NINETY-SEVENTH ANNUAL REPORT

OF THE

BUREAU OF WATER

FOR THE YEAR ENDING DECEMBER 31, 1899

AND

FIRST ANNUAL MESSAGE

OF

SAMUEL H. ASHBRIDGE

MAYOR OF THE CITY OF PHILADELPHIA

WITH

ANNUAL REPORT

OF

WILLIAM C. HADDOCK

DIRECTOR OF THE DEPARTMENT OF PUBLIC WORKS

ISSUED BY THE CITY OF PHILADELPHIA

1900

162436

No longer the property of the St. Louis Public Library

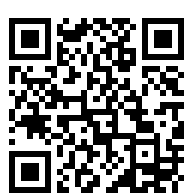
PHILADELPHIA
DUNLAP PRINTING COMPANY
1332-1336 CHERRY STREET

Digitized by Google

This is a reproduction of a library book that was digitized by Google as part of an ongoing effort to preserve the information in books and make it universally accessible.

Google™ books

https://books.google.com



5 M. Ag 1900. A. A.

5th Tier

09

CLASS: 352.6 Phil. Water Bureau

12

SAINT LOUIS
Public Library

14

No longer the property of
the St. Louis Public Library

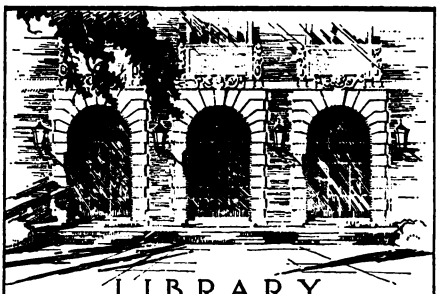
No 162436 (1)

18

40 This Book shall not be taken from the Library. 03

REMOTE STORAGE

Digitized by Google



LIBRARY
OF THE
UNIVERSITY
OF ILLINOIS

628.1
P53
v. 97

Digitized by Google

OFFICE OF THE MAYOR

PHILADELPHIA

Mayor
SAMUEL H. ASHBRIDGE

Secretary
J. HAMPTON MOORE

Chief Clerk
GEORGE W. SEEDS

Contract and License Clerk
JOSEPH F. JONES

Stenographer
JEANNE L. LOCKE

Clerk
WILLIAM W. GAMBLE

Ass't Stenographer and Typewriter
HARRY W. KEELY

Messenger
WALKER B. WEBB

Secretary Civil Service Board
ARTHUR R. H. MORROW

Stenographer
JOSEPH MARCUS

Clerk
WILLIAM WEAVER

Digitized by Google

REMOTE STORAGE

Digitized by Google

628.1
P53
v.97

FIRST
ANNUAL MESSAGE

OFFICE OF THE MAYOR, CITY HALL

Philadelphia, April 2, 1900.

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

GENTLEMEN:—In pursuance of the provisions of the Act of Assembly, June 1, 1885, I herewith transmit to your Honorable Bodies my first Annual Message, and submit therewith for your consideration reports from the following Departments, immediately within my jurisdiction, namely: Department of Public Safety, Department of Public Works, Department of Charities and Correction, and submit also reports from the following Departments: Receiver of Taxes, City Treasurer, City Controller, Law, Education and Sinking Fund Commission.

On Monday, the third day of April, 1899, I took the oath of office and assumed the duties of Mayor of the City of Philadelphia. At the same time I announced the appointment of Abraham L. English as Director of the Department of Public Safety, and William C. Haddock as Director of the Department of Public Works. In the selection of these two gentlemen I feel that the developments of the past twelve months have shown that each Department has secured a thoroughly practical and efficient executive, at once progressive, faithful and energetic in promoting the highest interests of the municipality.

Digitized by Google

In the Department of Charities and Correction, there have been three changes caused by resignation. Wm. H. Lambert was succeeded by Dr. C. S. Middleton; Joseph H. Mann by Dr. Joseph S. Neff, and H. B. Gross by A. H. Dingee.

DEPARTMENT OF PUBLIC SAFETY.

The Department of Public Safety has been maintained at a very high standard under the direction of Abraham L. English, who has also introduced a number of improvements tending toward the betterment of the public service. An account of these matters, in detail, will be found in full in the report of this Department and in the reports of the various Chiefs under his direction, which will be found accompanying this message.

Bureau of Police.

Too much commendation cannot be given to the Bureau of Police for its work during the past year. Handicapped as it has been, as compared with other cities of the nation, and as regards the vast area of territory covered, by the fact that the number of patrolmen has been entirely disproportionate to the services to be performed, the Bureau has, nevertheless, reduced law breaking to a minimum.

The increase of 150 men, which your Honorable Bodies granted at the beginning of 1900, should be augmented by at least 500 more, so as to properly police the City. The beats to be covered by the men, especially in outlying sections, are too long and cover too wide a territory, to furnish that adequate police protection to the taxpayers which is theirs of right.

The police tug service, in conjunction with the fire service, will be increased this year by a powerful new fire and police boat, now under contract, thus promoting the efficiency of this very important branch of the service.

Digitized by Google

The Detective Corps of the City is numerically much smaller than that of any other leading municipality, and should be increased.

A most important branch of the Police Bureau's work, that of meat inspection, is likewise inadequately performed, because of the fact that but three men are assigned to this work. An increase in the force is desirable, as it is physically impossible for these three inspectors to cover all localities and to make an exhaustive inspection of meats. This is a matter so vital to the health and welfare of the community that anything that would promote the efficiency of the inspections should be promptly and cordially approved.

Pool selling, policy and other forms of gambling have been suppressed, or reduced to a minimum. There are now no known resorts, and should any be started, they will be immediately closed. Not in many years has the City been so free from these traps for the innocent and unwary. Harassed by the police, as they have been, it has become unprofitable, as well as dangerous to carry on speak-easies, and the determination of the Bureau is firm to keep this species of crime under strict surveillance.

During the many celebrations and parades of the last twelve months, the Medical Emergency Corps has rendered most efficient volunteer service, and their work deserves commendation.

Bureau of Fire.

The report of the Chief Engineer of the Bureau of Fire exhibits in full the work of the Bureau during the year and the urgent needs of an increase in the force and of the apparata necessary for successful fire fighting. For many years the appropriations for new and modern appliances have not kept pace with the growing needs of the community. The erection of lofty buildings, the extension

Digitized by Google

of electrical appliances and other new conditions, which have so radically changed the condition of municipal life during a recent period, bring on new responsibilities and involve the employment of new agencies, so that the problems now confronting this Department are vital ones. During the past year there have been a number of very dangerous conflagrations in the heart of the City, and only the prompt and energetic work of the Bureau, embarrassed, as it has been, by insufficiency of modern apparata, prevented the destruction of millons of dollars' worth of property.

Early last summer the subject of new fire service mains in the business section of the City was agitated. It was proposed to run large mains from the Delaware river west upon Arch, Market and Walnut streets as far as Sixteenth street, with a permanent pumping station maintained on the banks of the Delaware. By the introduction of this system abundance of raw water, under high pressure, could be furnished and at the same time a great saving in the use of filtered water would be effected, soon repaying the cost of the original installation. With these raw water mains connections could be made at cross streets; three-way plugs should be placed at corners and at the middle of blocks, and the pressure from the pumping station should be strong enough to lift the water to the topmost stories of the highest buildings. Owners of such buildings could then run lines of pipe through the structures, with connections at the street, so that at a moments's notice the pumping station could force great streams of raw water throughout the entire building. This would further economize in the use of fire engines.

This system, its utility being proved, could be readily extended north of Arch street, south of Walnut and west of Sixteenth, as the needs and demands of the City might require.

Digitized by Google

I strongly urge this matter upon the attention of your Honorable Bodies, as it would be of the greatest possible assistance in preserving property, safe-guarding lives and reducing rates of insurance.

The plans and specifications for this system are under way, and will be laid before your Honorable Bodies at an early date. Prompt action in the matter of appropriation would enable your executive to have this system constructed and installed this year.

It has been suggested that fire boats could be used to pump the raw water into these proposed mains. This, however, in my judgment, is inadvisable. With the increased commerce and shipping of the port, the extension of piers and the construction of large warehouses thereon and the general improvement of the Delaware river front, the services of the fire and police boats will be absolutely necessary for the protection of property within reach of their own lines.

The number of lives lost and persons injured in fires during the past year prompts me to suggest more rigid laws and regulations concerning the matter of fire escapes, thus affording greater protection to tenants and to employees in manufactories and stores, as well as tenements. This is especially true of the large department stores, where the number of employees is large and constantly increasing.

Bureau of Building Inspection.

The Bureau of Building Inspection during the past year, by insisting upon the thorough construction of party walls, with a view to prevent the spread of fire to the adjoining premises, has saved large losses to the community, and, doubtless, many lives. The inspection of various department stores wherein was found much laxity in management concerning the exits, the overweighting of floors with merchandise, thus endangering collapse; the blocking

Digitized by Google

of aisles and fire escape approaches, led to many beneficial changes. It is but fair to state that these complaints were promptly remedied by the property owners when their attention was called to the same by the Bureau.

At the time of writing this message there are but two inspectors employed for the inspection of elevators. This inspection cannot be too exacting and too many safe-guards cannot be thrown about employees and others who are compelled to use elevators constantly. There are now upwards of 8,000 elevators in the City, and these are increasing at the rate of 500 a year. It is manifestly impossible for two men to make constant and thorough inspections of such a large number of appliances. More inspectors should unquestionably be provided.

Boiler Inspection.

In addition to the work formerly performed by the Bureau of Boiler Inspection, there has been added under the Act of Assembly, 1899, the duty of examining and issuing certificates of competency to engineers. The total number of applicants examined after the passage of this Act was 592.

Electrical Bureau.

The Electrical Bureau has become one of the most important under the municipal government. Holding not only intimate relations with practically every other Department, but with the entire community as well, it has rendered most efficient service, and its standard is of the highest. During the past year it has wired the entire Pennsylvania Avenue Subway system, and has greatly extended the conduit system for municipal wires underground. These conduits, constructed by the City, are now being leased in part to private concerns, thus yielding a handsome revenue upon the cost of construction.

While the fire alarm system has been maintained at a

Digitized by Google

high degree of efficiency, still better results would be accomplished by the installation of very many more keyless fire boxes. This would facilitate the sending in of alarms of fire and would render less probable the spread of conflagration.

I desire to particularly commend the telephone service connected with this Bureau. It has been especially efficient, considering the small force of men available for this branch of the work. There were 5,307,671 calls recorded last year.

It is a matter of congratulation to citizens and taxpayers that the electric lighting of the City will cost $29,176.74 less this year than in 1899, the average cost per light per night being thirty and thirteen one-hundredths cents.

On January 1, 1900, there were 7,832 electric lights on the highways, making Philadelphia the best lighted City in the world. It is a recognized fact that electric lighting is a great aid to police protection from law breakers of all descriptions.

The revenue from licenses, rentals, poles and wires has been largely increased during the year.

Bureau of Health.

The health of the community should be considered always of paramount importance in our municipal life. It affects all classes and localities and has a most important relation to the commercial and business prosperity of our City. It is, therefore, gratifying to note that notwithstanding the growth of the City during the year and the unnecessary alarm occasioned by unwise publications, the vital statistics show a considerable reduction in the death rate. This is most gratifying as showing that a more healthful condition exists in Philadelphia than in almost any large city on the continent.

Under the Act of Assembly of April 12, 1899, the Board

Digitized by Google

of Health was reorganized by the appointment of Colonel J. Lewis Good as President, and Rev. Dr. J. Gray Bolton and Byron E. Wrigley as his associates. They have unselfishly given of their time to this important work and markedly increased the efficiency of the Bureau.

