey pumps, machine tools and condensers	1,500 00	594 68	905 32	
Item 35. For special articles and small stores	$3,000 00	$2,989 81	$10 19	
Item 36. For lead pipe, block tin and sheet lead	19,500 00	18,490 75	1,009 25	
Item 36½. For iron water-pipe and special castings	1,204 44	1,203 46		$0 98
Item 37. For iron water-pipe, special castings and pig lead	200,000 00	183,720 40		16,279 60
Total	$961,536 28	$23,353 86		$16,280 58

Bureau of Filtration.

Taken from the Books of the City Controller.	Amount appropriated.	Amount expended.	Amount merging.	Amount not merging.
Item 37. For coal, oil, grease, packing and waste	$25,000 00	$23,214 77	$1,785 23	
Item 38. For hose, rubber goods, lumber, hardware, pipe fittings and paint	5,000 00	4,717 02	282 98	
Item 39. For printing and stationery	2,000 00	1,111 67	888 33	
Item 40. For hauling and transportation	1,000 00	515 24	484 76	
Item 41. For supplies for electrical machinery and preliminary filters	2,000 00	1,997 66	2 34	
Item 42. For laboratory supplies	3,000 00	2,240 07	759 93	
Total	$38,000 00	$33,796 43	$4,203 57	

Recapitulation.

Balance from books of 1906	$656,872 46		
Additional and transfers	856,190 10		
Annual appropriation	929,309 00		
Appropriation, Department of Supplies	1,001,169 74		$3,443,541 30
Expended for filtration	453,423 50		
Expended for maintenance	1,199,175 08		
Expended for supplies	961,536 28	$2,614,134 86	
Amount merging	9,396 98		
Amount merging, Department of Supplies	23,352 88		
Transferred	158,072 95		
Amount not merging	622,303 05		
Amount not merging, Department of Supplies	16,280 58	829,406 44	3,443,541 30

Bureau of Filtration.

Balance from books of 1906	$2,834,902 40		
Additional and transfers	1,628,879 95		
Annual appropriation	94,980 00		
Appropriation, Department of Supplies	38,000 00		$4,596,762 35
Expended for extensions	2,307,116 86		
Expended for maintenance	138,568 19		
Expended for supplies	33,796 43		
Expended for Bureau of Water	29,617 65	$2,509,099 13	
Amount merging	18,260 10		
Amount merging, Department of Supplies	4,203 57		
Transferred	69,636 10		
Amount not merging	1,995,563 45	2,087,663 22	4,596,762 35

Receipts from Operations of the Bureau of Water as Reported by the Receiver of Taxes.

1907.	Water Rents by Schedule on Existing Connections.		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		$3,779 55	$4,548 15	$11,930 85		$601 31	$706 00	$266 50	$6,125 47	$110 95	$12 00	$19 10	$2,012 18	$30,112 06
February	$180,352 15	3,347 50	3,126 50	25,146 59		504 08	56 00	221 75	6,690 14	252 47	9 00	17 94	2,802 47	222,526 59
March	286,340 75	2,343 00	11,164 10	61,600 63		361 43	1,497 00	283 50	8,620 45	209 45	23 00	56 76	4,343 72	376,843 79
April	358,435 55	4,936 00	14,541 15	7,831 62		750 77	1,044 00	456 75	8,793 74	227 83	12 00	19 62	4,692 27	401,780 30
May	2,225,979 66	8,323 50	11,174 43	20,404 99		1,209 72	1,210 00	594 75	7,366 78	295 59	44 00	77 45	6,527 11	2,283,207 98
June	64,568 40	1,903 50	8,146 80	45,851 06	$2,822 00	244 97	929 00	553 75	10,871 60	406 22	22 00	35 71	4,581 62	140,936 63
July	37,803 67	483 00	9,782 70	12,766 51	1,997 92	83 21	372 00	396 50	7,418 41	162 89	7 00	12 69	4,322 45	75,608 95
August	91,652 75	696 00	6,132 90	27,555 32	4,627 78	125 10	787 00	254 25	7,911 37	90 70	15 00	43 35	1,664 40	141,555 92
September	30,647 66	1,257 00	3,761 44	34,853 56	4,260 74	201 77	938 00	274 50	6,136 18	142 48	11 00	87 83	1,066 40	83,641 56
October	73,650 16	578 50	3,443 20	18,293 14	11,068 70	80 60	1,595 00	315 50	17,386 89	52 68	7 00	8 85	3,286 10	129,775 32
November	18,205 10	247 50	2,584 25	38,158 31	2,722 87	40 37	1,478 00	260 75	11,041 39	90 44			1,828 38	76,657 30
December	18,661 15	796 50	3,005 83	19,497 95	2,660 44	119 48	626 00	117 50	8,709 43	1,876 02	19 00	34 02	2,049 64	58,172 96
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
1906	3,258,551 90	31,704 15	95,087 39	338,567 38	33,218 10	4,738 65	15,193 00	3,610 00	193,164 30	2,944 51	235 00	1,543 84	41,946 21	4,020,504 43
Increase	$127,745 10							$386 00		$973 21				$314 93
Decrease		$2,982 60	$13,675 94	$14,676 85	$3,057 71	$394 84	$3,955 00		$86,092 45		$54 00	$1,130 52	$2,769 47	

List of Miscellaneous Receipts for the year 1907.

Jan.	8	Phila. Rapid Transit Co.	Shifting pipe $55.89
	9	Phila. Electric Co.	Taking out 4-in. draw .. 20.02
	19	J. M. Kennedy Mfg. Co.	Putting in stop 10 06
	19	Lit Bros.	Repairing private supply 12.08
	21	B. & O. R. R. Co.	Repairing private service 12.90
Feb.	4	M. J. Jaffalla	Relaying 6-in. pipe 37.49
	4	M. J. Jaffalla	Excavating and moving 6-in pipe 42.30
	6	Phila. Rapid Transit Co.	Shifting 12-in. Dept. stop 87.85
	8	Burnham, Williams&Co.	Repairing 3-in. stop 29.63
	11	Phila. Rapid Transit Co.	Removing fire hydrant . 44.59
	25	American Ice Co.	Repairing 4-inch Dept. stop 10.61
Mar.	6	Penna. R. R. Co.	Renewing No. 1 fire hydrant 39.96
	6	Phila. & Reading Ry. Co.	Moving 12-in. pipe 42 77
	7	National Tube Co.	Renewing 4-in. stop 54.88
	26	Phila. Rapid Transit Co.	Repairing broken main.. 20.76
	28	Phila. Rapid Transit Co.	Repairing 6-in. main.... 16.30
	28	Phila. Rapid Transit Co.	Renewing 6-in. stop.... 34.78
Apr.	1	M. J. Jaffalla	Repairing break in 6-in. main 10.78
	1	M. J. Jaffalla	Repairing break in 6-in. main 10.42
	1	Phila. & Reading Ry. Co.	Repairing leak 6.75
	1	Phila. & Reading Ry. Co.	Repairing 12-in. main... 9.00
	2	Phila. Rapid Transit Co.	Moving 6-in. main 65.35
	2	Phila. Rapid Transit Co.	Relaying 6-in pipe 29.94
	10	Penna. R. R. Co.	Repairing 4-in. fire connection 26.11
	10	Robert Higgins	Plugging 6-in. pipe..... 20.62
	25	Phila. Rapid Transit Co.	Removing No. 1 fire hydrant 20.95
	26	Howard Ruch	Repairing break in 6-in. main 15.36
	27	David McMahon	Repairing break in 6-in. main 12.55
May	1.	American Ice Co.	Repairing 4-in. stop on meter 3.52
	1	Jas. S. Williams	No. 1 fire hydrant 34 00
	6	Robert F. Ryan	Repairing fire hydrant. 13.27
	6	Robert F. Ryan	Repairing private pipe.. 1.31

May	6	Robert F. Ryan	Repairing 6-in. pipe	$12.37
	6	Robert F. Ryan	Shutting off service	2.38
	6	Robert F. Ryan	Shutting off water	1.44
	6	Robert F. Ryan	Repairing private pipe	3.45
	16	E. Walter Clark	Moving fire hydrant	46.15
	20	Phila. & Reading Ry. Co.	Removing No. 1 fire hydrant	6.52
	23	D. McMahon	Repairing break in fire hydrant	14.31
	24	Phila. Rapid Transit Co.	Relaying 20-in. main	36.38
	24	Phila. Rapid Transit Co.	Cutting out 8-in. main	28.51
	24	Phila. Rapid Transit Co.	Cutting out fire hydrant	7.42
	24	Phila. Rapid Transit Co.	Connecting fire hydrant	32 89
	24	Phila. Rapid Transit Co.	Connecting fire hydrant	35.69
	24	John Jaffolla	Repairing break in 6-in main	10.74
	29	Bell Telephone Co.	Cutting off 4-in. pipe	5.24
June	3	Disston Co.	No. 1 fire hydrant	102.00
	3	Delaware Freezing Co.	Removing 6-in. stop	31.88
	4	Phila. Rapid Transit Co.	Burning out joints	15.00
	5	Hahnemann Hospital	Renewing 6-in. stop	41.55
	6	H. C. Ball	Renewing 4-in. stop	25.19
	11	Phila. Rapid Transit Co.	Moving 30-in. stop	26.25
	14	Disston Water Co.	No. 1 fire hydrant	68.00
	17	U. S. Arsenal	Renewing 6-in. stop	38.42
	18	Phila. Rapid Transit Co.	Cutting out 6-in main	23.52
	20	Robert Higgins	Repairing 6-in. main	12.00
	21	J. H. Loucheim	Repairing break in 6-in. main	10.81
	21	J. H. Loucheim	Repairing break in 6-in. main	11.60
July	5	Phila. Rapid Transit Co.	Moving 8-in. stop	27.77
	8	Francis Bros.	Repairing 6-in. stop	7.38
	15	Phila. Rapid Transit Co.	Repairing 20-in. main	88.62
	25	Aldine Hotel	Removing stop	6.50
	25	W. Lewis	Cutting down stop box.	69
	26	Phila. Rapid Transit Co.	Making alterations in pipe	8.25
	30	U. G. I. Co.	Lowering 6-in. fire connection	23.68
Aug.	1	Phila. Rapid Transit Co.	Moving two 6-in stops.	40.27
	5	Mercantile Club	Putting in wooden box.	4.81
	8	Burnham, Williams&Co.	Repairing stop	3.80
	13	Phila. Rapid Transit Co.	Moving 6-in. main	19.49
	19	U. G. I. Co.	Lowering 6-in. pipe	22.33

Sept. 5.	Phila. Rapid Transit Co.	Moving 6-in. stop	$29.97
18	Union Ice Co.	Repairing stop	10.51
18	Disston Water Co.....	No. 1 fire hydrant	102.00
Oct. 10	S. B. &. B. W. Fleisher..	Adjusting 3-in. stop ...	2.00
11	A. D. McNeil	Repairing private pipe.	1.87
14	Phila. & Reading Ry. Co.	Renewing screw on stop	2.26
21	Cunningham & Murray.	Repairing laterals and service	8 22
21	Cunningham & Murray.	Repairing laterals and service	5.98
21	Cunningham & Murray.	Repairing laterals and service	2.15
21	Cunningham & Murray.	Repairing laterals and service	4 91
21	Cunningham & Murray.	Repairing laterals and service	7.24
29	Burnham, Williams&Co..	Cutting out 4 ft. of pipe	18.05
Nov. 6.	Phila. Rapid Transit Co.	Moving 12-in. stop	30.11
7	Phila. & Reading Ry. Co.	Repairing leak	12.50
7	J. H. Loucheim	Repairing private pipe .	5.65
12	Phila. Rapid Transit Co.	Repairing 4-in. stop ...	8.90
22	Vare Bros.	Cutting out pipe	33.28
Dec. 3	Bureau of Water.....	Overdrawn warrants, Nos. 1243 and 2145 and sale of stone	5.25
6	David McMahon	Drawing and redriving ferrule	5.62
7	R. J. Loughrey	Repairing 4-in. stop	4 45
10	Tacony Tr. Co.....	No. 11 Buffalo Pit. 10-ton roller	352.00
10	A. H. Kaiser	1 locomotive	600.00
10	L. F. Seifert's Sons.....	1 hoisting engine	150.00
10	Howard W. Read	1 pile driver engine and 1 Carson machine ...	502.00
13	Girard Estate	Repairing break	16.14
14	D. McMahon	Repairing break	19.04
16	Cunningham & Murray.	Repairing service pipe .	3.44
19	E. H. Vare	Repairing fire hydrant..	3.62
19	M. O'Rourke	Repairing 6-in. main ...	14.06
19	M. O'Rourke	Repairing 6-in. main ...	22.15
20	Wm. F. Albrecht	Repairing fire hydrant .	44.54
21	Germantown S. H. Co...	Testing meter	2.00
21	Wm. McKeon	Repairing 6-in. main ...	15.37
21	Wm. McKeon	Repairing 6-in. main ...	11.82
23	Phila. & Reading Ry Co	Putting in 4-in. stop ...	62.30
27	Herbert McCormick ...	Renewing fire hydrant.	32.63
27	D. McMahon	Repairing 6-in. main ...	9.59
		Total	$3,917.72

APPENDIX B

REPORT

OF THE

GENERAL SUPERINTENDENT

SUBMITTING

TABLES OF EXPENSES, PUMPAGE AND CONSUMPTION OF WATER DURING 1907

Philadelphia, January 1908.

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

DEAR SIR:—I respectfully submit the following report of operations and expenses in connection with the work performed at the several pumping stations during 1907:

There has been a decrease in the pumpage from the Delaware and the Schuylkill rivers averaging 17,329,721 gallons per day, and a decrease of 6,896 tons in the quantity of coal consumed.

The price of coal averaged 1 cent per ton less than that in the preceding year, which, together with reduction in quantity consumed, represents a decreased expenditure during 1907 of $22,405.15.

Owing to the extensive repairs made to the machinery, boilers, buildings, grounds and reservoirs; to increased wages authorized by Councils, and to the greater cost of

materials, the expenses for operating the river stations were $64,607.61 in excess of those for the preceding year.

The pumpage at the high service stations was 277,545 gallons per day less than that of 1906, and the consumption of coal within two tons of the quantity used during that year.