I would call especial attention to the recommendation of the Director of Public Safety and the Chief of the Bureau of Health for the improvement and extension of the Municipal Hospital. The institution accommodates patients suffering from all kinds of contagious diseases, and separate buildings should be erected for the treatment of each of these malignant types apart from the others.

The Chemical and Bacteriological sections of this Bureau are most intelligently conducted.

City Property.

The most interesting statement in the exhaustive report of the Chief of the Bureau of City Property, is that between June 15th and September 13th, 1899, there were 3,469,596 persons of both sexes who used the nine public bath houses. The public bath house is a valuable adjunct in conserving the public health, and is a veritable boon to those who have not accommodations in their own homes.

The restoration of Independence Hall to its original condition has been completed, and the building turned over to the City. Much praise is due to the various patriotic organizations and citizens, who have given liberally of their time and contributed many priceless revolutionary antiquities in carrying out the work of restoring this historic edifice.

Under the reorganization of the Bureau and the intelligent management of George G. Pierie the properties leased by the City have become a source of largely increased revenue. Some properties which had not paid for years have been converted into a source of income.

Digitized by Google

The improvement of Chestnut street pier has been completed, and is of vast benefit to the citizens and residents of the river front section, and at the same time brings revenue to the City. The improvement has met with general approval, and similar work could be wisely inaugurated on other City wharves. The moderate expense necessary is amply justified, for while the upper decks afford admirable breathing places for the people, the lower decks can be leased at rentals returning more than a fair interest on the original investment.

The importance of this Bureau was largely increased by the transfer to its control of the employees for the maintenance of the Public Buildings. This change, which also placed upon the Bureau the task of refurnishing City offices, has also had the beneficial result of greatly reducing the cost of such work.

During this year the Public Building Commission will bring its work practically to completion, so that the duties and responsibility of the Bureau of City Property will be greatly augmented in 1901.

The double purpose of beautifying and of adding to the healthfulness of the City will be attained this year by the planting of shade trees along almost the entire length of Broad street. If this experiment proves successful, it will add much to the beauty of our streets and will lead to the extension of the system to other thoroughfares.

In this connection I would call the attention of your Honorable Bodies to the matter of the plotting of new streets in the undeveloped portions of our City. I would suggest that at certain intervals the main streets be made wider and boulevarded by means of trees and grass plots. This has been introduced with fine effect in other large cities, and would inevitably make our own rapidly developing suburbs more attractive. It would be in line with the best modern ideas of municipal growth, and would

Digitized by Google

tend to keep within City limits those who are now drawn to the suburbs, just outside the county line. By plotting the improvements now, builders could accommodate themselves to the new conditions, and the City would be put to little or no expense.

DEPARTMENT OF PUBLIC WORKS.

At no period since the enactment of the so-called Bullitt Bill Charter has the City of Philadelphia made such advancement along the lines of progressive development as during the past year, nor has the energy of the Department of Public Works been put to such a severe test. Both the Director, William C. Haddock, and his Chiefs of Bureaus, have worked with the greatest energy in carrying into effect the vast enterprises and improvements made possible by the legislation of your Honorable Bodies. The hands of the executive department of municipal government would be tied were it not for the cordial support and co-operation of the City Councils, and it is but fair that I should state in this place that at no time during the first year of my administration have I found any desire on the part of your Honorable Bodies to delay or postpone, but rather zealousness in supporting all measures for the public weal.

The entire organization of both your Chambers has been most prompt in enacting legislation and in making appropriations to carry into effect the plans and propositions for much needed and extensive improvements. This is notably the case in the Bureaus of Water, Surveys and Highways, in which branches of municipal endeavor progress has been most marked.

Bureau of Water.

On Monday, April 3, 1899, in my inaugural address to your Honorable Bodies, I called especial attention to the

Digitized by Google

water question. The problem of a half century, I found it yet unsolved upon the threshold of my administration, and realizing that nothing more directly affects the life and happiness of the whole people than the quality of water furnished them by the municipality, I announced my resolute intention with the assistance of your Honorable Bodies, to begin at once the gigantic task of meeting this issue to the general satisfaction and welfare.

At the very outset I announced my unalterable opposition to the sale or lease of any portion of the water system to any private corporation, believing then, as I more firmly believe now, that the City alone should have supreme jurisdiction in this important utility. In that address I announced that in a few days I would lay before your Honorable Bodies certain propositions looking toward that end.

On April 5th, in my first Annual Message to the two chambers, I entered at length into the discussion of the matter of the water supply, and in conclusion recommended appropriations for repairs and for new pumps, which were imperatively demanded at once; the employment of a Board of Experts to take up and press to a final conclusion an investigation of the water supply, and the enactment of legislation to reduce the waste of water.

Accompanying this message, I forwarded a resolution, which was immediately adopted by your Honorable Bodies, authorizing the selection of a commission of three experts. I also sent you drafts of ordinances, the first appropriating $25,000 for the payment of these experts, coupled with the condition that their preliminary report should be filed within sixty days and their final report within three months, so that it could be laid before the two Chambers upon their reassembling after the summer recess.

The other ordinances provided for appropriations of $20,400 for needed repairs in the Water Bureau and

Digitized by Google

$250,000 for new pumps, and made provision for what is now generally known as the "Hopper Closet Regulation." All of these matters were promptly acted upon by your Honorable Bodies, and in pursuance of your action authorizing the employment of experts, I named, with your approval, Rudolph Hering, of New York; Joseph M. Wilson, of this City, and Samuel M. Gray, of Providence, R. I., all eminent engineers and recognized authorities in the matter of water works and water purification. Their report amply justified their high reputation. Into three months they crowded the work which would ordinarily have occupied at least a year, and did it well.

In accordance with the terms of their appointment, their preliminary report was filed with me within the stipulated period of sixty days, and when your Honorable Bodies came together in September, I laid before you their final report.

This was a full and exhaustive document, covering in a brief space and in a manner readily understood, all the researches, studies and investigations of the City's water supply during the past century, together with the experts' own conclusions. These covered not only the betterment of the present supply, but took into consideration the demands of the future, so that provision was not only made for immediate betterment but for future extension, as the need may arise.

Their conclusions were: First, the adoption of that project by which the waters of the Schuylkill and Delaware rivers, taken within the City limits, are purified by filtration; and second, the immediate improvement of the existing plant in accordance with certain detailed recommendations.

The reasons for the first recommendation briefly stated were as follows:

"The entire works can be built for a sum which the City can secure at this time through a loan.

Digitized by Google

"A supply of pure water for the entire City can be obtained within a comparatively short time, and the City can thus at an early day be protected against a continuance of those diseases which are known to be caused by the present polluted water supply.

"A filtered water supply, under skillful management, offers a greater security against the effects of accidental pollution of the water than is possible when the supply is taken from open, unprotected water courses. Filtration can, without difficulty, be made to render the water thoroughly wholesome.

"The two large rivers at Philadelphia, or even the Delaware river alone, can furnish at all times a quantity of water sufficient for a very large city."

The appointment of the experts had been favorably commented upon in the public prints and by various public spirited organizations interested in the betterment of the water supply and by engineers all over the country, and their report received the same generous and general approval. It was therefore, with extreme gratification that I watched the swift action of your Honorable Bodies in carrying the legislation suggested into immediate effect.

By prompt co-operation on your part the people were enabled to vote on the question of creating a loan of $12,000,000 to carry into effect the recommendations of the commission. So greatly concerned were the people and so generally did the recommendations meet popular approval that a majority of nearly 90,000 was given in favor of the loan, faction and party being obliterated in the public desire to support the measure.

When, compared with the majority of 20,000 which had been accorded the $12,000,000 loan for miscellaneous improvements a few years ago, the indorsement given to the plan of water improvement by the people was as substantial as it was encouraging. By further legislation

Digitized by Google

money was made available, and there is now, or will be in a few days, in operation an experimental station to determine the kind and character of filtered beds to be constructed in accordance with the recommendation of the experts.

I venture to say that never in the history of Philadelphia did such energy and promptness characterize legislation dealing with a matter freighted with so many beneficial consequences to every locality and to all classes of our people.

A re-organization of the Water Bureau, with Frank L. Hand as Chief, has been effected, under which the distinguished services of George S. Webster, Chief of the Bureau of Surveys, and his capable assistants, will be utilized. The Chief Assistant will be John W. Hill, of Cleveland, Ohio, an engineer admittedly at the head of his profession, and one who has attained world-wide reputation as a constructor, designer and builder of modern water works systems.

Not a day has been lost in pressing forward this important work since I first asked the co-operation of your Honorable Bodies, little more than eleven months ago. When completed, I fully expect that the citizens of Philadelphia will have the most extensive and the best water system of any city in the world.

Coincident with the construction and installation of the filter beds, there will be erected additional engines at all the pumping stations, which will increase the continual supply, in case of a break-down at any point. Great improvements in this direction have already been made during the past year by means of your generous appropriations.

At each station there will be installed all modern appliances, including electric cranes and other improved ma-

Digitized by Google

chinery, which will make the water system of Philadelphia the best known type of a modern plant.

Elsewhere I refer to a system of raw water mains for fire service, and I may add that Chief Engineer Webster, of the Bureau of Surveys, and Chief Hand, of the Bureau of Water, are now preparing by my direction an estimate of the cost of construction of such a system. Plans and specifications will be ready for presentation to your Honorable Bodies soon after your organization. If installed, this system will not only furnish abundant water for fire purposes and flushing gutters and sewers in the congested part of the City, but will, at the same time, save its cost of construction in economizing the use of filtered water.

If money can be found to meet the expense of installing this system, it should be made at once available, so that the work can be completed this year.

Bureau of Surveys.

The work of the Bureau of Surveys under the efficient management of Chief Engineer Webster, has been most gratifying, and of the greatest importance has been the completion of the Pennsylvania Avenue Subway and Tunnels, at a cost largely within the original estimate; of the Delaware river front improvement, and of the deepening of the Delaware river channel to accommodate the shipping of this port.

The work of the Chief Engineer upon these magnificent improvements has been splendidly commented upon by engineers and experts from various cities. All of this work has been done under his personal supervision, and notwithstanding the exacting nature of these duties, he has yet given much of his time to the development of the plans for the new water system. I am sure that under the energetic direction of Director Haddock and the co-operation of Chief Engineer Webster and Chief Hand the work of

Digitized by Google

constructing the new water system will be thorough, economical and speedy.

In recent years, in the matter of fixing the grades of streets and the location of sewers, much thought has been given to the growth of the City for the next twenty-five or thirty years. Had the same forethought been given during the past quarter of a century, it would have effected a saving to our citizens of many millions of dollars in obviating the necessity, now often manifesting itself, of too frequent revision of plans and rearranging of the lines and grades of streets, and the locations of sewers. I would recommend to your Honorable Bodies that great care be exercised in the enactment of legislation for the opening and grading of streets, so that subsequent revisions, at great expense to the City, may not become hereafter necessary. Legislation should not only have in view present needs, but should take into consideration the demands of the future.

With the completion of the Aramingo Canal, begun a few months ago, and the extension of the Wingohocking and other large main sewers, the health of the community will not only be protected, but building enterprises will be further encouraged.

Ninth Street Grade Crossing.

One of the most important and urgent improvements, but one which, however, cannot be consummated unless an additional loan is voted by the people, is that of removing the grade crossing on the line of Ninth street, north of Fairmount avenue to Huntingdon street. It is estimated that the cost of elevating the tracks and removing all of the grade crossings on this line will approximate $3,000,000. The great number of trains running over this road, the urgent demand for rapid transit and the populous district through which this line passes, demand

Digitized by Google

that this improvement be made at the earliest possible moment, and I would request that your Honorable Bodies take up for consideration the advisability of creating a loan for this express purpose. In comparison to the vast benefits that would accrue to the City, the cost is inconsiderable. With this improvement provided for and the abolition of grade crossings at Trenton avenue, already under contract, completed, two of the greatest menaces to life and limb within the City limits will be removed.

I would also recommend the extension of the Delaware avenue improvement, north and south, and the extension of the piers to the Port Wardens' line, thereby greatly extending the facilities of the port for commerce and trade. These improvements will very materially advance the shipping and commercial interests of the municipality.

Bureau of Highways.

The work of the Bureau of Highways calls for the very highest praise, as its operations during the year show greater results than during any similar period previously.

The paving and repaving with improved pavements amounted to more than sixty-six miles and covered two hundred and fifty-five streets. Although the money for this work did not become available until the season was far advanced, the energetic work of the Bureau pushed to completion this very desirable improvement. Philadelphia may justly claim the reputation of being the best paved City, as it is the best lighted one, in the country. In addition to the paving and repaving there were also executed 289 contracts for grading, 198 contracts for new paving and 85 contracts of a miscellaneous character, the total number of contracts being 827. Many miles of unpaved or macadamized public highways have been given most careful attention.

In the matter of repairs to bridges, larger appropriations

Digitized by Google

should be made, as it is poor economy to permit structures costing $17,000,000 to depreciate.

City Ice Boats.

Last December, while the river was frozen, the City Ice Boats kept the channel clear, making free ingress and egress for foreign shipping and the commerce of the port.

Bureau of Gas.

The Bureau of Gas, established in June of last year, has been operated under the terms of the lease, without any expense whatever to the City, and while not a source of revenue, it yet acts as a safe-guard to the people's interests.

Bureau of Street Cleaning.

In regard to the Bureau of Street Cleaning, I can only repeat with my approval, the recommendation expressed by Director Haddock, of the Department of Public Works, that if proper legislation were enacted to permit the making of contracts for the cleaning of streets and the removal of garbage and ashes for a period of five years, the work would be better done and at less cost to the City than at present.

DEPARTMENT OF CHARITIES AND CORRECTION.

The Philadelphia Hospital, under the Bureau of Charities, is one of the best conducted municipal hospitals in this country, having an efficient medical and surgical staff and a trained corps of nurses. The unfortunate poor and sick are given care and treatment equal to that of any pay institution.

The increased census of the insane department demands, however, the location and construction of a separate insti-

Digitized by Google

tution for these unfortunates, and the $200,000 appropriated in the loan bill for ground should be made available as soon as possible, so that a location may be selected and the construction of the buildings begun. This new building should be a model institution for the care and maintenance of the insane of the City.

DEPARTMENT OF EDUCATION.

In compliance with the other demands of the growing municipality, City Councils have been most liberal in their appropriations to the Department of Education, for the purchase and erection of buildings. It is to be regretted, however, that the Boys' High School and Annex are still uncompleted. Work on these buildings should be pushed to a completion as soon as possible, so that the school can be opened to meet the increasing demands of the boys of the City for the higher grades of education. There exists, moreover, in the outlying districts an urgent demand for new schools. Every child should have an opportunity to get a full day's schooling.

I would recommend the sale of all unoccupied school buildings and property and the conversion of the money so obtained into the Sinking Fund to reduce the public debt. In this way, indirectly, more money could be procured for the erection of new school buildings.

DEPARTMENT OF LAW.

The work of the Department of Law merits the highest commendation of all municipal officials and the public at large. Its services have been prompt and its advice most luminous to the executive branches of the municipal government.

Digitized by Google

Careful attention has been given by this Department to the will of the late Dr. Evans, under which a large sum of money is to be given to the City for the establishment of a public museum. One of the assistants in the Department has been sent to Paris, and has practically concluded negotiations, so that in a short time it can reasonably be expected that this money will become available.

CITY CONTROLLER.

The report of the City Controller shows a most satisfactory state of the public finances. Never was the credit of the City so high and never were her securities in such active demand. This fact was most strikingly shown last July in the award of the $5,600,000 loan, for which better bids were received than were ever offered previously for City bonds, the rate of interest being 2.954 per cent.

SINKING FUND COMMISSION.

The Sinking Fund Commissioners have guarded carefully the financial interests of the City, and wherever possible have purchased outstanding high rate bonds, thereby saving large amounts of interest to the City.

Their onerous and exacting duties have been most capably performed and General Louis Wagner, President of the Commission, and City Controller John M. Walton are deserving of the highest praise.

In this message reference should be made to the various public and semi-public celebrations which have marked the year 1899. The Thirty-third National Encampment of the Grand Army of the Republic was held in Septem-

Digitized by Google

ber, attracting to this City thousands of the veterans of the Civil War and their friends. Plans for their entertainment were on the most extensive scale, and were carried forward successfully.

The National Export Exposition, which was held in the fall, brought to this City, from all quarters of the globe, thousands of those identified with the commercial development of the world. Philadelphia maintained its reputation for hospitality, and I am sure its business, manufacturing and shipping interests were largely advanced. In conjunction with the Exposition, a Commercial Congress was held, in which sat as delegates men, representing not only other governments, but the commercial exchanges of almost every large city of the civilized nations. A feature of the entertainment given delegates was a public reception, tendered them in the Mayor's office at City Hall, this being the first time that such a function was observed in our new municipal buildings.

Philadelphia charity was again tested during the year by the reports of distress in the Island of Puerto Rico. Through the munificence of our citizens, Philadelphia sent to the distressed island two shiploads of provisions and other articles needed there.

The Naval Committee of the Congress of the United States made an important visit to this City regarding League Island and the Delaware river channel. They were most hospitably entertained and given every opportunity to see the facilities for handling vessels of the largest size at this port.

Their attention was called to the necessity for continuing the work of improving the Delaware river channel by carrying the depth at low water to thirty feet, instead of twenty-six feet, as at present. The importance of this work cannot be too strongly impressed upon every Philadelphian who is sincerely interested in the progress of his

Digitized by Google

City, and I would recommend on the part of your Honorable Bodies a continuance of agitation and legislation looking to this desirable end.

On May 1st of last year, upon the resignation of Harry L. Neall, Secretary of the Board of Civil Service Examiners, I appointed Arthur R. H. Morrow, which appointment you immediately confirmed.

From May 1st until Jan. 1st, 1900, there were held by the various Boards of Examiners, 219 examinations, with 3,914 candidates for places examined. In the selection of the various Boards great care was exercised to procure men of the highest standing in professional and business circles, and too much credit cannot be given to these gentlemen for their disinterested services to the public. They serve without remuneration and at a sacrifice of their time and attention to their personal affairs. The returns from the various examinations have been most prompt.

The report of Dr. Thomas H. Andrews, Surgeon for the Bureaus of Police and Fire, show that during a similar period, from May 1, 1899, to January 1, 1900, he conducted 2,006 examinations for candidates for patrolmen and hosemen and 75 candidates for guards at the House of Correction.

The continued prosperity of our City, the promotion and protection of all her multifarious interests have been the constant care of your executive officials as of your Honorable Bodies.

The harmony which has characterized every relation between the executive and legislative branches of our municipal government should continue for the very highest welfare of our citizens and of our City.

Very respectfully,

SAMUEL H. ASHBRIDGE,

Mayor.

Digitized by Google

ANNUAL REPORT

OF THE

Department of Public Works

FOR THE

Year Ending December 31, 1899

3 w

Digitized by Google

Digitized by Google

OFFICERS

OF THE

Department of Public Works.

Director,

WILLIAM C. HADDOCK.

Assistant Director,

HARRY W. QUICK.

CHIEF CLERK—WILLIS SHEBLE.
CLERK—ERNEST T. HANEFELD.
ASSISTANT CLERK—ANDREW L. TEAMER.
STENOGRAPHER AND CLERK—HARRY A. STOY.
STENOGRAPHER AND TYPEWRITER—Vacancy.
GENERAL INSPECTOR—ROBERT C. HICKS.
MESSENGER—JOHN P. JUNIOR.

Superintendent of City Ice Boats,

H. E. MELVILLE.

Chiefs of Bureaus,

GAS—DR. N. WILEY THOMAS.
HIGHWAYS—WILLIAM H. BROOKS.
LIGHTING—JOHN J. KIRK.
STREET CLEANING—SYLVESTER H. MARTIN.
SURVEYS—GEORGE S. WEBSTER.
WATER—FRANK L. HAND (acting).

Digitized by Google

Digitized by Google

. K. 20,000-'99.

This boo
ublic. Ta
hat others

Sec. 3.
ear, write
ook, pam
rinted pa
njury to be in
f a misdeme
um of not mo
Unless
esponsible

THIRTEENTH ANNUAL REPORT

OF THE

DEPARTMENT OF PUBLIC WORKS

WILLIAM C. HADDOCK, Director

Philadelphia, January 2, 1900.

Hon. Samuel H. Ashbridge,
Mayor of Philadelphia.

Dear Sir:—As required by the law constituting the Department of Public Works, I have the honor to present the report of the operations of this Department for the year ending December 31, 1899—the thirteenth annual report of the Department.

During the past few years the City of Philadelphia has undergone many changes along the lines of progressive development. The abolishment of railroad grade crossings, the completion of the Pennsylvania Avenue Subway and Tunnel, the widening of Delaware avenue and improvement of the Delaware river front, the dredging and deepening of the channels of the Delaware and Schuylkill rivers, the paving and repaving of many miles of streets with improved pavements and the beginning of the work looking to the perfecting of the water supply—all these and many minor works the citizens of Philadelphia should fully appreciate and accept as an augury of the tremendous possibilities of the City's future.

Digitized by Google

The Bureaus embraced in this Department are well organized, and the officials and employees of each Bureau so thoroughly acquainted with their work, that all the public interests assigned to the Department receive prompt and satisfactory attention. That some idea may be had of the amount of work assigned to this Department, I beg to submit a few statistics.

The area of the City of Philadelphia is 129½ square miles, with an estimated population of 1,452,840.

Within the City of Philadelphia there are 1,430.50 miles of streets and roads, of which

856.62 miles are paved,
193.58 miles are macadamized and
430 miles unpaved.
There are 1,780 miles of sidewalks,
310 bridges,
844.51 miles of sewers,
1,301.66 miles of water mains,
20,250 gas lamps,
13,314 gasoline lamps and
33.4 miles of river front.

Now, when it is borne in mind that the testing of the quality of gas supplied to our citizens, the care and maintenance of all streets and dirt roads, repairs to sewers and bridges, the paving and repaving of streets, the cleaning of streets and inlets, the collection of ashes, the removal and disposal of garbage, the supervision of all gas and gasoline lamps (electric lights being under the jurisdiction of the Electrical Bureau, Department of Public Safety), the construction and reconstruction of bridges, the building of main and branch sewers, the abolishment of grade crossings, the care and maintenance of pumping stations, the construction of new pumping plants and reservoirs,

Digitized by Google

the laying of water mains, the pumping and distribution of 107,991,371,604 gallons (1899) of water, and the thousand and one details which enter into these works, some faint conception may be had of the magnitude of the work entrusted to this Department.

The receipts of the Department during the year just closed were $3,436,848.44, and the expenditures $7,751,-709.56. These receipts and expenditures are set forth in detail in the general summary of the work herein presented, and more elaborately in the reports of the Chiefs of Bureaus, which accompany this report.

City Ice Boats.

During the severely cold weather in February, 1899, the three ice boats rendered valuable service by breaking the ice in the rivers and keeping the channels open to navigation. No. 1 was in commission forty-one days, No. 2 twenty days and No. 3 eighteen days.

The repairs necessary to place the boats in condition for service during the season of 1899-1900 were made during the past summer, the work being done principally by the care takers on the boats. On December 1 all three boats were ready for service.