The price of coal consumed at the high service stations was 6 cents per ton greater than that in 1906, which, with the additional cost of labor, materials and repairs, increased the annual operating expenses of these stations $9,275.54.

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

Very respectfully yours,

ALLEN J. FULLER,
General Superintendent.

Coal Consumed During 1907.

Pumping Stations.	Classification.	Tons.	Price per ton.	Cost.	Total Cost.
*Fairmount	Egg.	115	$5 56	$339 40	$339 40
Spring Garden	Pea.	55,633	2 93	163,004 69	
Spring Garden	Bituminous.	9,765	2 97	29,002 05	192,006 74
Belmont	Pea.	35,580	2 90	103,182 00	103,182 00
Queen Lane	Pea.	42,183	3 18	134,141 94	134,141 94
Roxborough	Pea.	38,349	2 93	112,362 57	
Roxborough	Bituminous.	198	2 97	588 06	112,950 63
Frankford, No. 1	Pea.	1,575	2 89	4,551 75	
Frankford, No. 1	Bituminous.	154	2 97	457 38	
Frankford, No. 1	Bituminous.	193	2 83	546 19	5,555 32
Frankford, No. 2	Pea.	7,471	2 89	21,591 19	
Frankford, No. 2	Bituminous.	1,195	3 03	3,620 85	
Frankford, No. 2	Bituminous.	5,691	2 97	16,902 27	
Frankford, No. 2	Bituminous.	3,055	2 83	8,645 65	50,759 96
Totals and averages		201,157	$2 98		$599,235 99
High Service Stations.					
Belmont	Pea.	1,880	$3 82	$7,181 60	$7,181 60
Roxborough	Pea.	1,366	3 40	4,644 40	4,644 40
Roxborough Annex	Pea.	2,979	3 40	10,128 60	10,128 60
Mt Airy	Pea.	202	3 85	777 70	777 70
*Chestnut Hill	Pea.	56	3 30	184 80	184 80
Frankford	Pea.	942	3 45	3,249 90	3,249 90
Totals and averages		7,425	$3 52		$26,167 00
Grand totals		208,582	$3 00		$625,402 99
Decrease for 1907		6,896	$0 01		$22,405 13

*For heating only.

Cost of Pumpage, Gallons Pumped and Percentage of Work Done at Each Station for 1907.

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	$29,102 42	8,133,114,825	125.0	10,166,393,531	$2 86	4.196
Spring Garden	382,107 28	42,957,389,865	152.5	65,510,019,544	5 83	27.039
Belmont	229,135 21	13,383,266,869	287.6	38,490,275,515	5 95	15.886
Queen Lane	288,980 17	21,909,890,670	274.9	60,230,289,452	4 80	24.859
Roxborough	212,657 61	8,346,342,945	374.8	31,282,093,358	6 80	12.911
Frankford, No. 1	32,417 68	705,061,565	203.2	1,432,685,100	22 63	.591
Frankford, No. 2	120,872 06	14,971,791,268	208.1	31,156,297,629	3 88	12.860
Totals and averages	$1,295,272 43	110,406,858,007	215.8	238,268,054,129	$5 44	98.342
High Service Stations.						
Belmont	$20,659 50	900,778,185	121.3	1,092,643,938	$18 91	.451
Roxborough	15,838 65	1,198,457,309	117.5	1,408,187,338	11 25	.581

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.						
Roxborough Annex	18,645 64	3,794,198,000	18.7	710,132,432	26 26	.293
Mt. Airy	7,358 17	36,610,050	107.4	39,319,194	187 14	.016
*Chestnut Hill	2,538 32					
Frankford	15,810 59	545,311,071	140.7	767,252,677	20 61	.317
Totals and averages	$80,850 87	6,475,354,615	62.0	4,017,535,579	$20 12	1.658
Grand totals and averages	$1,376,123 30	116,882,212,622	207.3	242,285,589,708	$5 68	100.000
Increase during 1907	$73,883 15				$0 62	
Decrease during 1907		6,426,652,086	2.3	14,983,433,834		

*Out of service.

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

BELMONT HIGH SERVICE STATION, 1907.

Total Capacity, 7,000,000 gallons per day.

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

1907.	Running Time of each Engine in Hours.		Gallons Pumped by Each Engine.		Total Pumpage for Each Month.	Average Pumpage per Day.	Coal.		Lubricants.			Mean Water Pressure per Square Inch less Mean Pressure on Suction Pipe.		Gallons Raised 100 Feet per Pound of Coal.
									Grease and Tallow.	Oils.				
										Cylinder.	Engine.			
Months.	No. 1.	No. 2.	No. 1.	No. 2.	Gallons.	Gallons.	Tons.	Lbs.	Lbs.	Qts.	Qts.	No. 1.	No. 2.	
January	99	645	6,774,500	42,467,479	49,241,979	1,588,450	159	1,030	21½	168	42	60	60	155.78
February	672	-------	51,137,950	----------	51,137,950	1,826,355	134	510	14	140	20	60	-------	125.67
March	20	731	1,330,900	62,174,030	63,504,930	2,048,546	152	1,220	21½	184	22	60	60	210.01
April	-------	718	----------	62,050,855	62,050,855	2,065,361	129	1,040	40	268	12	-------	65	266.39
May	8	624	505,625	60,629,730	61,135,355	1,972,108	124	1,830	30½	217	47	68	68	287.32
June	62	420	4,078,500	49,963,321	54,041,821	1,801,394	136	930	20	212	30	60	60	199.85
July	-------	740	----------	85,402,350	85,402,350	2,754,914	164	1,510	31	244	12	-------	60	261.67
August	12	726	801,000	89,573,100	90,374,100	2,915,293	167	1,760	24½	262	15	64	64	293.84
September	16	701	1,076,000	96,607,870	97,683,870	3,256,129	187	1,670	25	284	15	70	70	315.90
October	12	732	600,000	99,848,150	100,448,150	3,240,262	168	555	110	294	14	56	63	319.31
November	-------	719	----------	91,690,740	91,690,740	3,056,358	178	1,655	100	278	8	-------	63	275.27
December	11	733	732,250	93,333,835	94,066,085	3,034,389	176	660	52	228	16	70	70	323.93
Totals and averages	912	7,489	67,036,725	833,741,460	900,778,185	2,467,885	1,880	930	490	2,770	253	63	64	252.91

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

ROXBOROUGH HIGH SERVICE STATION, 1907.

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

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

1907.	Running Time of Each Engine in Hours.		Gallons Pumped by Each Engine.		Total Pumpage for Each Month.	Average Pumpage per Day.	Coal.		Lubricants.			Mean Water Pressure per Square Inch Less Mean Pressure on Suction Pipe.		Gallons Raised 100 Feet per Pound of Coal.
									Grease and Tallow.	Oils.				
										Cylinder.	Engine.			
Months.	No. 1.	No. 2.	No. 1.	No. 2.	Gallons.	Gallons.	Tons.	Lbs.	Lbs.	Qts.	Qts.	No. 1.	No. 2.	
January	51	693	8,514,990	81,817,745	90,332,735	2,913,959	117	1,020	20	140	24	56	56	403.43
February	23	649	3,896,640	75,887,040	79,783,680	2,849,417	104	1,040	18	132	20	56	56	400.62
March	118	625	17,344,800	74,327,753	91,672,553	2,957,179	119	2,190	17	155	24	56	56	402.33
April	52	668	8,042,760	80,298,915	88,341,675	2,944,722	107	520	17	150	22	56	56	427.98
May	33	711	4,906,440	84,050,690	88,957,130	2,869,586	104	640	18	155	24	56	56	447.45
June	5	715	974,160	85,541,496	86,515,656	2,883,855	101	1,960	17	150	22	56	56	445.47
July	5	739	870,210	90,110,170	90,980,380	2,934,850	105	1,600	21	140	24	56	56	451.44
August	31	712	4,713,390	87,305,130	92,018,520	2,968,339	108	1,665	23¼	140	24	56	56	443.88
September	6	714	1,030,590	96,406,880	97,437,470	3,247,915	104	2,040	22½	120	22	56	56	487.19
October	8	735	2,001,780	125,120,660	127,122,440	4,100,723	119	340	23¼	124	24	56	56	559.64
November	24	695	4,933,170	121,457,675	126,390,845	4,213,028	127	1,120	25	120	22	56	56	519.99
December	27	716	5,794,470	133,109,755	138,904,225	4,480,781	144	2,080	23	124	22	56	56	506.24
Totals and averages.	883	8,372	63,023,400	1,135,433,909	1,198,457,309	3,283,445	1,366	535	245	1,650	274	56	56	457.97

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, 1907.

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

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

1907.	Running Time of Each Engine in Hours.			Gallons Pumped by Each Engine.			Total Pumpage for Each Month.	Average Pumpage per Day.	Coal.		Lubricants.			Mean Water Pressure per Square Inch Less Mean Pressure on Suction Pipe.			Gallons Raised 100 Feet per Pound of Coal.
											Grease and Tallow.	Oils.					
												Cylinder.	Engine.				
Months.	No. 1.	No. 2.	No. 3.	No. 1.	No. 2.	No. 3.	Gallons.	Gallons.	Tons.	Lbs.	Lbs.	Qts.	Qts.	No. 1.	No. 2.	No. 3.	
January	8	8		315,000	315,000		630,000	20,322	10	1,700		4		60	60		29.54
February	4			180,000			180,000	6,429	8	1,680		16	8	54			9.00
March	2	2		90,000	90,000		180,000	5,806	9	1,540		1	2	60	60		9.37
April	4	4		180,000	180,000		360,000	12,000	9	840		14	9	60	60		19.37
May	6	10		298,750	450,000		748,750	24,153	12	520	10	6	3	60	60		20.00
June	4	2		180,000	90,000		270,000	9,000	9	840	1	6	7	60	60		14.53
July	6	2		270,000	90,000		360,000	11,612	9	1,540		12	1	60	60		18.75
August	4	4		180,000	180,000		360,000	11,612	9	1,540		4	7	60	60		18.75
September	104	26		4,225,000	1,403,600		5,628,600	187,620	17	720	2	13	14	55	58		149.63
October	123	227		5,535,000	10,332,700		15,867,700	511,861	49	140	5	62	7	55	55		146.41
November	129			5,805,000			5,805,000	193,500	30	708	2	20	7	56			88.65
December	107	18		810,000	5,410,000		6,220,000	200,645	26	160	2		5	50	50		99.17
Totals and averages	501	303		18,068,750	18,541,300		36,610,050	100,302	202	728	22	158	70	57	58		51.95

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

CHESTNUT HILL PUMPING STATION, 1907.

Total Capacity, 750,000 gallons per day.

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

1907.	Running Time of Each Engine in Hours.		Gallons Pumped by Each Engine.		Total Pumpage for Each Month.	Average Pumpage per Day.	Coal.		Lubricants.			Mean Water Pressure per Square Inch Less Mean Pressure on Suction Pipe.		Gallons Raised 100 Feet per Pound of Coal.
									Grease and Tallow.	Oils.				
										Cylinder.	Engine.			
Months.	No. 1.	No. 2.	No. 1.	No. 2.	Gallons.	Gallons.	Tons.	Lbs.	Lbs.	Qts.	Qts.	No. 1.	No. 2.	
January							8	680		1				
February							7	1,120		1				
March							8	680		1				
April							8	80		1				
May							4	1,840						
June							2	220						
July														
August														
September							1	1,660						
October							5	1,040						
November							4	1,690						
December							5	250						
Totals							56	300		4				

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

FRANKFORD HIGH SERVICE STATION, 1907.

Total Capacity, 7,000,000 gallons per day.

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

1907.	Running Time of Each Engine in Hours.		Gallons Pumped by Each Engine.		Total Pumpage for each Month.	Average Pumpage per Day.	Coal.		Lubricants.			Mean Water Pressure per Square Inch less Mean Pressure on Suction Pipe.		Gallons Raised 100 Feet High per Pound of Coal.
									Grease and Tallow.	Oils. Cylinder.	Oils. Engine.			
Months.	No. 1.	No. 2.	No. 1.	No. 2.	Gallons.	Gallons.	Tons.	Lbs.	Lbs.	Qts.	Qts.	No. 1.	No. 2.	
January	740	-------	51,791,047	-------	51,791,047	1,670,678	101	1,025	-------	64	79	71	-------	320.64
February	662	-------	40,547,235	-------	40,547,235	1,448,116	69	115	-------	60	67	71	-------	362.37
March	740	-------	47,103,745	-------	47,103,745	1,579,475	75	1,285	½	80	78	71	-------	391.50
April	634	84	30,816,494	6,321,847	37,138,341	1,237,944	66	1,220	-------	83	70	71	71	350.56
May	339	405	16,248,126	27,894,547	44,142,673	1,423,957	72	1,520	-------	119	51	71	71	381.51
June	390	340	21,040,360	22,271,025	43,311,385	1,443,712	68	1,010	½	109	95	71	71	397.27
July	427	316	25,123,776	23,082,823	48,206,599	1,555,051	69	1,990	1½	126	80	71	71	433.26
August	337	300	26,403,281	22,560,472	48,963,753	1,579,475	80	415	-------	123	32	71	71	383.55
September	457	255	26,594,652	18,981,811	45,576,463	1,519,215	81	1,445	-------	109	68	71	71	350.64
October	422	322	23,770,315	24,239,173	48,009,488	1,548,693	86	400	-------	114	63	71	71	350.11
November	378	342	19,778,242	24,339,556	44,117,798	1,470,593	86	920	-------	89	56	71	71	320.69
December	392	352	20,595,888	25,806,656	46,402,544	1,496,856	83	1,200	½	109	60	71	71	348.91
Totals and averages.	5,818	2,716	349,813,161	195,497,910	545,311,071	1,494,003	941	1,345	[illegible]					[illegible]

ND CON

PTION.

al.	Average per day.	Average Total Pumpage per Day.	Percentage of Pumpage.	Total Steam Pumpage.	Total Water Pumpage.
718,106	298,248,971	311,447,990	8.260	8,793,830,132	861,057,581
384,156	312,335,148	323,351,095	7.746	8,279,543,755	774,286,896
661,945	304,247,160	328,974,861	8.725	9,237,560,628	880,660,075
505,104	306,450,170	326,236,298	8.374	8,922,018,781	865,070,160
312,237	313,461,717	329,352,037	8.735	9,416,632,737	793,280,398
471,741	290,115,725	305,272,748	7.835	8,538,170,222	620,013,199
374,871	308,544,350	321,700,046	8.532	9,505,434,732	467,266,717
239,683	297,523,861	317,962,958	8.433	9,651,659,672	205,191,986
209,146	310,773,638	329,455,821	8.456	9,490,625,378	393,049,257
820,376	303,478,077	325,757,863	8.640	9,299,562,118	798,931,636
551,607	293,385,053	312,782,068	8.029	8,580,670,243	802,791,804
325,113	291,342,746	310,480,790	8.235	8,953,389,399	671,515,116
374,085	302,436,641	320,225,240	100.00	108,749,097,797	8,133,114,825
					1,487,971,141
122,968	17,377,622	17,607,266		7,914,623,227	

October
November
December

No. 1—Holly Rotary Duplex.