At the date of this report, January 2, 1900, all three boats are in commission and at work.

The following summary is an abstract of the receipts and expense of maintenance of the City Ice Boats during the year 1899:

	1899.
Amount received for towage and assistance rendered	
Amount received for sale of old material	$72 45
Total paid to City Treasurer	$72 45

Digitized by Google

	1899.
Total amount of warrants drawn	$20,834 70
Deduct cash paid City Treasurer	72 45
Actual current expenditure	$20,762 25

Bureau of Gas.

The ordinance of Councils authorizing the lease of the Philadelphia Gas Works to the United Gas Improvement Company, provides in clause 11 of the agreement between the City and said company, for the appointment of a Chief Inspector of Meters and such assistants as may be necessary, whose duty it shall be to ascertain the quality and illuminating value of the gas supplied by the United Gas Improvement Company, and to determine the accuracy of meters when a complaint shall be received from any consumer doubting the correctness of the bill rendered by said company.

The Bureau of Gas was reorganized under authority of ordinance of Councils approved March 29, 1899, and Dr. N. Wiley Thomas was appointed Chief Inspector of Meters, with offices in Rooms 230 and 232, City Hall. He assumed charge of the Bureau on June 1, 1899.

In accordance with its agreement, the United Gas Improvement Company paid into the City Treasury, for the payment of salaries of the officials and incidentals expenses of the Bureau of Gas for the balance of the year 1899, the sum of $7,083.33.

Expenditures from the date of re-organization to December 31, 1899	$5,920 76
There was transferred	1,161 79
Merged	78
	$7,083 33

Digitized by Google

In accordance with the provisions of the agreement between the City of Philadelphia and the United Gas Improvement Company, two very satisfactory gas testing stations have been established and equipped with all the necessary apparatus for testing the gas; these stations are located at Seventeenth street and Passyunk avenue and Richmond and Ann streets.

The daily tests of the gas furnished have been made and the average candle power of said tests was as follows:

August	22.70
September	22.50
October	22.70
November	22.60
December	23.10

A meter testing station, complete with all the apparatus for accurately proving the meters has been established by the United Gas Improvement Company at Twenty-second and Filbert streets, and since June 1st we have been prepared to examine all meters over which disputes may have arisen; but notwithstanding the fact that we have all the facilities for this work, we have not yet had a request from any customer asking for an examination as provided for in the agreement between the City and the United Gas Improvement Company.

The Chief Inspector of Meters and his assistants have been faithful in the discharge of their duties; tests of gas have been made daily, and at no time have we had any cause to report the deficiency of illuminating power, but, on the contrary, the results obtained at the testing stations have demonstrated that the terms of the contract as to the quality and illuminating power of the gas have been fully complied with by the United Gas Improvement Company.

Digitized by Google

Bureau of Highways.

The operations of this Bureau during the year 1899 show greater results than in any previous twelve months. Great credit is due the Chief of Bureau and his assistants for the able and efficient manner in which they conducted the large amount of work entrusted to their care. The paving and repaving with improved pavements amounted to more than sixty-six miles.

During the year Councils appropriated out of the loan $2,000,000 for repaving streets with improved pavements, and by ordinance designated the streets and the character of pavement to be laid thereon. Of this amount $1,450,000 was made available and $1,403,266.53 placed under contract, covering two hundred and fifty-five streets. Notwithstanding the fact that this money did not become available until the season was far advanced, the Department, by energetically pushing the work, succeeded in completing the repaving of two hundred and forty streets. The balance will be finished in the early part of the year 1900.

In addition to the above work there were two hundred and eighty-nine contracts for grading, one hundred and ninety-eight contracts for new paving and eighty-five contracts of a miscellaneous character, making a total of eight hundred and twenty-seven contracts in this Bureau for the year 1899.

The tables found in another portion of this report set forth in detail the work of the Bureau of Highways. For ready reference the following table shows the classification of street pavements laid during the year and their mileage; also the total mileage of the various kinds of street pavements on December 31, 1899:

Digitized by Google

General Pavement Statistics.

Kinds of Pavements.	Laid During 1899.		Making Total in City, Dec. 31, 1899.	
	Sq. Yards.	Miles.	Sq Yards.	Miles.
Sheet asphalt	592,381	44.09	3,713,283	234.81
Asphalt block	2,702	.13	180,702	19.30
Granite block	14,821	1.03	5,775,339	352.16
Cobble or rubble			2,317,717	112.49
Vitrified brick	159,842	10.18	1,936,965	119.52
Granolithic			72,726	12.77
Slag block	22,985	2.55	40,867	5.57
Macadam	75,408	8.22	2,022,182	193.58
Total	868,139	63.20	16,059,772	1,050.20

In addition to the paved and macadam streets, there are 430 miles of unpaved streets or dirt roads.

There has been no departure from the system formerly adopted by the Committee on Highways in the selection of material for the paving and repaving of streets. The ordinance of Councils designating the streets to be paved or repaved, names the character of material and the kind of base upon which it shall be laid. Granite block, vitrified brick or block and slag block are required to be laid on a concrete foundation, while the ordinance authorizing the paving or repaving of streets with sheet asphalt requires only a broken stone base and binder. This is a mistake, and I recommend that sheet asphalt as well as all other street pavements be laid on a concrete foundation only.

The grading of streets continues to be an important part of the work of this Bureau; 1,451,379 cubic yards of grading was done during the year, opening many miles of new streets and bringing other streets already opened to the established City grade.

The amount of curved curbing placed during the year

Digitized by Google

was 37,066 linear feet, which is far in excess of similar work in any previous year. The great bulk of this work was done at the intersections on the lines of streets which were repaved with improved pavement.

The importance of placing radius curbs at the intersections of streets has ceased to be a subject of controversy. When first introduced it was with the intention of beautifying our streets; it has now become a matter of necessity for the safety and convenience of drivers and wheelmen. Councils should make liberal appropriations for this work, so that at the intersections of all streets paved or repaved, these curbs may be placed, and on streets already repaved with improved pavements, the old square corners be removed and the radius curbs substituted as far as practicable.

With the many miles of street pavements laid, neglect has been observed on the part of owners of property abutting on the streets paved or repaved, to place suitable curbing in front of their properties.

The functions of a curbstone are such that great stability is required and should be insured. Our specifications for the paving and repaving of streets calls for excellent and expensive work, while the choice of curbstone is left to the property owner, with the result that often both permanence and strength, as well as appearance, are disregarded.

The comparative cheapness of cement is leading to its liberal use for curbstones, but such curbs will never convey as good an impression as when made from granite, neither will they withstand as well the destructive impact of wheels of vehicles.

The appearance of the streets of the City would be much improved and the drainage in the gutters less impeded if the law provided for the setting of dressed granite curbs on all streets prior to paving or repaving, and

Digitized by Google

an ordinance making it obligatory for the placing of such curbs should be passed by Councils.

The unpaved or macadamized public highways of the City have received the most careful attention; 50,000 tons of broken stone was spread and rolled on macadamized roads, placing them in most excellent condition. All necessary repairs were made in a prompt and substantial manner, and the magnificent condition of the roads at the beginning of the winter season attests to the unremitting care and labor bestowed upon them during the year.

The sprinkling of macadamized roads has become such an important feature in the care of these roads, both as a matter of economy in the maintenance of the roads and in adding to the pleasure of those driving upon them, that provision is now made annually by Councils for its continuance. During the past year the work of sprinkling was commenced April 6, 1899, and continued until November 9, 1899, with eminently satisfactory results.

We have 430 miles of dirt roads, including streets graded and unpaved. During the summer months and in dry weather these roads are put in condition and are very pleasant to drive over, but because of the fact that the bulk of the material in them is composed of clay, they are, in wet seasons and during the winter months, almost impassable. These roads are being repaired with macadam as rapidly as the amount appropriated for the purpose will permit.

Previous to the year 1899 repairs to paved streets were made at so much per square yard, but during the past year, on all streets except those paved with sheet asphalt, this work was done for a lump sum. According to the terms of the contract, it was incumbent upon the contractor to repair every street in the City which was not in good condition and covered by his contract, and to maintain said streets in first-class condition during the entire

Digitized by Google

year. The terms of the contract have been faithfully complied with, and at no time in the history of the City of Philadelphia have these streets been kept in as good condition as during the year 1899. The results of this system of repairing streets have proven eminently satisfactory.

During the past year there has been no serious difficulty with any of the sewers of our City, and all needed repairs have been promptly attended to. The only serious break occurred during a heavy rainfall to the old Cohocksink Sewer at a point on Norris street, east of Eleventh street. Repairs were promptly made by removing the broken section and reconstructing the part where damage occurred. This work was done under the supervision of the Bureau of Surveys.

The Superintendent of Bridges reports general repairs to one hundred and seventeen bridges belonging to the City, at a cost of $123,095.16, and estimates that similar work next year will cost about $145,500.

The bridges of the City exceeding eight feet in span, number three hundred and one, and have been constructed at an estimated cost of $17,000,000.

During the year repairs have been made to the extent of the amount appropriated for the purpose, but the appropriation for the maintenance of bridges is totally inadequate to paint the iron and steel structures so as to prevent deterioration. It is poor economy to permit these important structures to depreciate, and Councils should appropriate sufficient money to maintain them properly.

The report of the Chief of Bureau of Highways shows in detail the great extent and variety of the work done on the highways and bridges of the City during the past year.

Digitized by Google

Receipts and Expenditures.

The receipts of the Bureau of Highways during the past year were $142,164.20, an increase of $12,696.96 over the previous year.

Statement of Expenditures.

	1899.
Current expenses	$922,893.14
For extensions	1,584,729.38
Total	$2,507,622.52

The following tables give a statement in detail of work done by the Bureau of Highways during the year 1899:

Statement of Work Done.

	1899.
New paving	306,144 linear feet.
Macadamizing (new)	43,442 linear feet.
Grading	1,451,379 cubic yards.
New footway paving	111,861 square yards.
Repairs to paved streets	1,901,934 square yards.
Footways repaved	30,749 square yatds.
Ditches repaved	83,992 square yards.
Gutter stone laid	65,042 linear feet.
Crossing stone laid	19,158 linear feet.
Tramway stone laid	2,106 linear seet.
Curbstone reset	386,164 linear feet.
Wooden trunks	6,647 linear feet.
Brick and stone drains	2,950 linear feet.
Hand railings	3,666 linear feet.
Broken stone used	50,000 tons.
Macadamizing (resurfacing)	179,697 linear feet.
Curved curb corners	37,066 linear feet.
Footway, curb and railroad notices served	57,964.

Digitized by Google

Summary of Work Done in Improved Pavements—New Streets.—1899.

	Square Yards.	Linear Feet.
Granite blocks	7,715	3,052
Sheet asphalt	37,260	11,035
Vitrified bricks	142,107	47,375
Asphalt blocks	2,702	685
Macadamizing	75,408	43,442
Total	265,192	105,589

Replacing Cobblestone With Improved Pavements.—Old Streets.—1899.

	Square Yards.	Linear Feet.
Granite blocks	7,106	2,428
Sheet Asphalt	551,121	221,695
Vitrified bricks	17,735	6,384
Granolithic		
Slag block	22,985	13,490
Total	602,947	243,997

1899.—Total amount of new paving 349,586 linear feet, equal to 66 miles, 1,106 linear feet.

In addition to the work done by the City in the paving and repaving of streets, with improved pavement, the following statement shows in detail the amount of work done by the passenger railway companies during 1899:

	Repaving Linear Feet.
Granite blocks	14,484
Granite blocks (old blocks relaid)	63,443
Vitrified bricks	2,742
Total	80,669

Equal to 15 miles, 1469 linear feet at an estimated cost of $90,000.

Digitized by Google

Board of Highway Supervisors.