No. 2—D'Auria Horizontal

Jonval Turbine No. 7.—Capacity, 5,100,000 gallons per day.
Jonval Turbine No. 8.—Capacity, 5,100,000 gallons per day.
Jonval Turbine No. 9.—Capacity, 5,100,000 gallons per day.

		Total Pumpage for Each Month.	Average Pumpage per Day.	Lubricants.		
				Oils.		Grease and Tallow.
				Cylinder.	Engine.	
o. 8.	No. 9.	Gallons.	Gallons.	Qts.	Qts.	Lbs.
8,933,083	128,174,078	861,057,581	27,776,051	52	196	25
2,837,125	131,696,424	774,286,896	27,653,106	58	206	60
7,029,375	149,804,194	880,660,075	28,408,389	45	220	30
0,668,025	125,182,507	865,070,160	28,835,672	60	260	62
4,461,495	113,602,590	793,280,398	25,589,690	76	148	25
7,712,539	132,892,030	620,013,199	20,667,106	156	112	15
----------	79,295,500	467,266,717	15,073,119	176	92	40
8,300,150	29,716,125	205,191,986	6,619,096	100	64	40
2,600,450	57,070,875	393,049,257	13,101,641	88	112	30
7,554,225	137,707,714	798,931,636	25,771,988	104	168	40
4,798,050	94,530,125	802,791,804	26,759,726	136	260	70
5,395,650	40,125,150	671,515,116	21,661,777	20	211	70
1,290,167	1,219,797,312	8,133,114,825	22,282,506	1,071	2,049	507

GARDEN PUMPIN

l Capacity, 170,000,000 ga

Capacity, 30,000,000 gallons per day.
Capacity, 30,000,000 gallons per day.
Capacity, 15,000,000 gallons per day.
Capacity, 15,000,000 gallons per day.

ACH ENGINE.

ATER PRESSURE AND MEAN SUCTION
IN POUNDS PER SQUARE INCH.

	NE HOUSE.					NEW HOUSE.				Gallons Raised 100 Feet per Pound of Coal.
	No. 2.	No. 3.	o. 7.	No. 8.	No. 11.	No. 2.	No. 3.	No. 9.	No. 10.	
)	590,163,790	684,860,0(	54	60	54	60	52	56	64	460.47
)	636,656,500	594,142,5(	54	60	54	60	56	56	71	451.30
)	742,500,000	604,681,5	54	61	54	60	60	57	64	430.22
)	560,942,750	632,714,5(	54	70	54	60	55	57	62	423.03
)	557,130,000	644,604,0(	54	54	54	59	55	58	69	441.06
)	100,770,000	654,727,0(	54	54	54	52	55	58	60	413.31
)	751,327,500	736,417,5(	54	54	54	60	55	59	71	455.58
)	744,450,000	741,615,0(	54	54	54	60	55	58	64	464.27
)	692,245,100	743,667,5(	54	54	54	60	55	58	68	464.76
)	402,140,000	446,845,0(	54	54	54	60	55	60	73	441.23
--	556,080,000	243,652,5(	54	60	--------	60	55	60	76	467.39
--	699,310,000	429,490,0(	54	54	--------	60	55	60	76	443.21
)	7,033,715,640	7,157,417,0	54	57	54	59	55	58	68	446.32

07.

No. 7
198,117
170,747
236,557
60,578
112,111
221,890,
251,572,
262,354,
205,463,
221,084,
216,419,
195,849,
352,747,

07.

	TOTAL PUMPAG FOR EAC MONTH
No. 7.	Gallons
198,117,560	1,075,485,
170,747,900	992,654,
236,557,600	1,080,014,
60,578,280	1,113,471,
112,111,090	1,115,073,
221,890,870	1,028,124,
251,572,413	1,123,406,
262,354,050	1,128,910,
205,463,860	1,204,180,
221,084,740	1,214,449,
216,419,700	1,136,543,
195,849,320	1,170,951,
352,747,383	13,383,266,

—Southwark Vertical Triple Expansion. Capacity, 20,000,000 llons per day.

—Southwark Vertical Triple Expansion. Capacity, 20,000,000 llons per day.

OAL.	LUBRICANTS.			MEAN WATER PRESSURE AND MEAN SUCTION LIFT IN POUNDS PER SQUARE INCH.				Gallons raised 100 Feet per Pound of Coal.
	GREASE AND TALLOW.	OILS.						
		CYLINDER.	ENGINE.					
Lbs.	Lbs.	Qts.	Qts.	No. 1.	No. 2.	No. 3.	No. 4.	
1,840	523	888	826	105	105	105	105	597.86
800	392	612	680	105	105	105	105	563.87
1,800	516	942	512	105	105	105	105	669.73
1,180	891	910	844	105	105	105	105	583.18
1,440	869	1,002	800	105	195	105	105	611.59
1,280	926	1,208	1,090	105	105	105	105	631.79
1,960	785	1,028	866	105	--------	105	105	663.14
400	630	1,234	710	105	105	105	105	656.59
1,760	628	896	928	105	105	105	105	655.06
200	703	1,040	754	105	105	105	105	624.01
240	633	982	778	105	105	105	--------	712.51
1,760	604	996	818	105	105	105	--------	686.88
1,220	8,100	11,738	9,606	105	105	105	105	638.02

'AL.
'AGE
EACH
'TH.

ons.
,357,045
,147,335
,500,180
,764,265
,866,080
,870,570
,477,770
,159,140
,514,755
,731,210
,338,130
,616,165
,342,945

No. 4.—
No. 5.—
No. 6.—
No. 7.—

TAL. PAGE EACH TH.	AVERAGE PUMPAGE PER DAY.	COAL
ons.	Gallons.	Tons.
,357,045	23,334,098	3,431
,147,335	23,290,976	3,592
,500,480	22,951,628	3,446
,764,265	21,458,808	2,922
,866,080	21,189,228	2,872
,870,570	21,829,019	3,054
,477,770	23,112,186	2,981
,159,140	23,230,940	3,032
,514,755	24,659,491	2,987
,731,210	23,668,748	3,322
,338,130	22,711,271	3,252
,616,165	22,987,618	3,652
,342,945	22,866,693	38,547

No. 1—Southwark Vertical Compound Rotary. Capacity, g[illegible],000,000 gallons per day.

No. 2—Southwark Vertical Compound Rotary. Capacity, p[illegible],000,000 gallons per day.

	LUBRICANTS			MEAN WATER PRESSURE AND MEAN SUCTION LIFT IN POUNDS PER SQUARE INCH.				Gallons Raised 100 Feet High per Pound of Coal.
		OILS						
	TALLOW.	CYLINDER.	ENGINE.					
	lbs.	Qts.	Qts.	No. 1.	No. 2.	No. 3.	No. 4.	
January	----	64	36	----	----	----	----	----
Februa[illegible]	2	16	12	----	----	----	----	----
March	2	168	224	----	82	81	----	420.49
April --	2	130	112	80	80	75	80	875.78
May ---	136½	1,028	998	75	78	75	78	1874.40
June --	4	3	8	----	----	----	----	----
July --	----	2	8	----	----	----	----	----
August	----	10	12	----	----	----	----	----
Septemb	----	2	6	----	----	----	----	----
October	----	12	12	----	----	----	----	----
Novemb	1	40	23	----	----	----	----	----
Decemb[illegible]	½	4	6	----	----	----	----	----
Tot[illegible]	148	1,479	1,457	77	80	77	79	264.22

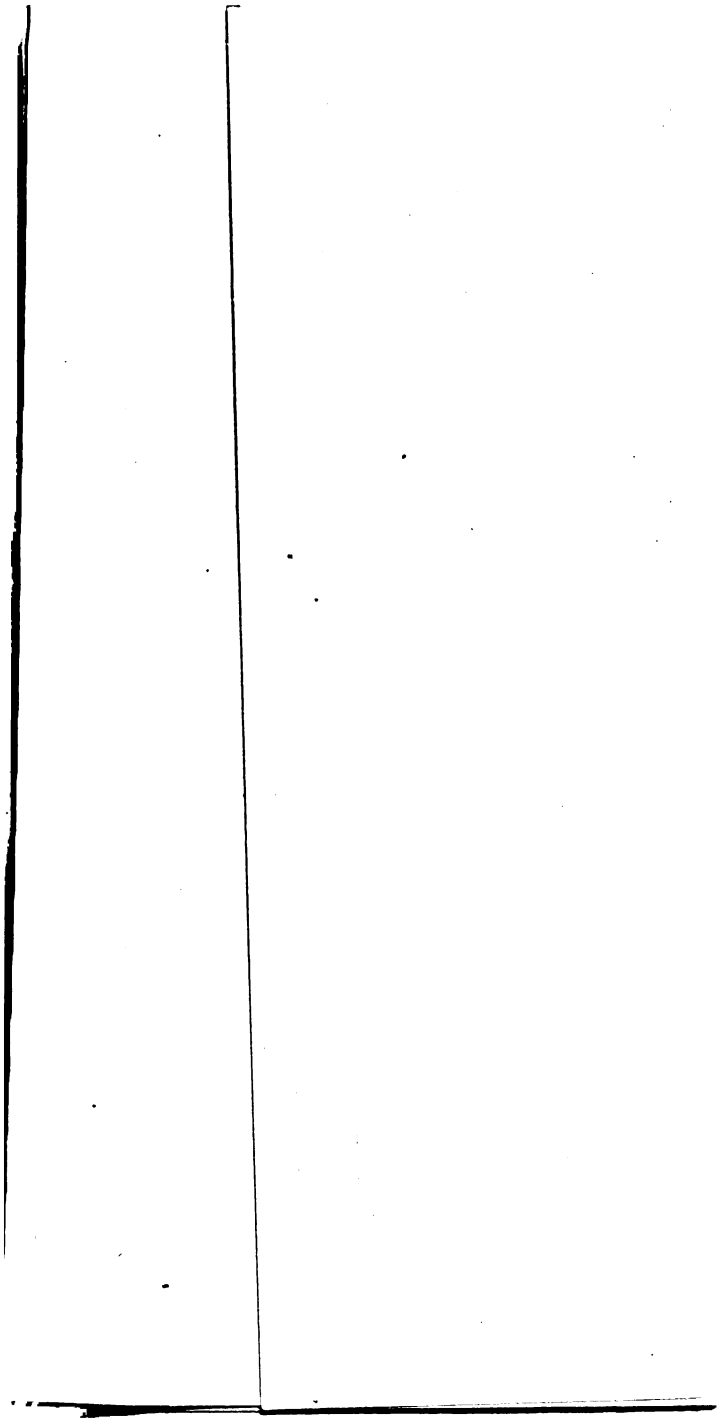
each. Total Capacity, 1

	TOTAL PUMPAGE FOR EACH MONTH.	AVERA PUMPA PER DA
	Gallons.	Gallons
---	1,116,589,950	36,019,
---	1,021,287,510	36,474,
---	1,032,467,820	33,305,
---	1,000,230,610	33,341,
---	623,199,549	20,103,
---	1,143,723,500	38,124,
---	1,202,803,790	38,800,
---	1,202,942,749	38,804,
---	1,364,401,890	45,480,
---	1,752,495,060	56,532,
---	1,760,443,460	58,681,
60	1,751,205,380	56,490,
60	14,971,791,268	41,018,

...NSES

Improv... aterial.	...ighting. Cost.	Outside Current.	Miscellaneous Supplies.	Total.	Total Expenses.
	$19 61		$749 81	$20,993 75	$29,102 42
1,075 65	133 97		2,230 59	311,155 87	382,107 28
90 00	154 63		1,981 36	179,389 22	229,135 21
	119 47		2,612 59	201,482 50	288,980 17
82 64	63 33		935 23	180,470 43	212,657 61
719 90	28 55	$225 91	586 62	22,445 73	32,417 68
1,687 00	82 11		1,069 88	101,092 28	120,872 06
3,655 19	$601 67	$225 91	$10,166 08	$1,020,029 78	$1,295,272 43
	$20 34		$282 08	$17,908 93	$20,659 50
	2 12		142 81	13,502 10	15,838 65
	21 27		110 49	16,353 95	18,645 64
	1 56		44 19	7,140 16	7,358 17
	16 95		28 88	2,519 54	2,538 32
	24 65	$174 64	245 52	12,831 02	15,810 59
	$86 89	$174 64	$853 97	$70,255 70	$80,850 87
3,655 19	$688 56	$400 55	$11,020 05	$1,090,285 48	$1,376,123 30
	$336 22				$73,883 15
			$23,110 51	$2,927 48	

PUMPING STATIC	Length of Steam Drum (feet).	Length of Grate (feet).	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).
Spring Garden	21½	6⅙	42	1,551	113	100	49
	....	6⅙	42	1,116	100	150	27
	4	6	40½	1,371	95.9	95	25
Belmont	....	6⅙	42	1,116	100	150	38½
	....	6⅙	42	1,116	100	150	38½
	....	8⅛	42	1,116	100	150	38½
Belmont High Service	....	6⅙	42	1,116	80	125	20
Belmont Filters	....	.....	41	1,302	.....	150	
Queen Lane	....	6⅙	42	1,116	100	202	118
Roxborough	4	5	33¾	1,215	87	100	20¼
	13½	6⅙	37½	1,047	75	100	28
	21½	6⅙	42	1,551	113	100	28
	....	6¼	42	1,116	100	175	38½
	....	6⅙	42	1,116	100	175	38½
Roxborough High Servic	....	6⅙	42	1,116	80	125	20
Mt. Airy	....	4	16½	475	33	50	7⅛
Chestnut Hill	17½	5	13¾	175	16½		
	4	5	22½	.....	44		
Frankford	21½	.....	42	1,551	113	{150 100	38 33
	....	5¾	40¼	1,811.5	110	150	38½
	1	8½	102	5,090	500	150	38½
Frankford High Service	....	6⅙	37½	1,116	100	125	12
Torresdale Filters	28	7½	66	3,280	325	250	



Current Expenses of Reservoirs for 1907.