The year 1899 has been one of unusual activity in the Board of Highway Supervisors, and the net revenue to the City is larger than during any previous year. The receipts for the year 1899 show a considerable increase over those for the year 1898, being nearly double. This is not due to any addition to the staff of draughtsmen, but to the increased amount of work accomplished, and, when the many disadvantages under which this corps has been compelled to labor, are taken into consideration, the amount of new work performed seems almost incredible.

Much credit is due to the valuable services of Mr. Jules T. Jollivet, Chief Draughtsman, and his corps of able assistants, who have performed their duties faithfully, and often at a cost of their personal time. It is to be regretted that the force of the draughting division of this Board has not been increased in proportion to the increase of labor imposed upon it; we need at least five more draughtsmen to meet successfully and satisfactorily the demands made upon the Board.

The total amount earned for the City by the draughtsmen of the Board during the past year was $25,117.39, and the expenses for the same period were $8,797.01. What better argument could be advanced for an increased force? It means an increase of earnings for the City.

During the year 35.5 miles of underground plans have been added to the valuable records of the Board, making a total of 206.8 miles, or about one-fifth of the mileage of the paved streets of the City. The importance of this work cannot be estimated, and the additional force suggested should be granted, that the Board may complete, as early as practicable, plan maps showing the underground structures in all the paved streets of the City.

During the past year the records of the draughting di-

Digitized by Google

vision show that the United Gas Improvement Company laid 77 miles of gas mains in the streets of the City and the Bell Telephone Company 161.3 miles of ducts and 50.7 miles of conduits.

The increased receipts and the number of permits authorized by the Board show the continued disturbance of our highways, and the outlook for a cessation of such work in the near future is very unpromising.

The following is a statement of the Board of permits authorized to be issued during the year 1899 to the several companies maintaining underground structures:

West End Electric Company	2
Suburban Electric Company	2
Northern Electric Light Company	6
Edison Electric Light Company	12
Pennsylvania Heat, Light and Power Company	1
Diamond Electric Company	3
Union Traction Company	8
Bell Telephone Company	544
The United Gas Improvement Company	757
Total	1,335

The facts set forth in this statement are very suggestive. Is the tearing up of our street pavements to continue indefinitely? In some instances the new pavement has scarcely been laid before application is made for permit to break it for the purpose of placing some underground structure. How to protect our street pavements is an important question, and one that will require much study and legislation by City Councils before a satisfactory plan can be evolved.

The following is a summary of the transactions of the Board of Highway Supervisors and of the work of the draughting department; also the receipts and expenditures for the year 1899:

Digitized by Google

Transactions of the Board of Hiyhway Supervisors.

Permits Authorized to be Issued.	1899.
For vaults	16
For railroad tracks, curves and turnouts	74
For underground pipes	9
For electrical conduits	578
For erecting bridges	4
For awnings	279

Work Done by the Draughtsmen of the Board of Highway Supervisors.

	1889.
Plans of iron awnings furnished	295
New street record plans prepared	172
Blue print plans placed on file	246

Receipts and Expenditures.

	1899.
Receipts	$21,844.36
Expenditures	8,797.01
Excess of receipts	$13,047.35

Recapitulation.

Amount of earnings during 1899	$25,117.39
Amount outstanding from previous years	2,256.18
	$27,373.57
Amount received in 1899 and deposited with City Treasurer	21,844.36
Amount outstanding	$5,529.21

Digitized by Google

Bureau of Lighting.

The work of this Bureau consists of a general supervision of the gas lamps lighted and maintained by the United Gas Improvement Company and the Northern Liberties Gas Company; also the gasoline lamps lighted and maintained by the Pennsylvania Globe Gas Light Company. The arduous duty of the Chief of the Bureau has been lightened during the past year by the addition of one clerk and two inspectors, all of whom have discharged their duties in a perfectly satisfactory manner.

The total number of lamps lighted and under the supervision of the Bureau of Lighting on December 31, 1899, was 33,276, divided as follows:

Gas lamps maintained by the United Gas Improvement Company	19 742
Gasoline lamps	13,314
Gas lamps maintained by the Northern Liberties Gas Company	92
Gas lamps maintained by the Department of Charities and Correction	128
	33 276

In addition to the gas and gasoline lamps, there are 7,832 electric arc lights under the care of the Department of Public Safety (Eelctrical Bureau) and fifty electric arc lights located along Delaware avenue and Front street, between Vine and South streets, maintained by the Board of Directors of City Trusts.

The United Gas Improvement Company during the past year has faithfully complied with the terms of its contract with the City in regard to the lamps under its care. All lamps have been kept in good order and lighted and extinguished regularly.

In accordance with the terms of the contract between the City of Philadelphia and the United Gas Improve-

Digitized by Google

ment Company, which requires said company to erect and maintain three hundred new gas lamps annually the Department located during the year three hundred and seventy-four new lamps. Of this number, two hundred and forty-five were erected and the balance will be erected in the early part of the present year. There were also erected during the year, seventy new gas lamps which were located in the year 1898.

The demands from operative builders for gas lamps on streets occupied by their operations, and the large number of gas lamps required on streets authorized by City Councils to be paved, are so great that the three hundred new lamps provided in the gas lease do not begin to meet the requirements. To meet this deficit of gas lamps the Department has made arrangements with the United Gas Improvement Company to discontinue the lighting and the removing of all gas lamps in close proximity to electric lights, re-erecting them in other places, as designated by the Department. Under this arrangement one hundred and ninety-nine discontinued gas lamps were relocated in other places. Of this number one hundred and eighty-two have been re-erected. There have also been removed and re-erected one hundred and one discontinued gas lamps which were located by the Department during the previous year, making a total of two hundred and eighty-three gas lamps re-erected during the year 1899.

As hereinbefore stated, the three hundred new gas lamps which the United Gas Improvement Company is required to erect annually is not sufficient to meet the needs of the rapid development of the City, and I would recommend that City Councils be asked to make provisions annually for an additional number of new gas lamps. The urgency of this matter is increasing, as we have about reached the limit of lamps that can be discontinued.

The following statement shows the number of gas and

Digitized by Google

gasoline lamps and the expenditures of the Bureau of Lighting during the year 1899:

	1899.	
	Number of Lamps.	Cost during the year.
Gas lamps maintained by the The United Gas Improvement Company	*19,922	
Gasoline lamps	13,314	$279,559 61
Gas lamps supplied by the Northern Liberties Gas Company	92	1,858 44
Gas lamps maintained by the Bureau of Correction	*236	
Salaries and office expenses		5,758 44
Total	33,561	$287,176 49

*Not lighted because of proximity to electric lights.

	1899.
Under care of the The United Gas Improvement Company	180
Under care of Bureau of Corrrection	108

Bureau of Street Cleaning.

The work of this Bureau during the year 1899 has been of a satisfactory charcter. The expenditures were as follows:

For cleaning streets an l inlets. removing ashes, etc.	$500,415 00
For the removal and disposal of garbage	356,810 00
For the removal of snow from City bridges crossing the Schuylkill River and from streets in the busines centre of the City	19,975 70
Supervision of all work and office expenses	23,246 80
Total	$900,447 50

During the year 202,799 cart loads of dirt were removed from the City's streets and inlets, 625,459 cart loads of ashes and dry refuse were collected and removed from business establishments and dwellings; 199,357 cart loads of kitchen garbage were collected and disposed of in a sanitary manner and 14,947 single and 5,018 double cart loads of snow were removed from the bridges spanning the

Digitized by Google

Schuylkill River and streets in the business section of the City.

Notwithstanding the magnitude of this work, the number of complaints received was small, thus attesting to the efficiency of the service and the satisfactory character of the work.

I am of the opinion expressed by my predecessors in previous reports, that if proper legislation was enacted to permit the making of contracts for the cleaning of streets, the removal of ashes and the collection and disposal of garbage and for other similar work for a period of five years, the work would not only be better done but at a less aggregate cost to the City than under the present one year system. Of recent years, this has become more apparent because of the fact that the work has become of such magnitude as to require an extensive plant to prosecute it successfully, and men of business experience are unwilling under the present system, to take a contract for work of this character with the risk of having an extensive plant on their hands after one year's service.

We have no well-defined law regulating the placing of ashes and garbage for removal. As a result, all kinds of receptacles are used and in almost every instance filled to overflowing, with the waste paper and other dry refuse placed on top which the first wind scatters far and wide over the streets. I would recommend that Councils be requested to pass an ordinance regulating the kind of receptacles to be used and requiring householders and storekeepers to keep their combustible waste in a vessel separate from the ashes; also that a regulation be adopted and enforced by the Bureau of Police preventing the overhauling of ash receptacles by rag-pickers; very much of the untidy appearance of our streets, particularly in the residential section, is from this cause.

The following is a statement in detail of the operations of the Bureau of Street Cleaning during the year 1899:

Digitized by Google

Total Work During the Year 1899.

DISTRICTS.	CLEANED.					REMOVED.				Number of Complaints of all kinds.
	Squares.	Inlets.	Crossings.	Market Houses.	Snow from Fire Plugs.	Number of Dead Animals.	NUMBER OF LOADS. Dirt	Ashes.	Garbage.	
First	436,227	189,827	126,436	622	5,971	1,498	35,410	110,976	33,932	233
Second	381,194	206,436	121,300	1,236	6,043	1,844	47,864	105,915	39,075	936
Third	225,863	108,210	62,690	298	4,560	1,452	14,633	68,202	37,275	240
Fourth	557,365	534,091	114,024	.....	1,659	2,270	78,898	196,418	46,866	420
Fifth	425,643	338,929	69,540	.....	1,956	1,638	20,496	143,948	42,209	384
Sixth	22,162	34,294	7,080	.....	2,628	.....	10,498	.....	.....	9
Totals, 1899	2,048,454	1,411,787	501,070	2,156	22,817	8,702	202,799	625,459	199,357	2,222

The total expenses of the Bureau of Street Cleaning for the year 1899 were $900,447.50

Digitized by Google

Bureau of Surveys.

The exhaustive report of the Chief Engineer of Bureau of Surveys shows in detail the varied works performed by this important branch of the City service.

The expenditures during the past year were $2,317,-248.42. Of this amount $2,070,742.01 were expended for permanent improvements and the balance $246,506.41, for the current expenses of the Bureau. The receipts for the year were $148,813.23, being an excess of $20,060.15 over the previous year.

Work of a greater or lesser extent, as the appropriation for the purpose permitted, was done upon the following main sewers, but only the sewer on Kirkbride street, from the Delaware River to Geiger street, and the extension of the Stormwater Conduit at Wissahickon avenue, near Rittenhouse street, were finished to the full extent of the work needed.

Main Sewers Completed During the Year 1899.

Fifty-fifth street, from Baltimore avenue to north of Webster street.

Cottman street, from Delaware River to Philadelphia and Trenton Railroad.

Kirkbride street, from Delaware River to Geiger street.

Extension of Stormwater Conduit at Wissahickon avenue near Rittenhouse street.

In addition to completing the contracts for work on the above sewers, the following contracts have been executed; work has begun on the sewers under contract and all will be completed during the year 1900:

Main Sewers under Contract.

Ash street, from Frankford Creek to Thompson street.

Extension of Reed street sewer from terminus at Schuylkill avenue to Schuylkill River.

Digitized by Google

Sixty-one-and-a-half street, from point 200 feet south of Vine street to Vine street, and on Vine street, etc.

Fifty-fifth street, from Thomas avenue to South street.

Webster street, from Fifty-fifth to Fifty-eighth street, and on Fifty-eighth street, etc.

Montgomery avenue relief, from Twelfth to Sydenham street, etc.

Hegerman street, from Deveraux to Benner street, and on Benner street, etc.