Reservoirs.	Improvements and Repairs.		Maintenance.				Total Expenses.
	Material.	Wages.	Wages of Watchmen.	General Labor.	Uniforms.	Miscellaneous Supplies.	
Fairmount	$5 99	$223 25	$2,046 71	$753 02	$93 34	$0 84	$3,123 15
Spring Garden	75	8 00	1,670 01	279 66	93 32	29 78	2,081 52
Corinthian	88 35	212 50	1,855 87	459 47	93 32	51 65	2,761 16
East Park	220 40	1,178 60	3,428 06	955 03	186 68	82 29	6,051 05
Belmont	188 18	569 00	1,700 00	52 00	93 32	5 69	2,608 49
Queen Lane	1,746 53	3,458 90	3,456 82	768 02	160 00	115 59	9,705 86
Lower Roxborough		5 35	1,627 63		80 00		1,712 98
Upper Roxborough			1,694 78	34 00	93 34	14 94	1,837 06
Mt. Airy	3 75	9 00					12 75
Wentz Farm	2 54	6 80	1,784 90	675 56	93 34	1 23	2,764 37
Lehigh			1,710 38	14 00	93 34	24 38	1,842 10
Oak Lane			1,663 97		93 32	41 95	1,799 24
Totals	$2,256 79	$5,671 40	$22,639 13	$3,990 76	$1,173 32	$368 34	$36,099 74

APPENDIX C

REPORT

OF THE

ASSISTANT IN CHARGE OF DISTRIBUTION

Philadelphia, January 24, 1908.

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

DEAR SIR:—I have the honor to submit the following report on the distribution system for the year 1907:

Mains.

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

New Work.

Service mains laid	131,216 feet
Supply mains laid	13,787 feet
Connections, etc.	6,897 feet
Total	151,900 feet

Comparison of Conditions Relative to the Distribution, 1906-1907.

	1906.	1907.	Increase.	Decrease.
Service mains, 4-in. to 16-in.	154,598	131,216	----------	23,382
Supply mains, 10-in. to 16-in.	14,633	13,787	----------	846
Connections and miscellaneous work	6,650	6,897	247	----------
Totals in feet	175,881	151,900	247	24,228

	1906.	1907.	Increase.	Decrease.
Relaid, 4-in. to 30-in.	8,273	5,910		2,363
Miscellaneous repairs, 3-in. to 36-in.	2,581	9,216	6,635	
Taken up, 3-in. to 36-in.	7,660	4,199		3,461
Lowered, raised and shifted, 6-in. to 30-in.	3,221	8,110	2,889	
Totals in feet	23,735	27,435	9,524	5,824
Pipe cut off and abandoned, 3-in. to 12-in.	3,359	2,431		928

Meters.

	1906.	1907.	Increase.	Decrease.
Meters in use	1,733	1,726		7

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

	1906.	1907.	Increase.	Decrease.
Dwellings with water	271,988	282,455	10,467	
Dwellings without water	11,823	11,928	105	
Water closets	344,671	362,733	18,062	
Baths	314,755	325,182	10,427	
Wash paves	97,027	99,419	2,392	
Basins and sinks	134,816	145,708	10,892	
Urinals	6,753	6,921	168	

Repairs.

Mains relaid ..... 5,910 feet
Repairs and connections ..... 9,216 feet
——————15,126 feet
Old pipe taken up ..... 4,199 feet
Pipe lowered, raised and shifted .. 8,110 feet
——————12,309 feet

Total .....27,435 feet

Abandoned.

Three-inch	40 feet	
Four-inch	880 feet	
Six-inch	1,436 feet	
Twelve-inch	75 feet	
Total		2,431 feet

The total quantity of pipe handled for all purposes throughout the year was 179,335 feet, weighing 8,501,487 pounds.

The total quantity of new pipe laid was 151,900 feet, or 28.77 miles, making, in addition to that previously laid, 1,558.25 miles now in use.

Fire Hydrants.

New style fire hydrants in new locations	308
New style fire hydrants in place of old style	316
Total	624
New style fire hydrants taken out	37
Old style fire hydrants taken out	1
Total	38

The total number of new style fire hydrants added to the distribution system was 270, and the total number in use December 3, 1907, was 14,852, of which 445 are of the old style and 14,407, or 97 per cent., are of the new pattern.

Drills for Attachments.

Size.	No. of Openings.	Area, Sq. Inches.
One-half inch	8,343	1,638
Five-eighth inch	401	123
Three-quarter inch	121	53
One inch	143	112
One and one-quarter inches	21	26
One and one-half inches	32	57
Two inches	75	236
Three inches	9	64
Four inches	7	88
Six inches	15	424
Total	9,167	2,821

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.

Respectfully submitted,

W. WHITBY,

Assistant in Charge of Distribution.

SERVICE AND SUPPLY MAINS LAID DURING 1907.

FIRST DISTRICT.

Comprising the First, Second, Third, Fourth, Twenty-sixth, Thirtieth, Thirty-sixth, and Thirty-ninth Wards.

	Purposes for which used.		Size in Inches. 3	4	6	8	10	12	16	20	36	Total in Feet and Pounds.
New pipe or feet added.	Service mains				10,432	430	1,146	512				12,520
	Supply main connections								38	7	16	61
	Fire hydrant connections				234							234
	Fire connections (private)				40							40
	Supply connections (private)		17		16							33
	Total	Feet	17		10,722	430	1,146	512	38	7	16	12,888
		Pounds	255		353,826	18,060	63,030	38,400	4,370	1,085	6,720	485,746
Pipe used but adding nothing to feet in ground.	Pipe relaid				3		13					16
	Repairs, general				253	12	8	11	5	11	5	305
	Pipe taken up			33	19							52
	Pipe raised				226							226
	Total	Feet		33	501	12	21	11	5	11	5	599
		Pounds		660	16,533	504	1,155	825	575	1,705	2,100	24,057
	Total handled	Feet	17	33	11,223	442	1,167	523	43	18	21	13,487
		Pounds	255	660	370,359	18,564	64,185	39,225	4,945	2,790	8,820	509,803
	Pipe cut off and abandoned				24							24

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. 3	4	6	8	10	12	16	20	30	Total in Feet and Pounds.
New pipe or feet added.	Service mains				836							836
	Supply mains						13	3,351	146			3,510
	Supply main connections						92	36		41	26	195
	Fire hydrant connections				269							269
	Fire connections (private)		13	63	86							162
	Supply connections (private)		10	56								66
	Total	Feet	23	119	1,191		105	3,387	146	41	26	5,038
		Pounds	345	2,380	39,303		5,775	254,025	16,790	6,355	8,580	333,553
Pipe used, but adding nothing to feet in ground.	Pipe relaid			25	110	501	2,595	323			561	4,115
	Repairs, general		23	7	413	3	150	30		11		667
	Pipe taken up			12	2,203	64	19	328			530	3,156
	Pipe shifted				300		151			1,238		1,689
	Total	Feet	23	44	3,056	568	2,915	681		1,249	1,091	9,627
		Pounds	345	880	100,848	23,856	160,325	51,075		193,595	360,030	890,954
Total handled		Feet	46	163	4,247	568	3,020	4,068	146	1,290	1,117	14,665
		Pounds	690	3,260	140,151	23,856	166,100	305,100	16,790	199,950	368,610	1,224,507
Pipe cut off and abandoned				4	995							999

Third District.

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

Purposes for which used.		Size in Inches.											Total in Feet and Pounds.
		3	4	6	8	10	12	16	18	20	30	36	
New pipe or feet added.	Service mains	-----	27	20,612	888	97	2,710	-----	-----	-----	-----	-----	24,334
	Supply mains	-----	-----	-----	-----	-----	-----	8,135	-----	-----	-----	-----	8,135
	Supply main connections	-----	-----	10	-----	7	-----	-----	-----	6	40	40	103
	Fire hydrant connections	-----	-----	1,023	-----	-----	-----	-----	-----	-----	-----	-----	1,023
	Fire connections (private)	9	38	82	-----	-----	-----	-----	-----	-----	-----	-----	129
	Supply connections (private)	17	35	-----	-----	-----	-----	-----	-----	-----	-----	-----	52
	Drains	-----	-----	55	-----	-----	-----	-----	-----	-----	-----	-----	55
	Total — Feet	26	100	21,782	888	104	2,710	8,135	-----	6	40	40	33,831
	Total — Pounds	390	2,000	718,806	37,296	5,720	203,250	935,525	-----	930	13,200	16,800	1,933,917
Pipe used, but adding nothing to feet in ground.	Pipe relaid	-----	-----	1,391	36	28	-----	-----	-----	-----	-----	-----	1,455
	Repairs, general	-----	25	5,455	79	109	273	12	-----	3	34	34	6,024
	Pipe taken up	3	42	255	-----	32	-----	-----	-----	-----	-----	-----	332
	Pipe lowered	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	235	235
	Pipe raised	-----	-----	69	-----	-----	-----	-----	110	-----	-----	-----	179
	Pipe shifted	-----	-----	3,516	-----	-----	450	-----	-----	-----	-----	-----	3,966
	Total — Feet	3	67	10,686	115	169	723	12	110	3	34	269	12,191
	Total — Pounds	45	1,340	352,638	4,830	9,295	54,225	1,380	14,300	465	11,220	112,980	562,718
Total handled	Feet	29	167	32,468	1,003	273	3,433	8,147	110	9	74	309	46,022
	Pounds	435	3,340	1,071,444	42,126	15,015	257,475	936,905	14,300	1,395	24,420	129,780	2,496,635
Pipe cut off and abandoned		-----	775	327	-----	-----	-----	-----	-----	-----	-----	-----	1,102

Fourth District.

Comprising the 15th, 20th, 28th, 29th, 32d, and part of 37th and 38th Wards

	Purposes for which used.		Size in Inches. 3	4	6	8	10	12	30	36	Total in Feet and Pounds.
New pipe or feet added.	Service mains				9,433			2,829			12,262
	Fire hydrant connections				499						499
	Fire connections (private)			14							14
	Supply connections (private)			19							19
	Total	Feet		33	9,932			2,829			12,794
		Pounds		660	327,756			212,175			540,591
Pipe used, but adding nothing to feet in ground.	Pipe relaid				54		13				67
	Repairs, general		8	18	933		40				999
	Pipe taken up		61	22	160	4	7		20	87	361
	Pipe raised						48				48
	Pipe shifted				939						939
	Total	Feet	69	40	2,086	4	108		20	87	2,414
		Pounds	1,035	800	68,838	168	5,940		6,600	36,540	119,921
Total handled		Feet	69	73	12,018	4	108	2,829	20	87	15,208
		Pounds	1,035	1,460	396,594	168	5,940	212,175	6,600	36,540	660,512
Pipe cut off and abandoned			40	44	66						150

Fifth District.

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

	Purposes for which used.		Size in Inches. 4	6	10	30	36	Total in Feet and Pounds.
New pipe or feet added.	Service mains			3,645				3,645
	By-pass connections			20				20
	Fire hydrant connections			84				84
	Fire connections (private)		29					29
	Drains			21				21
	Total	Feet	29	3,770				3,799
		Pounds	580	124,410				124,990
Pipe used but adding nothing to ft. in ground	Repairs, general		9	52	4	26	6	97
	Pipe lowered			177		180		357
	Total	Pounds	9	229	4	206	6	454
		Feet	180	7,557	220	67,980	2,520	78,457
Total handled		Feet	38	3,999	4	206	6	4,253
		Pounds	760	131,967	220	67,980	2,520	203,447

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	20	24	30	Total in Feet and Pounds.
New pipe or feet added.	Service mains			19,541		246	1,681				21,468
	Supply main connections				60	14					74
	Fire hydrant connections			564							564
	Fire connections (private)			30							30
	Supply connections (private)	37									37
	Drains					14					14
	Total — Feet	37		20,135	60	274	1,681				22,187
	Total — Pounds	555		664,455	2,520	15,070	126,075				808,675
Pipe used but adding nothing to feet in ground.	Pipe relaid		7	93				36			136
	Repairs, general			624	6	16	25			12	683
	Pipe taken up		91	85		2	27		36		241
	Pipe lowered			252							252
	Pipe shifted						25				25
	Total — Feet		98	1,054	6	18	77	36	36	12	1,337
	Total — Pounds		1,960	34,782	252	990	5,775	5,580	11,160	3,960	64,459
Total handled	Feet	37	98	21,189	66	292	1,758	36	36	12	23,524
	Pounds	555	1,960	699,237	2,772	16,060	131,850	5,580	11,160	3,960	873,134
Pipe cut off and abandoned			28	24							52

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	22	30	Total in Feet and Pounds.
New pipe or feet added.	Service mains			45,813	5,182	4,096		1,060				56,151
	Supply mains							2,142				2,142
	Service main connections			8								8
	Supply main connections					43	10		16			69
	Fire hydrant connections			1,841								1,841
	Fire connections (private)			75								75
	Supply connections (private)	100	434									534
	Drains			93			137			310		543
	Total — Feet	100	434	47,833	5,182	4,139	147	3,202	16	310		61,363
	Total — Pounds	1,500	8,680	1,578,489	217,644	227,645	11,025	368,230	2,480	77,500		2,493,193
Pipe used, but adding nothing to feet in ground.	Pipe relaid				17		104					121
	Repairs, general		26	269	58	43	33				21	441
	Pipe taken up			40	17							57
	Pipe raised			80								80
	Pipe shifted			114								114
	Total — Feet		26	491	92	43	137				21	813
	Total — Pounds		520	16,302	3,864	2,365	10,275				6,930	40,256
Total handled	Feet	100	460	48,327	5,274	4,182	284	3,202	16	310	21	62,176
	Pounds	1,500	9,200	1,594,791	221,508	230,010	21,300	368,230	2,480	77,500	6,930	2,533,449
Pipe cut off and abandoned			29				75					104

Alterations of Water Pipes on the Line of the Market Street Subway—Pipe Relaid.