East Branch Wingohocking Creek, from stream south of Church street on the line of a proposed street, thence on Twenty-first street, etc.

Oregon avenue, from Delaware river to Weccacoe avenue.

Extension of Wissahickon high level intercepting sewer, from terminus near Hartwell avenue northwest.

Eastwick street, from creek west of Sixty-fourth street to Sixty-fourth street, etc.

Extension of Aramingo avenue sewer, from Norris street to Delaware River.

Extension of Wingohocking Creek sewer, from Eleventh street eastwardly.

South street, from Fifty-fifth to Fifty-four-and-a-half street.

Important Main Sewers Recommended to be Built.

Extension of Montgomery avenue relief sewer on Sydenham street to Columbia avenue, to Twentieth street.

Relief sewer on Oxford street, from Twenty-sixth to Thirtieth street.

Extension of sewer in Robinson street, on Robinson street, Arch, Felton and Market streets.

Chestnut street, from Fifty-sixth to Fifty-ninth street, and on Fifty-ninth street to Arch street.

Extension of sewer on Sixty-fifth street, from Buist avenue to Woodland avenue.

Digitized by Google

Fifty-seventh and Eastwick streets extension.

McKean street relief sewer.

Shunk street sewer on Oregon avenue, from near Weccacoe street (now Leithgow) to Weccacoe avenue, etc.

Extension of Thomas Run sewer on Fifty-six-and-a-half street.

Rosehill street, from Allegheny avenue to Tioga street, on Tioga street to "B" street.

Extension of branch of Merion Creek sewer, from near Overbrook avenue and Upland Way to Fifty-ninth street, and on Fifty-ninth street.

Frankford Intercepting system.

Cohocksink relief sewer.

Extension of west branch Wingohocking sewer to Mt. Pleasant avenue.

Extension of Wissahickon high level intercepting sewer to Twenty-fourth and Indiana avenue.

All of the above main sewers and many others are of vital importance to the health and cleanliness of our City.

For the year 1900, Councils have provided $300,000 for main sewers and as soon as they pass an ordinance designating the sewers and authorizing their construction, the work will be placed under contract and proceeded with.

The amount appropriated for main sewers is totally inadequate to meet the many pressing demands for their construction and large appropriations are desirable for the immediate extension and completion of our main sewer systems.

The building of connections with the intercepting sewer is being steadily pushed. The total length of branches and connections built during the year 1899 was 32,345 linear feet, at a cost of $184,417.81.

The following work in connection with the intercepting system is now under contract, operations upon which have begun and will be completed during the year 1900:

Digitized by Google

Boone street, from Roxborough to Rector street.

Devon street, from Cresheim to Gowen street.

Fountain street, from Schuylkill Canal to Smick street.

Umbria street, from Fountain street to 130 feet southeast of Lemonte street.

Ogle street, from Fountain to Lemonte street.

Hermitage street, from Pechin street to Ridge avenue.

Leverington street, from Ridge avenue to Shalkop street.

Mansion street, from Hermitage to Gates street.

Gates street, from Mansion street to about 170 feet northeast.

Ripka avenue, from Silverwood to Sheldon street.

Shelden street, from Ripka avenue to Hermitage street.

Rector street, from Boone to Terrace street.

Seville street, from Ridge avenue to Pechin street.

Tulpehocken street, from Green to Wayne street.

Wayne street, from Washington lane to summit southeast of Tulpehocken street.

Freeland avenue, from Pensdale street to Walnut lane.

Lauriston street, from Pensdale street to Walnut lane.

Krams avenue, from Silverwood to Fleming street.

Boone street, from Krams avenue to Green lane.

Dupont street, from Silverwood to Fleming street.

The advantages and importance of this work are becoming more apparent every year and sufficient money should be appropriated to complete the extension of the Wissahickon high level sewer to the nearest objective point, which is Rex avenue; also to extend it to the Saint Joseph Convent at Chestnut Hill; and the Lincoln avenue intercepter, from Sedgwick street to Allen's lane.

During the past six or seven years, the City has constructed a system of intercepting sewers through that portion of the Twenty-second Ward, the drainage of which is tributary to the Wissahickon Creek. As a tempor-

Digitized by Google

ary expedient, this drainage has been allowed to flow through the main Manayunk intercepting sewer. The growth of improvements and the increase in the number of properties drained, has so increased the flow in this sewer as to make it necessary to construct the permanent outlet of the Germantown system, from Rittenhouse street at the Wissahickon Creek to the intersection of Twenty-fourth and Indiana avenue, to which point the sewer intended as an outlet has been constructed.

This is necessarily a tedious and costly operation, but in order to avoid surcharging the main intercepting sewer, it should be completed as early as practicable.

I therefore recommend that an appropriation for the purpose be made at an early date.

Four hundred and ninety connections were made to the intercepting sewer and its branches and 7,599 with other sewers during the year 1899. These do not include about 2,400 connections to sewers built at private cost during the year.

Nothing adds so much to the health and cleanliness of the City as an adequate system of sewers; and the Chief Engineer, in his report, refers fully to the necessity of providing for the extension of the present and the introduction of new systems of main sewers.

Plans have been prepared for the relief of the territory drained by the Cohocksink sewer and the sum of $100,000 has been set aside in the appropriation for the year 1900 to commence the work. Before permanent relief can be obtained, it will require an additional appropriation of $125,000. On July 28, 1899, a break occurred in this sewer in Norris street, east of Eleventh street. No contract for repairing this sewer being in force, Messrs. E. D. Smith & Company were directed to proceed with the work and in accordance with prices submitted by them, repairs were promptly made at a cost of $6,207.41.

Digitized by Google

In the latter part of the year, a contract amounting to $29,750 was executed for reconstructing worn out parts of this sewer but owing to the lateness of the season, the work was not commenced.

Careful and earnest study has been given by the officials of the Bureau of Surveys to the development of plans for the revision of lines and grades of streets in different parts of the City. This work requires much time and attention and is far-reaching in its importance.

Preliminary plans and estimates have been prepared for abolishing grade crossings on the line of the Chestnut Hill branch of the Philadelphia and Reading Railway at High street, Chew street and Washington lane. The railway company has agreed to co-operate and it is expected that this much needed improvement will soon be accomplished.

The Pennsylvania Railroad Company will commence, during the early part of the year 1900, the work of abolishing grade crossings on the line of Trenton avenue, for which plans for the necessary revision of lines and grades were completed during the past year.

Branch Sewers.—In the year just closed 250 contracts for branch sewers were executed, of which number 209 were completed; 33 1-3 miles of branch sewers were constructed by the City, and under private contract 5.62 miles. There were twelve contracts for the construction and reconstruction of inlets not included in sewer contracts, under which 1,060 inlets were built or rebuilt, 11,901.98 linear feet of curved granite curbing placed in connection therewith and 37,266 feet of lateral sewer connections placed in streets to be paved or repaved. Upon streets repaved with asphalt, 280 asphaltum filled manhole covers were substituted for the old iron covers.

Testing Laboratory.—The extremely poor results obtained in municipal work induced the Department to consider the establishment of a testing laboratory, where all

Digitized by Google

tests may be made upon cement, brick, iron, wood or other structural material.

This plant was first started in the year 1892 in a small way, and machinery has been gradually acquired from year to year as money could be obtained for the purpose, until we now have a fairly well equipped plant, where most of the material required in any public improvement has been tested before being used in the work. The results have proven eminently satisfactory to contractors and the officials in charge of the work. The benefits derived from the use of our testing laboratory are too many to enumerate. It has placed public work upon a firm basis, causing sound business principles to be applied in the selection of material. It has procured for the City the best materials on the market for public improvements, and insures a dollar's worth of material for every dollar expended. It is also an assurance to the contractor that the entire work will be conducted on a sound business basis, thus admitting a better class of contractors to competition.

While the work done by the testing laboratory during the past year has been greater than that of any previous year, yet the plant is inadequate to meet all the demands made upon it by the different City Departments, and it would be a wise and profitable expenditure of money if Councils would appropriate a sufficient amount to purchase the additional apparatus required to fully equip this plant.

Bridges.—No new bridges were authorized during the year 1899 to be constructed out of the appropriation to the Bureau of Surveys, but this Bureau prepared plans and specifications for the construction of two timber viaducts on the line of Rhawn street, funds for the construction of which were provided in the appropriation to the Bureau of Highways.

The contract and sureties of the Phœnix Bridge Com-

Digitized by Google

pany for the metal superstructure of the Gray's Ferry Bridge were approved by Councils on March 24, 1899. The work has proceeded in a satisfactory manner, and $102,466.66 has been paid the contractor on account of work done. Limit of contract $147,500. A further sum of $100,000 is set apart in the appropriation for the year 1900 to provide for the completion of this bridge.

The footway bridge on the line of Wheatsheaf lane over the tracks of the Connecting Railway and the Philadelphia and Trenton Railroad was completed September 8, 1899.

A large amount of bridge work is contemplated during the year 1900; $750,000 has been provided in the annual appropriation for the year for new bridges, but Councils have not yet passed the ordinance designating the bridges to be built.

The following list includes bridges of the utmost importance, all of which should be constructed as early as practicable:

Retaining walls, abutments and superstructure for Thirty-third street, over Philadelphia and Reading Railway and over Connecting Railway.

Lehigh avenue under Connecting Railway.

Walnut lane over Wissahickon creek.

Fifty-seventh street, over West Chester and Philadelphia Railroad.

Frankford avenue and Old Front street, over Frankford creek (2 bridges).

Seventeenth street, over Philadelphia, Germantown and Norristown Railroad.

Sedgley avenue, over Richmond Branch of Philadelphia and Reading Railway.

Seventy-first street, over Philadelphia, Wilmington and Baltimore Railroad.

Allegheny avenue, under North Penn Railroad.

Digitized by Google

Sixty-sixth avenue, North, over North Penn Railroad.

Glenwood avenue over Richmond Branch of Philadelphia and Reading Railway.

Hunting Park avenue, over Richmond Branch of Philadelphia and Reading Railway (one-third of cost).

Wyoming avenue, over Frankford creek.

Gravers lane, over Chestnut Hill Branch of Philadelphia and Reading Railway.

Erie avenue, over Richmond Branch of Philadelphia and Reading Railway.

Dauphin street, under Connecting Railway.

"D" street, over Connecting Railway.

Montgomery avenue, over Connecting Railway.

Fifty-second street, under Pennsylvania Railroad.

Luzerne street, under North Penn Railroad.

In addition to those named in the above list, there are many other bridges which are important and necessary to permit of direct communication between built up portions of the City that are now cut off by intersecting railroads or streams of water.

Pennsylvania Avenue Subway and Tunnel.—The important work of constructing the Pennsylvania Avenue Subway and Tunnel is practically completed.

The magnitude of the work can best be realized by reference to the following statistics:

Digitized by Google

	1899.	Total.
Earth and rock excavation	181,338 cubic yds.	1,083,422 cubic yds
Masonry laid exclusive of sewers	11,786 cubic yds.	183,114 cubic yds.
Temporary track laid	1.28 miles.	11.28 miles.
Permanent tracks laid	10.95 miles.	13.45 miles.
Sewers constructed	2.82 miles.	7.02 miles.
Bridges	7	18
Structural work	3,156,847 pounds.	10,515,787 pounds.
Number of approved drawings prepared (not counting studies)	141	1,354
Number of shop drawings checked	220	1,010
Average number of men employed by contractors	395	

The importance of this work cannot be estimated. It has resulted in greatly increasing the value of property in this immediate locality, removing many dangerous grade crossings, and has made Broad street one of the finest thoroughfares in the world.

Dredging Delaware and Schuylkill Rivers.—The work of improving the channels of the Delaware and Schuylkill rivers, which was commenced in the year 1895, and for which appropriations have been provided from time to time by City Councils, was completed at the close of the year 1899.