Streets.	Location.	Pipe.	
		Size.	Feet.
Fifth	From 6 feet north of south house line of Market street, to 25 feet north of south house line of Market street	10	19
Juniper	From South Penn Square to south house line of Market street	30	312
Market, S. S.	From west house line of Letitia street, to 14 feet west of east house line of Second street	10	194
Market, S. S.	From 2 feet east of east curb line of Second street, to east house line of Third street	10	540
Market, S. S.	From west house line of Third street, to east house line of Fourth street	10	388
Market, S. S.	From 204 feet 6 inches west of west house line of Fourth street, to 255 feet 6 inches east of east house line of Sixth street	10	362
Market, S. S.	From 21 feet east of west house line of Broad street, to 12 feet east of west house line of Fifteenth street	10	191
Market, N. S.	From Front street, to east house line of Second street	8	501
Market, N. S.	From east to west house line of Second street	6	50
Market, N. S.	From west house line of Second street, to 4 feet east of east curb line of Third street	10	508
Market, N. S.	From 4 feet east of east curb line of Third street, to west house line of Third street	6	42
Market, N. S.	From 21 feet east of west house line of Broad street, to 20 feet east of west house line of Fifteenth street	10	189
Market	From 7 feet east of east curb line of Broad street, to 43 feet west of west house line of Fifteenth street (City Hall main)	12	323
South Penn Square, S. S.	From Juniper street to Broad street	30	249
	Total		3,868

Alterations of Water Pipes on the Line of t Market Street Subway—Pipe Relaid.—Continued.

Streets.	Location.	Pipe.	
		Size.	Feet.
Broad	From north house line of South Penn Square, to north house line of Market street	20	320
South Penn Square	From east house line of Broad street (east), to 36 feet west of west house line of Broad street (east)	10	151
South Penn Square	From west curb line of Broad street (east), to Broad street (west)	20	275
	Total		746

		22	24	30	36	Total Feet and Pounds.
New pipe or feet added.	Service					131,216
	Supply					13,787
	Service					8
	Supply			66	56	502
	By-pas					20
	Fire h					4,514
	Fire c					479
	Supply					741
	Drains	310				633
	T	310		66	56	151,900
		77,500		21,780	23,520	6,720,665
Pipe used, but adding nothing to feet in ground.	Pipe			561		5,910
	Repai			93	45	9,216
	Pipe		36	550	87	4,199
	Pipe			180	235	844
	Pipe					533
	Pipe					6,73°
	T		36	1,384	367	27,435
			11,160	456,720	154,140	1,780,822
	Tot	310	36	1,450	423	179,335
		77,500	11,160	478,500	177,660	8,501,487
Pipe cut off						2,431

Total Feet of Pipe in Use December 31, 1907.

Size in Inches.	Total in use December 31, 1906.	Extensions and Relays During 1907.		Total.	Deductions During 1907.			Total in use December 31, 1907.
		Laid.	Relaid.		Taken up.	Abandoned.	Total.	
1	175							175
1½	3,566							3,566
2	3,655							3,655
3	76,556	203		203	64	40	104	76,655
4	175,618	715	32	747	200	880	1,080	175,285
6	5,405,396	115,365	1,651	117,016	2,762	1,436	4,198	5,518,214
8	338,200	6,560	554	7,114	85		85	345,229
10	494,867	5,768	2,649	8,417	60		60	503,224
12	497,264	11,266	427	11,693	355	75	430	508,527
16	170,429	11,521		11,521				181,950
18	16,089							16,089
20	276,643	70	36	106				276,749
22	606	310		310				916
23	27							27
24	13,149				36		36	13,113
30	276,137	66	561	627	550		550	296,214
36	101,403	56		56	87		87	101,372
48	197,111							197,111
60	9,500							9,500
Total	8,076,391	151,900	5,910	157,810	4,199	2,431	6,630	8,227,571

Recapitulation of Fire Hydrants, Set, Renewed and Removed.

	Districts.	Style.				Total.
		O. S.	No. 1.	No. 2.	No. 3.	
Set.	First		20			20
	Second		15			15
	Third		64	17	2	83
	Fourth		25	10		35
	Fifth		8			8
	Sixth		23	5	2	30
	Seventh		110	5	2	117
	Total		265	37	6	308
Renewed.	First		1			1
	Second		63	14	1	78
	Third		40	10	2	52
	Fourth		42	19	1	62
	Fifth		12			12
	Sixth		51	2	1	54
	Seventh		47	7	3	57
	Total		256	52	8	316
	Total new hydrants		521	89	14	624
Removed.	First		1	2		3
	Second		7	2		9
	Third		5	4	1	10
	Fourth		3	5		8
	Fifth					
	Sixth		4		3	7
	Seventh	1				1
	Total	1	20	13	4	38
	Total added during 1907					270

DS DURING 1907 A

	Fourth Distric					
	Wards.					
1.	15	20	28	29	32	37
2						
3			2		2	2
5						
0	5		1		1	1
5						

	912
	3
	12
	9
	1
	1
	2
	4
	944

Fire Hydrants by Wards.

Wards.	STYLE.							Total.
	O. S.	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	High Pressure.	
First	2	203	67	8	------	------	------	280
Second	1	132	90	15	------	------	------	238
Third	3	80	42	6	------	------	------	131
Fourth	1	65	33	14	------	------	------	113
Fifth	17	105	62	5	------	------	17	206
Sixth	8	83	47	8	------	1	49	196
Seventh	5	149	81	6	------	------	------	241
Eighth	10	125	97	4	------	1	24	261
Ninth	------	123	79	3	------	1	32	238
Tenth	------	110	68	------	------	4	22	204
Eleventh	4	75	26	1	------	------	------	106
Twelfth	7	63	26	5	------	------	------	101
Thirteenth	23	67	66	9	------	------	------	165
Fourteenth	------	91	86	1	------	------	------	178
Fifteenth	------	239	207	5	1	2	------	454
Sixteenth	2	82	39	4	1	------	------	128
Seventeenth	11	85	32	1	------	------	------	129
Eighteenth	12	205	57	9	------	------	------	283
Nineteenth	31	337	119	5	------	------	------	492
Twentieth	17	140	129	4	------	------	------	290
Twenty-first	40	415	38	7	------	------	------	500
Twenty-second	59	1,169	150	20	------	------	------	1,398
Twenty-third	37	344	80	7	------	------	------	468
Twenty-fourth	37	315	152	12	------	------	------	516
Twenty-fifth	------	296	65	3	------	------	------	364
Twenty-sixth	1	239	123	14	------	------	------	377
Twenty-seventh	7	187	66	7	------	1	------	268
Twenty-eighth	1	170	134	26	------	------	------	331
Twenty-ninth	12	205	203	8	------	1	------	429
Thirtieth	5	130	110	6	------	------	------	251
Thirty-first	------	248	63	7	------	------	------	318
Thirty-second	7	136	94	7	------	1	------	245

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	422	128	12	1			578
Thirty-fourth	6	386	48	10		1		451
Thirty-fifth		145	31	5				181
Thirty-sixth	6	342	101	29				478
Thirty-seventh	3	106	75	5				189
Thirty-eighth	16	456	113	10				595
Thirty-ninth		243	89	7				339
Fortieth	7	306	55	4				372
Forty-first		53	10	10				73
Forty-second		241	6	10				257
Forty-third	7	319	50	7				383
Forty-fourth	16	220	68	9				313
Forty-fifth		306	63	4				373
Forty-sixth	9	294	53	15				371
Totals	445	10,252	3,621	374	3	13	144	14,852

Fire Hydrants by Purveyors' Districts.

Districts.	Style.							Total.
	O. S.	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	High Pressure.	
First	16	1,444	686	102	------	------	------	2,248
Second	80	1,166	708	50	1	7	144	2,156
Third	104	2,589	633	68	1	------	------	3,395
Fourth	46	1,094	891	49	1	4	------	2,085
Fifth	42	529	38	8	------	------	------	617
Sixth	75	1,722	223	40	------	------	------	2,060
Seventh	82	1,708	442	57	------	2	------	2,291
Totals	445	10,252	3,621	374	3	13	144	14,852

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.	Removed for larger attachments.	Retriven.	Discontinued.	Transfer.	Not drawn.	Drawn and redriven.	Total.	Discontinued and abandoned.	Delinquent.	Leak.	Transfer.	Total.	Drawn and redriven.
First	1,287	40	17	20	1	1	9	1	----	4	1,380	------	94	69	3	------	45	211	------	------	122	------	122	------
Second	124	66	39	52	9	12	11	----	----	----	313	35	43	62	1	144	------	285	8	------	57	------	65	------
Third	1,328	15	15	22	5	5	27	3	5	5	1,430	------	47	57	1	------	------	105	107	------	116	20	243	10
Fourth	312	31	15	3	----	3	13	----	----	----	377	29	74	3	------	6	65	177	220	------	94	------	314	------
Fifth	168	23	------	1	----	1	3	----	----	----	196	2	------	4	5	22	34	67	1	------	------	------	1	2
Sixth	1,361	117	18	21	4	3	5	2	----	2	1,533	31	82	36	1	15	25	180	------	------	72	------	72	------
Seventh	3,763	109	17	24	2	7	7	3	2	4	3,938	12	------	15	------	------	97	124	3	2	66	------	71	------
Totals	8,343	401	121	143	21	32	75	9	7	15	9,167	99	340	246	11	187	266	1,149	339	2	527	20	888	12

Permits Issued During the Year 1907.

Aquaria	3	Lawn sprinklers	1
Bakeries	21	Laundries	7
Barber shops	68	Laboratories	4
Bars	32	Machines for scouring, rinsing, etc	13
Basins and sinks in dwellings	9,481	Milk houses	24
Basins and sinks in offices and stores	1,691	Motors (beer)	34
Baths in dwellings	10,053	Motors (organ)	10
Baths in hotels, etc	490	Photograph galleries	4
Baths (shower)	28	Pantry sinks	553
Bidets	3	Pools (swimming)	4
Boats, etc. (supply of)	58	Pools (in churches)	5
Bottling establishments	17	Restaurants and eating saloons	16
Building purposes	375	Slaughter houses	5
Carriages and wagons	245	Stables	40
Cellar drainers	5	Stalls (in stables)	984
Dwellings	10,467	Stalls (cow)	15
Dwellings (half)	60	Steam boilers (number)	128
Drug stores	25	Steam boilers (H. P.)	5,078
Dye houses	6	Steam engines (number)	59
Factories	15	Steam engines (H. P.)	663
Ferrules (number)	9,393	Street sprinklers	90
Filters	6	Tubs, vats and tanks	100
Fire hydrants (use of)	90	Urinals in dwellings	4
Fish troughs and stands	2	Urinals in stores, offices, etc.	208
Forges	19	Urinal troughs	61
Fountains (counter)	10	Wash paves and screw nozzles	2,396
Fountains (garden)	6	Wash paves for watering horses	22
Green houses	6	Wash tubs (stationery)	9,647
Heating boilers	48	Water closets in dwellings	17,632
Hydrants in new dwellings	9,567	Water closets in stores, etc.	748
Hydraulic elevators	7		
Ice-cream saloons	8		

Premises Supplied and Appliances in Use January 1, 1908.

Aquaria	37	Drug stores	488
Arsenals	2	Dye houses	686
Asylums	7	Engines (railroads)	400
Bakeries	1,378	Factories, foundries, mills	2,180
Barber shops	2,022	Filters	41
Bars	1,915	Fire stations	80
Basins and sinks in dwellings	109,589	Fountains (garden)	75
		Fountains (counter)	547
Basins and sinks in offices and stores	36,119	Forges	1,253
Baths in dwellings	821,204	Furnaces	23
Baths (public)	3,471	Gas works (holder)	13
Baths (shower)	412	Glass works	15
Baths (foot)	95	Green houses	1,134
Beam houses and tanneries	30	Grindstones	120
Bidets	462	Halls and club houses	275
Bottling establishments	742	Hatters' planks (per set)	25
Brick yards	16	Hydrants	289,964
Brick yards (gangs of men)	831	Hospitals	70
		Hotels	80
Breweries	92	Hydraulic elevators	289
Barrels (brewers)	3,350,814	Ice-cream saloons	166
Cars, steam and electric	1,984	Institutions (charitable)	150
Carriages and wagons	9,804	Ice machines	180
Cellar drainers	72	Laundries	785
Cemeteries	27	Lawn sprinklers	285
Churches	750	Laboratories	45
Coal yards	250	Machines for washing and scouring	217
Coloring rooms	140		
Condensers	35	Marble yards	70
Depots and railway stations	100	Malt houses	590
		Market houses	50
Dwellings (with water)	282,455	Milk houses	597
Dwellings (without water)	2,133	Mints	1
Dwellings (half without water)	9,795	Motors (beer)	1,982
Dyers	786	Motors (organ)	258

Premises Supplied and Appliances in Use—Continued.

Photograph galleries	151	Steam engines (number)	2,345
Photograph galleries (operators)	195	Steam engines (H. P.)	27,813
Polishing wheels	25	Steam saws	65
Police stations and patrols	76	Steam presses and hammers	60
Pools (swimming)	38	Shops and stores (with water)	6,560
Pools (in churches)	97	Shops (without water)	960
Printing establishments	180	School houses	337
Prisons	4	Theatres	30
Rectifying establishments	9	Tubs, vats and tanks	2,700
Restaurants and oyster saloons	1,234	Turbine wheels	40
Shot towers	1	Urinals in dwellings	295
Slaughter houses	492	Urinals in stores, offices, etc.	5,801
Soap-boiling establishments	17	Urinal troughs	825
Stand pipes for watering engines	70	Vinegar establishments	12
Stables	8,500	Wash paves and screw nozzles	148,757
Stalls (in stables)	56,439	Wash paves for watering horses)	466
Stalls (cow)	330	Wash tubs (stationery)	68,154
Stalls (fish troughs)	125	Water closets in dwellings	330,955
Steam boilers (number)	4,270	Water closets in stores, etc.	31,778
Steam boilers (H. P.)	151,016	Wool washers	140
Steam boilers (heating)	1,210		
Steam boilers, heating (H. P.)	6,600		

Repairs to Mains, Stops and Fire Hydrants, also Stops and Fire Hydrants Removed During 1907.

Districts.	Repairs to Mains	Stops.			Fire Hydrants.		
		Repaired.	Renewed.	Removed.	Repaired.	Renewed.	Removed.
First	32	1,429	3	1	158	1	3
Second	128	108	13	16	474	78	9
Third	479	209	17	14	78	52	10
Fourth	234	562	3	7	671	62	8
Fifth	47	26	1	-------	1	12	-------
Sixth	69	24	7	3	6	54	7
Seventh	295	301	24	9	140	57	1
Total	1,284	2,659	68	50	1,528	316	38

Total Number of Stops and Valves Arranged by Districts.

Pattern.	Size.	Outlets.	Districts.							Total.
			1st.	2nd.	3rd.	4th.	5th.	6th.	7th.	
	3	2-way.	1	184	4	23	2	17	13	244
	4	2-way.	107	260	61	159	51	90	90	818
	6	2-way.	3,933	2,625	4,740	3,234	773	2,712	3,600	21,617
	8	2-way.	171	119	189	121	10	86	365	1,061
	10	2-way.	246	402	327	247	34	201	240	1,697
	12	2-way.	145	221	343	167	51	248	217	1,392
Single Gate.	16	2-way.	38	48	64	21	5	41	28	245
Bureau of Water.	18	2-way.	------	------	6	18	------	1	------	25
	20	2-way.	25	36	20	37	14	16	30	178
	30	2-way.	8	9	29	27	15	3	3	94
	36	2-way.	3	2	7	12	11	------	8	43
	48	2-way.	------	------	3	9	------	------	------	12
	Total		4,677	3,906	5,793	4,075	936	3,415	4,594	27,426
	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
	20	------	------	------	1	------	------	------	------	1
	30	------	------	------	1	------	------	------	------	1
Fairbanks.	36	------	------	------	1	------	------	------	------	1
	Total		------	------	3	------	------	------	------	3
Vertical Fairbanks	36	------	------	------	1	------	------	------	------	1
	6	4-way.	3	3	------	12	------	------	13	31
	8	4-way.	------	------	------	5	------	------	------	5
Barton.	6	5-way.	12	24	------	------	------	------	------	36
	6	6-way.	------	5	------	------	------	------	------	5
	Total		15	32	------	17	------	------	13	77

Total Number of Stops and Valves—Continued.

Pattern.	Size.	Outlets.	Districts.							Total.
			1st.	2nd.	3rd.	4th.	5th.	6th.	7th.	
	6	2-way.	5	------	5	3	------	------	------	13
	6	3-way.	49	55	24	231	5	9	15	388
	8	3-way.	------	------	------	------	------	------	5	5
	10	3-way.	------	------	------	3	------	------	------	3
	12	3-way.	------	1	------	3	------	------	1	5
Viney.	6	4-way.	22	27	19	98	4	8	17	195
	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	88	50	377	9	19	46	690
	3	2-way.	1	46	4	10	------	------	10	71
	4	2-way.	4	47	3	10	------	------	5	69
	6	2-way.	4	75	29	42	12	12	25	199
	8	2-way.	1	1	13	------	------	------	------	15
Smith's Patent.	10	2-way.	------	7	12	1	2	7	5	34
	12	2-way.	1	11	8	------	------	------	1	21
	16	2-way.	4	3	2	------	------	------	------	9
	20	2-way.	------	1	2	------	------	------	6	9
	Total----		15	191	73	63	14	19	52	427
	3	2-way.	------	------	13	1	------	2	22	38
	4	2-way.	------	------	------	1	------	------	------	1
Ludlow's.	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.	------	4	------	1	2	11	9	27
	24	2-way.	------	------	------	------	4	------	------	4
	30	2-way.	------	1	2	1	15	4	2	25
	36	2-way.	------	------	------	------	4	------	8	12
	48	2-way.	------	------	17	------	------	------	------	17
	Total----		------	31	23	9	71	58	74	266
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	------	------	------	3
	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	------	49
Rensaeler Rotary.	30	2-way.	------	------	1	------	------	------	------	1

Total Number of Stops and Valves—Continued.

Pattern.	Size.	Outlets.	Districts. 1st.	2nd.	3rd.	4th.	5th.	6th.	7th.	Total.
Pratt & Cady.	16	2-way.	1							1
	20	2-way.		1						1
	30	2-way.		1						1
	36	2-way.	1		1					2
	Total		2	2	1					5
HIGH PRESSURE STOPS.										
Williamsport.	8	2-way.		190						190
	12	2-way.		54						54
	16	2-way.		19						19
	Total			263						263
Ludlow.	20	2-way.		4						4
Total number stops			4,812	4,522	5,990	4,633	1,102	3,537	4,819	29,415
Check Valves. Bureau of Water.	12			1						1
	20						1		1	2
	30				1		5		3	9
	36				1		4		2	7
	48				4	4	6			14
	Total			1	6	4	16		6	33

TABLE "A"

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

Districts.	NUMBER OF CONNECTIONS.			LENGTH IN FEET.		
	SIZE.		Total.	SIZE.		Total.
	½-inch.	2 inches.		½-inch.	2 inches.	
First	171		171	2,762		2,762
Second						
Third	186		186	2,204		2,204
Fourth	47		47	803		803
Fifth	12		12	130		130
Sixth	50	1	51	681	15	696
Seventh	626		626	12,216		12,216
Totals	1,092	1	1,093	18,886	15	18,901

Account of Iron Stop Boxes and New Stops.

Districts.	Iron Stop Boxes.	STOPS.						
		Bureau of Water.	Viney.	Smith.	Pratt & Cady.	Fairbanks.	Ludlow.	Totals.
First		67			2			69
Second		61		10	2			73
Third	4	166		2	1	4	1	174
Fourth		67	1	1				69
Fifth		15		3				18
Sixth	17	62		3				65
Seventh		229		10				239
Totals	21	667	1	29	5	4	1	707

Number of Valves Raised in the Several Districts During the Year 1907.

District.	Barton	Viney.	Smith.	Single Gate. Bureau of Water.						
	4-way.	3-way.	Single Gate.	4-inch.	6-inch.	10-inch.	18-inch.	30-inch.	36-inch.	Total.
Second	1	2			2					5
Fourth			1	1	3	2	1	2	3	13
Seventh	1				1					2
Total	2	2	1	1	6	2	1	2	3	20

Number of Complaints and Examinations During 1906 and 1907.

Months.	Hydrants.		Service Pipes.		Wash Paves.		Spigots.		Water Closets.		Horse Troughs.		No. Leaks.		Total.	
	1906	1907	1906	1907	1906	1907	1906	1907	1906	1907	1906	1907	1906	1907	1906	1907
January	137	167	113	208	6	6	11	35	51	74	----	5	5	15	323	510
February	160	118	152	188	14	2	12	22	28	75	1	1	6	10	373	416
March	104	162	125	244	4	6	16	55	60	96	26	5	8	7	343	575
April	121	188	114	220	5	9	24	45	57	84	1	2	7	11	329	559
May	122	165	110	182	----	11	6	35	42	77	1	3	6	4	287	477
June	163	196	119	160	2	7	19	33	63	84	3	5	7	8	376	493
July	156	206	122	178	2	7	20	35	52	88	2	4	8	11	362	529
August	157	192	110	149	6	10	76	58	79	91	2	----	8	10	438	510
September	141	201	135	164	6	10	32	54	44	59	7	2	6	12	371	502
October	209	269	174	204	3	8	45	44	84	83	11	2	7	12	533	622
November	161	240	146	227	5	4	59	64	83	110	10	1	5	5	469	651
December	150	158	225	159	4	2	24	42	60	69	2	4	18	7	483	441
Totals	1,781	2,262	1,645	2,283	57	82	344	522	703	990	66	34	91	112	4,687	6,285

New Meters Set During the Year 1907.

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.
5	Morris Rosenbaum	509 S. 5th st	Saloon	April 26	Keystone		1								1	2,900	$0 87	New ferrule.
8	Burlington Apart. House Co.	N. W. C. Juniper & Spruce sts	Apartments	Jan. 26	Empire				1						1	25,300		Experimental.
8	B. & O. Railr'd Co.	W. S. 25th st., S. of Locust st	Freight yard	Oct. 31	Nash								1		1	000		Experimental.
9	B. P. Order of Elks	E. C. Juniper & Arch sts	Hall	April 23	Worthington					1					1	58,600		Experimental.
10	Joseph Schonder	125 Burns st	Milk depot	Dec. 13	Empire				1						1	1,700		Experimental.
14	Thos. F. Kelley, estate of	S. W. C. 10th & Callowhill sts	Theatre	May 9	Empire				1						1	156,400	46 92	Additional ferrule.
16	Electric Tract'n Co.	E. S. Beach st., 230 ft. N. of Poplar st.	Power house	Oct. 21	Gem AA								1		1	573,900	172 17	New addi'al ferrule.
16	V.L.Cavanna & Co.	919-25 N. Front st	Cold storage	Dec. 16	Gem AA						1				1	800	24	Experimental.
16	Electric Tract'n Co.	E. S. Beach st., 230 ft. N. of Poplar st.	Power house	Dec. 30	Gem AA							1			1	000		New addi'al ferrule.
16	Electric Tract'n Co.	E. S. Beach st., 230 ft. N. of Poplar st.	Power house	Dec. 30	Gem AA							1			1	000		New addi'al ferrule.
17	Mrs. E. Volmer	1420-26 N. Randolph st	Brewery	Sept. 9	Gem AA						1				1	15,400	4 62	New addi'al ferrule.
18	J. W. Paxson & Co.	1056-60 Beach st	Foundry supplies	April 29	Crown					1					1	130,200	39 06	New addi'al ferrule.
20	Wills-Jones Dairy Co.	1206 Montgomery ave	Milk depot	Dec. 11	Eureka					1					1	42,200		Experimental.
21	Flanagan & Bro.	Freeland ave. & Walnut lane	Worsted mill	Jan. 3	Empire		1								1	28,200		Experimental.

New Meters Set During the Year 1907—Continued.

Ward.	Occupant.	Location.	Business.	Date When Set.	Name of Meter.	Size. ⅝ inch.	¾ inch.	1 inch.	1½ inch.	2 inch.	3 inch.	4 inch.	6 inch.	Total.	Cubic Feet Consumed.	Meter Rents.	Remarks.
21	A. Platt & Son	E. S. Main st., 8th property N. of Ridge ave	Cotton goods mill	Dec. 20	Crown			1						1	500		Experimental.
23	Pendlebury & Son	Sepviva & Duncan sts	Dyers	Nov. 12	Hersey					1				1	23,100		Experimental.
24	George H. Garrett	3908 Spring Garden st	Wagon builder	Oct. 14	Empire		1							1	000		Experimental.
28	Phila. Rapid Transit Co	S. S. Dauphin st., E. of 32d st	Power house	Jan. 4	Niagara				1					1	2,800	84	New addi'al ferrule.
29	American Ice Co	N. S. Columbia ave., W. of Connecting Ry. Co	Ice and stables	May 21	Empire				1					1	199,100	59 73	New addi'al ferrule.
29	Columbia Club	N. W. C. Broad & Oxford sts	Swimming pool	Sept. 10	Crown					1				1	60,000		Experimental.
31	Wm. Cramp Ship and Engine Co	Richmond & Ball sts	Foundry, etc	Dec. 2	Gem AA							1		1	224,200		Experimental.
33	K. Seiler & Bro	S. E. C. 5th & Luzerne sts	Provision dealers	June 27	Empire				1					1	11,200		Experimental.
34	P. J. McGarvey	1234-36 Belmont ave	Ice mfrs	Aug. 19	Gem AA						1			1	1,015,100	304 53	Additional ferrule.
40	Fels & Co	W. S. Island road, 277 ft. S. of Woodland ave	Soap mfrs	Feb. 19	Gem AA							1		1	1,145,400	343 62	New ferrule.
46	Equitable Brick Mfg. Co	E. S. 60th st., 72 ft. N. of Lombard st.	Brick mfrs	Oct. 22	Empire		1							1	18,800		Experimental.
	Total					4	1	3	6	4	3	4		25			

Schedule of Pipe and Material Inspected During 1907.

	Manufacturer.	Size in Inches.		Inspected.	Rejected.	Accepted.
		Pipe.	Special Castings.			
Bureau of Water.	Donaldson Iron Company	6		13,775	3,175	10,600
		8		1,600	240	1,360
		10		2,559	530	2,029
		12		2,026	447	1,579
		16		1,875	515	1,360
			Small	3,516	404	3,112
			Large	77	9	68
	U. S. Cast Iron Pipe and Foundry Company	20		76	24	52
	J. K. Drummond	30		211	28	183
			Large	10		10
	J. Alfred Clark		Frames and covers	1,396	196	1,200
			Covers	213	113	100
			Tupper grate bars	78	3	75
	Total			27,412	5,684	21,728

Schedule of Pipe and Material Inspected During 1907.—Continued.

	Manufacturer.	Size in Inches.		Inspected.	Rejected.	Accepted.
		Pipe.	Special Castings.			
Bureau of Filtration.	Millard Construction Company	4		30	5	25
		6		130	10	120
		8		128	33	95
		24		27	3	24
	J. K. Drummond		Large	26	5	21
	Total			341	56	285
Bureau of Correction.	Donaldson Iron Company	3		319	152	167
		6		414	164	250
	Total			733	316	417

Schedule of Pipe and Material Inspected During 1907.—Continued.