The improvement to the channels of these rivers during the four years has been of great benefit to navigation and of inestimable value to the shipping and commercial interests of the Port of Philadelphia.

Widening of Delaware Avenue.—This work was authorized by ordinance approved March 31, 1896, and the City appropriated $1,500,000. The Board of Directors of City Trusts, trustees of the estate of Stephen Girard, co-operated with the City in the work, and set aside $650,000, making the total amount **$2,150,000.**

Digitized by Google

The following contracts have been completed during the year.

Contract No. 5—Sewers in Delaware avenue, between Vine and Market streets, including Market street.

Contract No. 6—Sewers in Delaware avenue and adjacent streets, between Market and South streets.

Contract No. 7—Construction of bulkhead on the easterly line of Delaware avenue between Vine and South streets.

Contract No. 11—Superstructure for Arch street pier.

Contract No. 12—Superstructure for Chestnut street pier.

The following contracts are still in force and work on them will be pushed as steadily as possible:

Contract No. 13—Construction of bulkhead on the easterly line of Delaware avenue at the foot of Race street.

Contract No. 14—Construction of wooden pier at the foot of Race street, Delaware river.

The improved and changed conditions on Delaware avenue between Vine and South streets, are very marked, and give greatly increased facilities for our commercial interests.

District Surveyors.—The membership of the Board of Surveyors consist of the thirteen district surveyors with the Chief Engineer of Bureau of Surveys as President.

During the year this Board held twenty-four stated meetings and twelve special meetings; ninety-three plans of new streets, etc., were confirmed and one plan rejected; sixty-three plans of relocations of curves and street railway tracks were considered and approved; seven hundred and twenty-five references of bills and petitions for new streets, revision of City plans and new sewers were received, considered and acted upon and reported back to the Committee on Surveys.

The cash receipts and work performed by the District

Digitized by Google

Surveyors for the City during the year aggregates $245,-279.19, an increase of $30,690.25 over the previous year, and exceeding the expenditures of the thirteen districts by $85,154.30.

The following is a summary of the receipts and expenditures of the District Surveyors for the year 1899:

Digitized by Google

Summary of Receipts and Expenses of District Surveyors.

Districts.	Surveyors.	Cash Receipts.	Credit for Work Done for the City.	Total Credit.	Expenses.				Balance Profit to the City.	Profit to the City in 1898.	Increase.	Decrease.
					Salaries.	Pay of Assistants.	Miscellaneous.	Total.				
1	Thomas Daly	$7,793 92	$9,907 06	$17,700 98	$3,000 00	$5,669 96	$1,638 13	$10,308 09	$7,392 89	$3,696 42	$3,696 47	
2	Charles W. Close	5,340 45	8,539 28	13,879 73	3,000 00	5,306 66	1,901 33	10,207 99	3,671 74	†	3,846 85	
3	Wm. C. Cranmer	6,819 05	11,806 40	18,625 45	3,000 00	6,609 96	1,680 53	11,290 49	7,334 96	1,323 88	6,011 08	
4	Frits Bloch	6,314 32	10,968 41	17,282 73	3,000 00	4,383 84	1,671 88	9,055 72	8,227 01	1,841 76	6,385 25	
5	Walter Brinton	9,667 46	6,393 33	16,060 79	3,000 00	7,404 63	1,909 88	12,314 51	3,746 28	6,935 61		$3,189 33
6	Joseph Mercer	11,777 92	18,961 54	30,739 46	3,000 00	8,500 64	2,799 36	14,300 00	16,439 46	9,948 52	6,490 94	
7	Wm. K. Carlile	6,151 36	8,818 82	14,970 18	3,000 00	4,359 96	1,342 67	8,702 63	6,267 55	522 52	5,745 03	
8	C. A. Sundstrom	4,283 17	11,504 49	15,792 66	3,000 00	9,857 92	2,128 30	14,986 22	806 44	787 30	19 14	
9	Jos. C. Wagner	7,320 08	8,882 43	16,202 51	3,000 00	11,231 87	2,067 96	16,299 83	*	5,417 75		5,515 07
10	John H. Webster, Jr.	7,294 61	8,688 67	15,983 28	3,000 00	7,099 28	1,722 23	11,821 51	4,161 77	2,335 19	1,826 58	
11	Joseph Johnson	13,497 75	14,782 68	28,280 43	3,000 00	10,031 31	2,168 69	15,200 00	13,080 43	8,133 50	4,946 93	
12	J. H. Gillingham	10,611 61	12,715 10	23,326 71	3,000 00	7,635 32	2,008 39	12,643 71	10,683 00	8,005 62	2,677 38	
13	H. M. Fuller	10,096 81	6,337 47	16,434 28	3,000 00	7,869 32	2,124 87	12,994 19	3,440 09	2,195 15	1,244 94	
	Total	$106,973 51	$138,305 68	$245,279 19	$39,000 00	$95,960 67	$25,164 22	$160,124 89	$85,251 62	$51,143 22	$42,890 59	$8,704 40

* Deficiency, $97.32. † Deficiency, $175.11.

Digitized by Google

Registry Division.—The work of renewing worn-out registry plan books has been carried forward with somewhat better results than during the previous year. Ten books were renewed and placed in first-class condition.

The following is a Summary of the Operations of the Registry Division of the Bureau of Surveys during the year 1899.

	1899.
Number of certificates registered owners issued	4,194
Number issued for use of the Law Department	1,010
Receipts from certificates of registered owners	$1,058 50
Receipts frem miscellaneous sources	$115 68
Number of original lots plotted	12,030
Number of transfers registered	29,176
Number of plans made for use of City Departments, Bureaus, etc	294
Number of examinations of registry plan books made by the public	39,981
Number of descriptions of property filed for registry	41,206
Number of titles perfected	2,345
Number of certificates of legal opening of streets issued to Bureaus, etc.	2,534
Number of certificates of registered owners in municipal lien cases for Law Department	1,713

The following table gives a summary of the operations of the Bureau of Surveys in the active construction of work; also the receipts and expenditures during the year 1899:

Digitized by Google

Summary of Main, Branch and Private Sewers and Bridges Built During the Year 1899.

	1899.	
	No.	Linear Feet.
Bridges	1	
Subway bridges	7	
Intercepting sewer connections	3	4,372.20
Main sewers	12	10,085.60
Branch sewers	209	176,013.31
Private sewers	69	29,665.00
Subway sewers	3	2,368.00
Delaware avenue sewers	6	888.80
Total	310	*223,392.91

* Equal to 42.31 miles.

Statement of Work Upon Bridges During the Year.

	1899.
Finished	1
Begun	1
Authorized	...
Planned	28

Statement of Receipts.

Year.	Rrceipts of Bureau.	Receipts of District Surveyors.	Total.
1899.	$41,839 72	$106,973 51	$148,813 23

Digitized by Google

Statement of Expenditures.

	1899.
Current expenses	$246,506 41
For extensions	2,070,742 01
Total	$2,317,248 42

Bureau of Water.

Mr. John C. Trautwine, Jr., Chief of Bureau, resigned his position November 8, 1899. His resignation was accepted, to take effect November 15, and on the same day Mr. Frank L. Hand, General Superintendent, was appointed Acting Chief of the Bureau, which position he still holds pending an examination to be held by the Civil Service Board of applicants for the position.

To make the water supply answer the demands of our citizens during the past year required the utmost and constant exertions of the officials of the Bureau of Water and their subordinates. Every pumping engine was run at its maximum capacity, and all the resources of the Department taxed to their utmost.

The total quantity of water pumped during the past year was 107,991,371,604 gallons. The average daily pumpage was 295,866,771 gallons. The average daily consumption was 290,073,290 gallons, equal to 199.6 gallons per day for every man, woman and child of our population. We do not for one moment believe that this represents water actually consumed for either household or manufacturing purposes, but on the contrary, we are satisfied that these figures represent a wilful and flagrant waste of water.

The subject of preventing the waste of water is at the present time receiving the attention of managers of water works the world over. It is one of the most talked of and

Digitized by Google

at the same time the most perplexing question to solve which confronts the officials of Water Departments. Certainly such is the case in our City, with a population increasing at a rapid rate, water mains being extended over thirty miles every year, the pumping machinery overtaxed and strained at every point, it is, in my judgment, high time to call a halt and take some definite action to prevent this waste.

In a great measure the remedy is with our citizens, but if they will not protect themselves, then Councils should, by proper legislation, put the Department in a position to protect the taxpayers of our City against this wastefulness and to economize the water supply for the benefit of all.

The receipts of the Bureau of Water during the past year were $3,123,954.20, an increase of $58,288.34 over the previous year, and $1,439,396.94 in excess of all expenditures both for permanent improvements of every description and cost of maintenance.

The liberal legislation of Councils during the past year on matters pertaining to the Bureau of Water enabled the Department to meet many of the urgent needs of the Bureau and to remedy some of the critical conditions existing at several of the pumping stations, which for several years have been sources of great anxiety.

The following improvements have been contracted for during the year:

Spring Garden Pumping Station.

Six pump chambers and valves.

Queen Lane Pumping Station.

Two pump chambers and valves.

Roxborough Pumping Station.

Four 5,000,000 gallon pumping engines.
Three pump chambers and valves.

Digitized by Google

Two boilers.
Engine and boiler houses and intake.

Roxborough High Service Station.

One 5,000,000 gallon pumping engine.

Belmont High Service Station.

One 5,000,000 gallon pumping engine.

Frankford High Service Station.

Engine and boiler house and stack.
One 3,000,000 gallon pumping engine.
Three boilers.
Stand-pipe.

When the above mentioned improvements are completed and the new pumping engines installed, it will be possible for the Department to make much needed repairs to some of our machinery and boilers, which, during the past few years, have been operated continuously and taxed to their utmost capacity.

The loan authorized by ordinance aproved June 17, 1898, provides $3,700,000 for the improvement of the water supply; $500,000 of this amount has been appropriated and Councils now have under consideration an ordinance to appropriate the balance for the improvement and filtration of the water supply at Belmont and Roxborough and for some urgently needed mains in the distribution system.

Repairs have been made to the machinery at the several pumping stations to the full extent of the amount available for the purpose and are referred to in detail in the report of the Acting Chief of the Bureau.

At the Belmont Pumping Station the seven new boilers contracted for during the previous year were installed and put into service on March 16, 1899. The addition of these

Digitized by Google

boilers has enabled us, when necessary, to run all the engines at this station simultaneously, with the result that during the year we have succeeded in keeping the Belmont Reservoir full and at no time were we compelled to resort to direct pumpage for the supply of West Philadelphia.

The Roxborough Pumping Station has given the Department more concern than any of the others by reason of the critical condition of the boilers and engines. The 12,000,000 gallon Southwark engine at this station, which had only been kept in operation through the utmost care and attention of the General Superintendent, began, in early part of the year, to show signs of collapsing. Finally the conditions became such that it was unsafe to run at full capacity, and on August 23, 1899, the West side of the pump was disconnected and thrown out of service, the east side only remaining in operation.

To keep the district depending upon this station supplied with water it was necessary to immediately purchase and instal another pump. With this object in view Mr. Frank L. Hand, General Superintendent, was sent to the works of the Henry R. Worthington Company, in Brooklyn, to examine a 4,000,000 gallon pump, and if the same was satisfactory, to purchase it for the City. The engine was purchased and arrived on September 13. In the interim between its purchase and arrival the foundations for it were built and the other necessary appurtenances gotten in readiness for its immediate installation. The engine was put in operation September 20, 1899, just one week after its arrival.

We also purchased and installed at this station during the year a 2,500,000 gallon d'Auria pump. The other improvements consisted of the construction of a new stack and flue and the placing of six new boilers contracted for in 1898.