	Manufacturer.	Size in Inches.		Inspected.	Rejected.	Accepted.
		Pipe.	Special Castings.			
Bureau of Survey.	Donaldson Iron Company	10		10		10
		16		31	3	28
		20		66	10	56
		24		39	21	18
			Large	10	1	9
			Small	37	4	33
	Thompson & Company		Large	4		4
			Small	27		27
	Total			224	39	185
Fire Line.	Donaldson Iron Company		Small	23		23
	R. D. Wood & Company			110	41	69
	Total			133	41	92
Contractors.	Donaldson Iron Company	6		1,720	310	1,410
			Small	6	1	5
	Total			1,726	311	1,415

PERA

Si	Keystone.	Total.
½-inc	---	1
⅝-inc	1	4
¾-inc	---	20
1-inc	---	18
1½-in	---	7
2-inc	---	18
3-inc	---	17
4-inc	---	11
6-inc	---	1
12-in	---	---
20-in	---	---
30-in	---	---
36-in	---	---
48-in	---	---
T	---	---
	1	97

13

				Meters Tested.											
Columbia.	Disc.	Hersey.	Total.	Crown.	Gem.	Nash.	Trident.	Union.	Empire.	Columbia.	Keystone.	Worthington.	Hersey.	Eureka.	Total.
			7												
13			28	1				3	2	1	2				9
	1		89	13			7	1							21
			76	9					7						16
		1	50	8		1			2		1	1		1	14
	1		58	6	12								1	1	20
			15	2	16							1			19
			16	2	13	1							1		17
				1	1										2
13	2	1	339	42	42	2	7	4	11	1	3	2	2	2	118

New Attachments Made and Delivered to Districts During the Year 1907.

Districts.	Attachments Made and Delivered.	Lead Pipe. Feet.
		⅝-inch.
First	167	3,124
Second		
Third	217	3,715
Fourth	140	2,800
Fifth		
Sixth	40	800
Seventh	651	14,302
Total	1,215	24,741

DISTRIBUTION EXPENSES DURING THE YEAR 1907.

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	$1,659 37	$1,659 56	$6,933 05	$991 44	$987 73	$1,655 85	$5,920 20				$19,807 20
Gasket	39 92	180 13	165 48	126 56	58 69	42 05	76 21	$45 76			734 80
Coke	18 00	90 00	226 50	30 00	30 00	60 00	85 50				540 00
Wood						59 00					59 00
Straight pipes								163,672 28			163,672 28
Small specials								9,435 11			9,435 11
Large specials								2,348 70			2,348 70
Breeches pipe and ¼ turns								886 21			886 21
Frames and covers	878 56	509 92	908 42	602 26	501 79	506 06	902 06				4,809 07
Hauling								4,314 01			4,314 01
Transportation and hotel								2,863 43			2,863 43
Supplies, tools, small stores, etc.	2,007 74	1,802 89	1,947 21	1,114 80	1,319 21	1,741 40	467 24	8,400 64	$6,744 56	$172 33	25,718 02
Plumbing and plumbing supplies	5 50				12 44	70 38			2,763 76		2,852 08
Meters, etc.									106 02		106 02
Brick, stone, lime and cement	92 00	122 10	88 40	320 25	233 75	578 83	36 50		15 00		1,486 83
Lumber	5,885 55	451 82	594 45	359 95	1,784 67	1,626 59	599 60		300 00		11,602 63

Distribution Expenses—Continued.

Material and Labor.	First District.	Second District.	Third District.	Fourth District.	Fifth District.	Sixth District.	Seventh District.	Distribution.	Meter Shops.	Main Office.	Totals.
Hay, feed, etc.	$1,122 07	$939 84	$875 29	$971 98	$338 56	$330 03	$639 71				$5,217 48
Stable supplies	726 99	654 37	302 80	295 76	118 70	65 38	275 80				2,439 80
Stable repairs	103 55	255 14	244 05	314 86	42 50	92 00	177 49				1,229 59
Stable medicines	11 50	13 25	35 50	5 00	15 20	35 53	67 01				182 99
Stable shoeing	235 63	269 25	243 05	131 25	47 50	88 50	116 75				1,131 93
Supplies, stationery	75 98	133 70	119 24	44 02	92 20	81 75	49 28	$983 39	$137 55	$98 80	1,815 91
Wages—Per diem	29,459 37	32,545 94	77,424 91	26,604 28	17,002 96	37,815 44	42,062 27				262,915 14
Salary	4,923 98	4,942 81	7,197 68	8,753 15	3,445 41	4,262 00	4,857 19				38,382 22
Total cost of labor and material on account of distribution	$47,245 68	$44,570 72	$97,306 03	$40,665 56	$26,031 31	$19,110 79	$56,332 81	$192,949 53	$10,066 89	$271 13	$564,550 45
Buildings, grounds and reservoirs	$20 62	$1,639 67	$9,239 27	$535 59	$5,536 67	$918 21	$18,177 70				$36,067 73
High pressure fire service	217 05	8,925 60	875 16	31 25		177 50	201 43				10,427 99
Filtration	339 66	98 03	19,313 61	731 73			270 59				20,753 62
Collapsed building	52 82	82 19					41 25				176 26
Main office			713 74	853 74							1,567 48
Repair shop			700 88								700 88
Total labor and material	$47,875 83	$55,316 21	$128,148 69	$42,817 87	$31,567 98	$50,206 50	$75,023 78	$192,949 53	$10,066 89	$271 13	$634,244 41

APPENDIX D

REPORT

OF THE

OPERATIONS AT THE CONSTRUCTION AND REPAIR SHOP, BUREAU OF WATER, DURING THE YEAR 1907

Philadelphia, January 2, 1908.

MR. FRED C. DUNLAP,
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, 1907.

Yours respectfully,

JAMES H. DEAN,
Superintendent of Shop.

MERCHADISE AND WAGES.		DR.
Inventory, January 1, 1907		$27,909 45
Bolts and nuts	$952 86	
Hardware	913 30	
Steel	2,112 29	
Wrought iron	1,641 26	
Iron castings	18,449 46	
Brass castings	8,136 00	
Lead coating	435 99	
Gum goods	1,119 07	
Coal	1,559 15	
Coke	27 00	
Lumber	790 50	
Paints, brushes and oils	150 23	
Brass fittings	221 41	
Oils and tallows	157 95	
Wrought iron pipe and fittings	14 65	
Pig lead	2,983 58	
Forage	170 04	
Baskets, brushes, brooms, etc.	4 80	
Harness and stable supplies	46 38	
House cleaning supplies	11 71	
Miscellaneous	115 56	
Wages	40,513 97	
		80,527 16
Total		$108,436 61

MERCHANDISE.		CR.
First District	$3,852 38	
Second District	5,105 28	
Third District	8,622 24	
Fourth District	5,934 48	
Fifth District	820 89	
Sixth District	2,986 95	
Seventh District	12,457 35	
		$39,779 57
Spring Garden machinery	5,546 39	
Spring Garden boilers	856 14	
		6,402 53
Fairmount machinery	970 12	
		970 12
Belmont machinery	3,599 23	
Belmont boilers	537 96	
		4,137 19

Queen Lane machinery	$10,450 58	
Queen Lane boilers	604 93	
		$11,055 51
Roxborough machinery	3,448 47	
Roxborough boilers	427 47	
		3,875 94
Frankford machinery	1,646 85	
Frankford boilers	297 46	
		1,944 31
General buildings and grounds	1,820 26	
		1,820 26
Distribution	691 59	
		691 59
High Pressure Fire Service	2,633 84	
		2,633 84
Mt. Airy machinery	50 08	
		50 08
Torresdale filters	106 21	
		106 21
Fixed patterns	2,926 86	
		2,926 86
Construction and Repair Shop	3,087 09	
		3,087 09
Filtration Bureau	15 00	
		15 00
Total		$79,496 10
Inventory, January 1, 1908		35,453 46
Total, Cr.		$114,949 56
Total, Dr.		108,436 61
Balance		$6,512 95

INVENTORY, JANUARY 1, 1908.

4 4-inch stop valves, at $16.00	$64 00	
7 6-inch stop valves, at $18.50	129 50	
17 8-inch stop valves, at $28.50	484 50	
15 10-inch stop valves, at $37.50	562 50	
7 12-inch stop valves, at $48.00	336 00	
4 16-inch stop valves, at $80.00	320 00	
2 20-inch stop valves, at $120.00	240 00	
		$2,136 50

Finished parts of stop valves, iron	$1,506 00	
Finished parts of stop valves, brass	587 90	
		$2,093 90
35,756 lbs. iron castings for stop valves, at 2¾ cents	983 29	
2,624 lbs. brass castings for stop valves, at 20 cents	524 80	
		1,508 09
24 No. 1 fire hydrants, at $34.00	816 00	
		816 00
Finished parts of fire hydrants, iron	1,196 78	
Finished parts of fire hydrants, brass	506 13	
		1,702 91
41,204 lbs. iron castings for fire hydrants, at $2.65	1,091 92	
273 lbs. yellow brass for fire hydrants, at 20 cents	54 60	
3,668 lbs. red brass for fire hydrants, at 22½ cents	825 30	
Cap bands, frost and valve rods for hydrants	250 41	
		2,222 23
Tools, etc., in stock, to distribute to districts	442 55	
		442 55
1 48-inch rotary valve, unfinished	536 00	
2 20-inch check valves	240 00	
1 48-inch check valve, partly finished	950 00	
5 glands	84 00	
1 crosshead guide	42 50	
2 piston plungers	134 35	
43 steel pump rods	2,857 00	
25 quadrants, 30 inches x 48 inches	274 00	
10 quadrant stands	32 00	
12 car wheels and 2 axles	35 00	
35 air pump straps, at $9.00	315 00	
77 brasses for air pump, at $2.75	208 25	
51 sets gibs and keys, at $4.50	229 50	

18	extra keys, at $2 25	$40 50
4	nozzle reducers, at $2.75	11 00
371	iron bands, 4 inches to 48 inches	1,622 25
	Tail clamps, bolts and saddles	95 20
42	viney stop screws, at $2.00 ...	84 00
28	viney stop screws, at $5.00 ...	140 00
8	barton stop screws, at $4.50 .	36 00
21	independent stop screws, at $2.00	42 00
413	stop screws, various sizes ...	1,806 25
88	socket screws	165 00
30	spindles	56 25
799	wooden plugs, various sizes .	400 00
364	small rubber valves for fire hydrants	182 00
136	large rubber valves for fire hydrants, ...	204 00
26	lbs. sheet gum	16 12
347	lbs. gum rings	104 10
50	hoe heads	87 50
465	sketch plates for hoe heads..	93 00
2,330	ferrule plugs, various sizes, brass	582 50
	Bolts, nuts, screws and washers	1,568 80
4,552	lbs. Ajax metal castings	1,092 48
1,588	lbs. brass castings	345 39
8,340	lbs. miscellaneous castings ..	250 20
16,763	lbs. pump machinery castings	670 52
30,383	lbs. loam castings for pump machinery	1,443 19
39,425	lbs. pig lead	2,759 75
868	lbs. non-shrinkable metal ...	217 00
15,158	lbs. steel (round, square and flat)	454 74
700	lbs. flat spring steel	28 00
200	feet 3/32-inch spring steel ...	16 00
5,654	lbs. cast steel	339 24
1,118	lbs. tool steel	167 70
650	lbs. self-hardening steel	227 50
40,981	lbs. iron (round, square and flat)	1,229 43
1,130	lbs. Norway iron	45 20
2,884	lbs. rolled brass	721 00

737 lbs. brass spring wire	$206	36
Hardware	119	08
Lumber	697	11
Oils and Tallows	107	52
Coal	118	60
Coke	1	20
Total	$35,453	46

Principal Articles Delivered to the Districts and Works.

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	22	----	62	3	4	----	1	----	----	----	32	125	1	10
Second	49	----	24	2	22	8	----	2	----	----	128	210	41	30
Third	71	6	151	5	3	11	6	----	----	----	190	420	56	35
Fourth	65	----	49	2	13	12	----	----	----	1	84	341	8	65
Fifth	11	----	19	----	----	----	----	----	----	----	6	------	------	----
Sixth	30	----	60	----	----	7	----	----	----	----	38	72	18	13
Seventh	135	5	235	22	16	3	8	----	2	----	111	156	------	19
Total	383	11	600	34	58	41	15	2	2	1	589	1,324	124	172

PRINCIPAL ARTICLES MANUFACTURED DURING 1907.

7	4-inch stop valves, at $16.00 .	$112 00	
591	6-inch stop valves, at $18.50..	10,933 50	
28	8-inch stop valves, at $28.50..	798 00	
59	10-inch stop valves, at $37.50.	2,212 50	
21	12-inch stop valves, at $48.00.	1,008 00	
14	16-inch stop valves, at $80.00.	1,120 00	
1	36-inch stop valve, at $230.00	230 00	
384	No. 1 fire hydrants, at $34.00	13,056 00	
632	ferrule plugs, various sizes, at $0.25	658 00	
867	wooden plugs, various sizes, at $0.50	433 50	
			$30,561 50

APPENDIX E

REPORT

OF THE

CHIEF DRAUGHTSMAN

ON THE

HYDROGRAPHIC WORK

FOR THE YEAR 1907

Philadelphia, January 2, 1908.

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

DEAR SIR:—The following report on Hydrographic Work under my charge and on data collected during the year 1907 is respectfully submitted.

Rainfall observations at twenty-one stations, from which the Bureau obtained these data, have been carried on, completing twenty-five years of continuous records. Nine of these stations are maintained 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 1907 was slightly above the normal for the years in which these observations have been made.

The greatest monthly rainfall on the area comprising the water sheds of the Schuylkill, Perkiomen, Neshaminy and Tohickon streams, during the year 1907, was 9.38 inches, being the average of 19 stations for the month of September. Over seven (7) inches of this rain fell after the 20th, and before the end of the month, causing two freshets in the Schuylkill River and in the adjoining streams.

The greater part of the precipitation, for the months of January, February and March, was in the form of snow, which remained upon the ground until the latter part of March. The precipitation for February was the smallest for the year. No very heavy rainfalls, for short periods of time, 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.

Mr. J. C. Beans, observer, located three miles northeast of Moorestown, N. J., reports as follows: "Of the year's precipitation 7.6 inches of snow are recorded for January, 19.3 inches for February, 13 inches for March, 8.2 inches for April, .4 for November and 6 inches for December. The total snow, 54.5 inches, is 10 inches above high record (44.5 inches), in 1867 and 1886; normal, 27.11 inches. The normal rainfall here, from April 1863, to December 1907, a period of 42 years, averaged 45.96 inches.

"N. J. W. Service standard gauge was used for rain, and, as far as practicable, for snow.

"The rainfall 2¼ miles back from Riverton seems to have been about the same as here during the year, there having been 2 inches more in August and corresponding deficits in the total.

"There are in this year 150 entries of measured rainfall as compared with 140 last year, and the highest in the preceding 42 years, 136. Years with heavier rainfall are all recent, viz., 1894 with 55.68 inches, 1901 with 55.97 inches and 1902 with 65.22 inches; the lightest rainfall was during the year 1895, when only 35.00 inches fell."

Stream flow observations with the automatic stream gauges have been continued on the Perkiomen Neshaminy, Tohickon and Schuylkill, making twenty-four years of continuous records, relative to stream flow, on the three first-named streams and nine 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 run off, 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	27.79	30.25	21.72

At present there is no method available by which the low water flow 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, April, May, June, July, August and September, to the 12th, when the rain of the 10th and 11th caused a rise and flow over the flash boards for three days.

The rain storms beginning on the 18th and continuing to the 25th, followed by another storm on the 27th and lasting to the 30th, caused freshets on the 24th and 29th respectively. On these days nearly 40 inches of water passed over the top of the flash boards continuously for 24 hours each day, and high water conditions remained until

the middle of the succeeding month. The lowest stage of the river was during the month of August, when the computed daily flow for the month was 679,320,000 gallons, 1051 cubic feet per second.

The amount of water flowing off on the surface of the ground, for the month of March, shows, by comparison with the precipitation for the same month, a percentage of flow that seldom occurs, and has not been equalled in the twenty-four years during which observations have been made.

The stream flow of the Perkiomen, for the month of March, 1907, was 4.75 inches, the observed rainfall on the water shed was 3.26 inches, the stream flow exceeding the rainfall by 1.49 inches, making the stream flow 45 per cent. greater than the rainfall for the month.

The stream flow of the Neshaminy, for the month of March, was 6.06 inches. The observed rainfall on the water shed was 2.83 inches, the stream flow exceeding the rainfall by 3.23 inches, making the stream flow 115 per cent. greater than the rainfall for the month.

The stream flow of the Tohickon, for the month of March, was 8.38 inches, and the observed rainfall on the water shed 3.24 inches, the stream flow exceeding the rainfall by 5.14 inches, making the stream flow 158 per cent. greater than the rainfall.

This seems to be an extraordinary result, if the abnormal percentage of run off is compared with the precipitation for the month of March only, especially as there were no sudden and heavy rain storms recorded, and no freshets that were above the mean height of high water on any of the streams, nor was the total flow for the month greater than was recorded for this month in previous years.

This excessive percentage may be accounted for by the unusual weather conditions of the month of March. During the preceding months of December, January and Feb-

ruary, and the first week of March, the average temperature was below the normal and the precipitation for these months was mostly in the form of snow, which fell upon frozen ground.

During the first week in March there was a fall of snow which varied from 10 to 15 inches on the area drained by these streams, followed, on the 10th, by a period of extremely high temperature for the month of March, in which the maximum temperature for one day was 86° F., and this high temperature continued to the end of the month.

The snow upon the ground was gradually melted and the frozen condition of the surface did not permit of the resulting water penetrating the ground and filling up the already depleted ground storage, but caused it to flow over the surface and into the natural drainage channels.

This peculiar condition produced a large and continuous stream flow beginning with the first of the month and continuing until near the end, without any extremely high water or freshets. The extremely low flow for the month of February, in all of the streams, and particularly in the Perkiomen, which was the lowest recorded for February for 24 years, shows that the ground storage was very low, and the low flows for April and May show that the month of March contributed nothing to replenish it. The precipitation of the preceding month, in snow and frozen rain, on this ground, was melted during the warm spell in March and drained into the streams, producing the abnormal percentage of stream flow, as compared with the precipitation for the same month.

Your attention is respectfully directed to the value of this Hydrographic work: First, in the length of time during which it has been continued, the year 1907 completing twenty-five years of records of rainfall and twenty-

four 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 the 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 run off from the smaller 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.

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., VI., VII.	Inches of rainfall flowing in..... Average annual yield of streams..... Comparative stream flow.....	Perkiomen. Neshaminy. Tohickon. 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. John C. Beans, Moorestown, N. J.

Mr. Benjamin H. Shoemaker, Pennsylvania Hospital.

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

Yours respectfully,

JOHN E. CODMAN,
Chief Draughtsman.

MONTHLY REAU OBSERVATIONS AT PHILA.

	E	Tohickon Series.				Neshaminy Series.		
	West Chester.	Ottsville.	*Quakertown.	Smith's Corner.	Point Pleasant.	Lansdale.	Forks of Neshaminy.	Doylestown.
Elevations are	455	390	536	480	119	350	143	05
	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.
January	4.16	3.48	-------	3.50	3.67	3.32	3.74	4.81
February	2.57	2.66	-------	1.44	2.56	2.90	3.02	3.16
March	3.31	3.65	-------	3.03	3.05	2.09	2.95	3.44
April	2.65	3.25	-------	3.09	2.89	2.92	3.38	4.22
May	4.03	2.80	-------	2.33	3.25	2.93	4.19	4.19
June	7.01	4.67	-------	4.86	4.72	5.37	5.42	6.19
July	4.10	3.85	-------	2.94	2.79	1.87	2.52	3.60
August	2.38	4.09	-------	4.74	3.98	4.94	3.79	2.37
September	7.30	10.04	-------	11.25	11.32	9.03	7.19	9.69
October	4.62	4.49	-------	5.54	5.64	3.02	4.86	4.92
November	6.81	5.36	-------	5.24	5.15	4.71	5.90	5.89
December	5.72	5.15	-------	4.47	4.60	4.07	4.55	4.77
Total	54.66	53.49	-------	52.43	53.62	47.17	51.51	57.25
Percentage	112	110	-------	107	111	97	106	118
25 years' yearly	51.88	47.82	-------	51.21	49.45	48.71	45.23	47.45
	129	117	-------	125	121	119	111	115
Average deficiency o	-2.78	+5.67	-------	+1.22	+4.17	—1.51	+6.28	+9.80
Percentage deficiency	4	9	-------	2	9	3	7	28

TABLE II.

Rain Storms Exceeding in Rate 0.25 Inches per Hour as Recorded by the Automatic Rain Gauge at Philadelphia for the Year 1907.

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.	
May 6, rain storm	.75	4—55	.55	60	.55	
May 17, rain storm	1.87	13—00	1.77	30	2.34	
May 19, rain storm	1.00	5—00	.80	30	1.60	
July 18, rain storm	1.16	2—50	1.00	50	0.83	
July 20, rain storm	1.42	4—10	1.12	35	1.92	
August 24, rain storm	1.15	12— 5	.25	25	.60	
September 23, rain storm	1.34	4—50	.54	15	2.16	
September 24, rain storm	.41	1.50	.20	20	.60	
Sept. 28 to 29, rain storm	2.79	14—30	.89	30	1.78	
October 29, rain storm	1.01	7—15	.35	60	.35	
December 23, rain storm	1.35	5—10	.45	25	1.08	

TABLE III.

Rain Storms Exceeding in Rate 0.25 Inches per Hour as Recorded by the Automatic Rain Gauge at Forks of Neshaminy for the Year 1907.

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 12, rain storm	1.08	9—25	.30	60	0.30	
May 4, rain storm	.91	6—40	.30	60	0.30	
May 10, rain storm	.47	9—45	.15	12	0.75	
June 26, rain storm	1.28	14—10	.73	30	1.46	
July 18, rain storm	0.30	1—10	.25	25	.60	
August 9, rain storm	.91	8—15	.36	25	.86	
August 25, rain storm	.61	2—15	.46	30	.92	
September 22, rain storm	2.07	29—10	1.02	60	1.02	
September 24, rain storm	.62	4—25	.32	15	1.28	
September 28, rain storm	2.34	20—30	.35	50	.42	
October 29, rain storm	1.60	29—25	.35	60	.35	
December 23, rain storm	1.19	11—45	.35	60	.35	

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 1907.

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 12, rain storm	1.04	7—00	.30	60	.30	
April 23, rain storm	1.76	9—55	.30	40	.45	
June 2, rain storm	1.94	19—40	.30	60	.30	
June 30, rain storm	1.77	21—30	.25	60	.25	
July 2, shower	0.39	0—45	.35	20	1.05	
August 9, rain storm	1.70	13—15	.55	30	1.10	
August 9, rain storm	1.70	13—15	.65	65	.60	
September 12, rain storm	.61	5—10	.42	10	1.26	
September 22, shower	.62	1—00	.52	30	1.04	
September 23, rain storm	4.09	27—30	2.50	150	1.00	
September 23, rain storm	4.09	27—30	.35	30	.70	
September 24, rain storm	.41	2—00	.35	35	.60	
Sept. 28 to 29, rain storm	3.27	21—50	.70	65	.65	
Sept. 28 to 29, rain storm	3.27	21—50	.40	40	.60	
October 4, rain storm	.34	2—45	.19	30	.38	
October 8, rain storm	.82	9—30	.34	30	.68	
Oct. 27 and 29, rain storm	2.34	43—25	.35	60	.35	
December 23, rain storm	1.26	9—10	.30	30	.60	

TABLE V.

Inches of Rainfall Flowing in the Perkiomen, Neshaminy and Tohickon Creeks.

Watersheds.	Area in Miles.	Percentage of Total Area.				Average for 24 Years 1883—1907.												
		Woodland.	Cultivated.	Flats.	Roads.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
Perkiomen, at Frederick, 24 years	152	25	71	2	2	2.93	3.43	3.82	2.18	1.31	0.93	1.10	1.03	1.05	1.09	1.61	2.26	23.08
Neshaminy, below Forks, 24 years	139.3	6	92	¼	1¾	3.18	3.77	3.90	2.13	1.49	0.88	1.05	1.04	0.91	1.11	1.47	2.44	22.90
Tohickon, 24 years	102.2	24	72	2	2	3.76	4.14	4.99	2.48	1.69	0.83	1.08	1.19	1.33	1.14	1.89	2.93	27.19
Perkiomen, at Frederick — Maximum, 24 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, 24 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, 24 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, 24 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, 24 years						7.34	10.41	8.38	4.76	8.56	3.43	6.41	3.75	5.49	4.27	5.25	7.58	
Tohickon — Minimum, 24 years						0.54	0.62	2.98	0.73	0.10	0.07	0.11	0.04	0.05	0.05	0.14	0.67	

TABLE VI.—*Average Annual Yield of Sundry Watersheds to October 1st.*

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	24	152.0	47.164	23.086	48.011	167,075,000	1.7007	0.0360
Neshaminy, below Forks	24	139.3	47.966	22.898	47.70	151,870,000	1.6869	0.0351
Tohickon	24	102.2	48.629	27.188	55.94	132,300,000	2.0029	0.0412
Schuylkill	9	191.5	47.818	21.119	44.1	1,925,570,000	1.5550	0.0325
Sudbury, Mass.	32	75.2	46.060	21.859	46.0	80,088,000	1.6103	0.0351
Croton, N. Y.								

TABLE VII.—*Comparative Daily Stream Flow, 1906 and 1907.*

Watersheds.	Area of watersheds.	Maximum Gallons.		Date.	Minimum Gallons.		Date.
		Per Day.	Per Sq. Mile.		Per Day.	Per Sq. Mile.	
Perkiomen	152.0	2,231,100,000	14,675,000	March 14th	19,389,000	127,000	Sept. 2.
Neshaminy	139.3	2,606,600,000	19,138,000	March 14th	8,725,000	62,600	Sept. 1.
Tohickon	102.2	1,922,800,000	18,790,000	March 15th	2,003,600	19,500	Aug. 3.
Schuylkill	191.5	14,566,000,000	8,064,000	March 14th	67,282,000	35,100	July —

ILL RIVER AT F.

pards in Inches, and

ches.	July.	Inches.
*9	479	3
8¼	479	3
7½	176	1½
2	----------	*2
----------	----------	*3
*2	----------	*4
*3	----------	*4
*3	260	2
*4	----------	*2
*5	----------	*4
*5	----------	*6
*8	----------	*6
10	----------	*6
10	----------	*8
10	----------	*10
10	----------	*7
10	----------	*7
10	----------	*7
12	92	1
6	----------	*1
6	----------	*7
6	----------	*2
6	----------	*8
6	----------	*7
6	----------	*7
6	----------	*9
6	----------	*10
6	----------	*13
6	----------	*9
2¾	----------	*16
----------	----------	*10
----------	1,486	----------
----------	38,846	----------
----------	36,332	----------

FAIRMOUNT.

AREA 915 SQUARE MILES.

Y M.	Average Yield in Cubic Feet per Second per Square Mile.	Rainfall in Inches.	Inches of Rainfall Flowing Off.	Average Daily Yield of Stream.		Average Yield in Cubic Feet per Second per Square Mile.
lons.				Cubic Feet.	Gallons.	
050,000	1.4778	4.390	0.409	130,830,000	978,670,000	0.7907
126,000	1.1460	1.785	1.162	120,750,000	903,270,000	0.7305
442,000	1.9560	4.492	2.266	162,995,000	1,219,290,000	0.9851
901,000	3.4532	3.550	4.262	379,570,000	2,839,400,000	2.2941
810,000	1.4530	2.220	1.392	152,052,000	1,137,400,000	0.9190
110,000	5.2570	3.243	8.379	390,260,000	2,919,350,000	2.3587
090,000	1.4005	3.076	1.406	173,595,000	1,298,580,000	1.0492
466,000	1.5369	2.793	1.056	140,610,000	1,051,830,000	0.8498
640,000	1.1845	4.750	1.084	103,550,000	774,610,000	0.6258
131,000	0.3911	3.126	0.404	101,261,000	757,490,000	0.6120
123,000	0.2457	4.270	0.096	90,812,000	679,320,000	0.5489
412,000	2.2601	10.870	4.193	323,415,000	2,418,570,000	1.9541
620,000	1.8177	48.565	26.109	207,581,000	1,552,820,000	1.2546
557,000	2.2054	5.223	3.190	305,277,000	2,283,630,000	1.8451
679,000	3.8173	5.250	4.847	423,554,000	3,168,400,000	2.5600
939,000	3.4871	4.740	4.901	585,970,000	4,346,000,000	3.5113
620,000	2.2283	54.111	35.210	264,764,000	1,980,580,000	1.6002