The laying of No. 2, 48-inch pumping main from the

Digitized by Google

Queen Lane Pumping Station to the reservoir, which was commenced December 6, 1898, was completed and put in service June 26, 1899.

The laying of the 36-inch pumping main from the Roxborough Pumping Station to the reservoir was commenced on November 2, 1899; about seventy-five per cent. of the work has been performed and the balance will be finished in the early part of the year 1900, in ample time for use in connection with the new pumps to be erected at this station.

A new 30-inch distributing main is now being laid from Belmont Reservoir to Thirty-eighth street and Lancaster avenue. The completion of this work will provide a more ample supply of water and better pressure in certain localities of West Philadelphia, where the supply now is at times inadequate and the pressure hardly sufficient to give even a partial supply of water to the upper stories of buildings.

Twenty-four and one-third (24 1/3) miles of mains of various description were laid during the year, making an aggregate of 1,301.66 miles of water pipe now in use.

The operations of the construction and repair shop have grown with the increased work of the Bureau, and have been carried on in a very satisfactory manner. The report of the Superintendent gives detail statements of all new appliances manufactured and all repairs made.

All the work at the several pumping stations and on the grounds and reservoirs was of the usual routine character, and has been performed in an eminently satisfactory manner.

The following tables give the numbers and types of engines, the locations and capacities of reservoirs and a summary of the operations of the Bureau of Water; also the receipts and expenditures for the year 1899:

Digitized by Google

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

Pumping Station.	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	
" "	6	Simpson's Compound Rotary	10,000,000	
" "	7	Marine Compound Rotary	20,000,000	
" "	8	Worthington Duplex	10,000,000	
" "	11	Gaskill	20,000,000	
New Station	9	Worthington Duplex	15,000,000	
" "	10	" "	15,000,000	
" "	2	Holly	30,000,000	
" "	3	"	30,000,000	170,000,000
Queen Lane	1	Southwark	20,000,000	
" "	2	"	20,000,000	
" "	3	"	20,000,000	
" "	4	"	20,000,000	80,000,000
Belmont	1	Worthington Duplex	5,000,000	
"	2	" "	5,000,000	
"	3	" "	8,000,000	
"	4	" "	20,000,000	38,000,000
Belmont Auxiliary	1	Worthington	2,000,000	
" "	2	Snow	500,000	2,500,000
Roxborough	1	Southwark	12,000,000	
"	2	Worthington Duplex	5,000,000	
"	3	" "	7,500,000	
"	4	" "	4,000,000	
"	5	D'Auria	2,000,000	30,500,000
Roxborough Auxiliary	1	Worthington	5,000,000	5,000,000
Mt. Airy	1	Davidson	1,000,000	
" "	2	"	1,000,000	
" "	3	Knowles	1,000,000	3,000,000
Chestnut Hill	1	Knowles	250,000	
" "	2	Worthington Duplex	500,000	750,000
Frankford	1	Marine Compound Rotary	10,000,000	
"	2	Corliss Compound Rotary	10,000,000	
"	3	Southwark Rotary	22,000,000	42,000,000
Fairmount. New House	1	Turbine Wheels	2,000,000	
" "	3	" "	5,330,000	
" "	4	" "	5,330,000	
" "	5	" "	5,330,000	
Old "	7	" "	5,100,000	
" "	8	" "	5,100,000	
" "	9	" "	5,100,000	33,290,000
Total				405,040,000

Digitized by Google

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

Name of Reservior.	Location.	Date of Completion.	Height above city Datum.	Capacity in gallon.
Fairmount. Reservoir No. 1	East Fairmount Park	1815	94 feet.	26,350,000
" " 2		1821		
" " 3		1827		
" " 4, Section 1		1835		
" " 4, " 2		1836		
" " 4, " 3		1836		
Lehigh. Section 1	Sixth and Lehigh avenue	1852 and 1871	114 "	28,910,000
Section 2				
Section 3				
Spring Garden	Twenty-sixth and Master streets	1844	120 "	12,900,000
Corinthian	Corinthian avenue Popular street	1852	120 "	37,341,400
East Park. Section 1	East Fairmount Park	1887	133 "	62,738,000
Section 2		1888		306,400,000
Section 3		1889		319,480,000
Queen Lane. North Basin	Thirty-third street and Queen lane	1894	238 "	205,620,000
South Basin				177,480,000
Frankford	Oxford Turnpike and Comly street	1877	167 "	36,046,000
Belmont	West Fairmount Park	1870	212 "	39,758,000
Mount Airy	Allen's lane and Mower street, Germantown	1851	363 "	4,546,000
Roxborough	Ridge and Shawmont avenues	1866	366 "	12,838,000
New Roxborough. North Basin	Port Royal avenue and Ann street	1893	414 "	71,594,000
South Basin				75,438,000
Mauatawna tanks—2	Manatawna and Ridge avenues	1878	442 "	107,000
Chestnut Hill tank	Hartwell avenue and Chestnut Hill Railroad, Chestnut Hill	1860	481 "	52,000
Belmont Stand Pipe	West Fairmount Park	1895	364 "	106,000
Roxborough Stand Pipe	Port Royal avenue and Ann street	1895	490 "	106,000
Total				1,417,860,400

Digitized by Google

Statement of Pumpage for the Year 1899.

	1899. Gallons.
Pumped to reservoirs	107,991,371,604
Equal to gallons pumped 100 feet high	231,813,686,728

NOTE.—The "pumped to reservoir," etc., includes 2,114,620,582 gallons of repumpage to higher levels at Mt. Airy, Roxborough, Belmont and Chestnut Hill Auxiliary Stations. This, deducted from the total pumped, gives 105,876,751,022 gallons as the total consumption.

The cost of pumpage is calculated on the total pumpage, and the consumption per capita on the smaller quantity.

	1899. Gallons.
Pumped by water-power	8,618,634,317
Pumped by steam-power	99,372,737,257
Largest quantity pumped in 24 hours	342,368,144
Smallest quantity pumped in 24 hours	213,254,250

Year.	Average daily consumption.	Average consumption in gallons per capita per pay, estimating the population at *	Increase of	Increase per capita per day.	Cost of 1,000,000 gallons pumped 100 ft. high.
	Gallons.	Gallons.	Gallons.	Gallons.	
1899.	290,073,290	199 6	5,621,916,480	3.4	$2.90

*1899—1,452,840 estimated.

The cost of pumping one million gallons lifted one hundred feet high was $2.90, or 7 cents less than in the previous year.

About eight per cent. of the total pumpage was by water-power, the turbine wheels using ..... 258,559,030,410 gallons.
To pump ..... 8,618,634,317 "

Digitized by Google

Statement of the Total Pipe Laid and of the Other Work Done During the Year 1899.

YEAR.	PIPE LAID.			*PIPE RELAID.	FIRE HYDRANTS PLACED IN POSITION.			SUBSTITUTED FOR DEFECTIVE HYDRANTS.			Fire Hydrants in Use.	New Water Attachments.
	Feet.	EQUAL TO			New Style.	Old Style.	Total.	New Style.	Old Style.	Total.		
		Miles.	Feet.	Feet.								
1899	128,793	24	2,073	†6,727	711	.....	711	188	3	191	12,170	5,952

Total pipe laid, 1,301.66 miles. * Adds nothing to feet in ground.

† Pipe taken up exceeds the quantity relaid, 3,951 feet.

Digitized by Google

Statement of Receipts and Expenditures for the Year 1899.

	Receipts 1899.
Receipts from water rents	$2,856,451 78
Receipts from fractional rent	54,075 44
Receipts from water pipes	80,644 23
Receipts from City Solicitor's office	50,627 83
Receipts from penalties	40,229 09
Receipts from delinquent rent	31,787 30
Receipts from Chief Engineer's office	4,590 42
Receipts from searches	942 75
Receipts from delinquent penalties	4,605 36
Total	$3,123,954 20

	Expenditures. 1899.
Current expenses	$1,461,583 36
For extensions	222,973 90
Total	$1,684,557 26

Improvement of Water Supply.—Definite and positive action has at last been taken on the question of an improvement of our water supply, a question which for the past few years has so greatly agitated the public mind. Councils on April 20, 1899, passed the following resolution:

RESOLUTION

Authorizing and directing the Mayor to select and employ three experts to consider the question of the immediate improvement and extension of the present water supply.

WHEREAS, The quality of water furnished by the municipality is such as to require purification by filtration or otherwise;

Digitized by Google

And Whereas, There are on record in the Bureau of Water, authoritative and exhaustive plans, surveys and reports heretofore drafted and made by various commissions, engineering experts and departmental officials, dealing with the water supply, and upon which no action has been taken; therefore,

Resolved, by the Select and Common Councils of the City of Philadelphia, That the Mayor be and is hereby authorized and directed to select and employ three experts, to act in conjunction with the Director of the Department of Public Works and the Chiefs of the Bureaus of Water and Surveys, to take up the question of the immediate improvement and extension of the water supply, provided that a preliminary report shall be made by said experts within sixty days of their appointment, and the final report shall be presented not less than three months thereafter, so that it may be presented to Councils immediately after the summer recess in September.

In accordance with this resolution you appointed as members of the Commission, Mr. Rudolph Hering, of New York; Mr. Samuel M. Gray, of Providence, R. I., and Mr. Joseph M. Wilson, of Philadelphia, all expert engineers and men of unquestionable ability and experience.

The resolution provided that this Commission should act in conjunction with the Chief of Bureau of Water, the Chief Engineer of Bureau of Surveys and the Director of the Department of Public Works, and that a preliminary report upon the subject under investigation should be made to Councils within sixty days from the date of their appointment, and the final report not later than three months thereafter.

The Commission began an immediate study of data already collected in relation to the future supply, care-

Digitized by Google

fully examined all previous reports of the Bureau of Water, the results of surveys made by former engineers and the published reports of the results of experiments on filtration at several cities in this and neighboring States. They visited the several water sheds throughout the State which were available for supply, also various points along the courses of the Schuylkill and Delaware rivers.

The various processes for the purification of water were carefully investigated and thorough consideration was given to every possible source of supply. Finally after a most careful and exhaustive study of the entire subject, the Commission, under date of September 15, 1899, submitted their report to you. This report, with all its exhaustive details, has been printed and distributed, and is too voluminous to reproduce here. I shall, therefore, only refer to the recommendations, which are as follows:

(1.) "The adoption of that project by which the waters "of the Schuylkill and Delaware rivers, taken within the "City limits, are purified by filtration."

(2.) "The immediate improvement of the existing "plant, in accordance with the detailed recommendations "of our report."

To carry out the plans recommended by the Commission, you asked Councils to pass an ordinance to provide for the issuance of a loan of $12,000,000 and for its submission to a vote of the people. This ordinance was passed by Councils and approved September 29, 1899, and at the election held in November of the same year the question of the loan was voted upon and received an overwhelming majority of the votes of the people.

In accordance with the action of the voters of the municipality an ordinance is now pending in City Councils to authorize the creation of a loan or loans by the City of

UNIVERSITY OF ILLINOIS LIBRARY
Digitized by Google

Philadelphia for the sum of $12,000,000 dollars for the construction and installation of works and for the improvement and filtration of the water supply of the City.

City Councils also have under consideration ordinances to authorize appropriations from this loan for the extension, improvement and filtration of the water supply, as recommended by the Commission.

Engineers and draughtsmen, known as the "Corps on Extension, Improvement and Filtration of the Water Supply," have been assigned to duty on this work and under the direct supervision of Mr. Frank L. Hand, Acting Chief of Bureau of Water, and Mr. George S. Webster, Chief Engineer of Bureau of Surveys, are preparing plans and Specifications preparatory to the prosecution of this great work. The work will be pushed with all energy and diligence. It cannot be completed in a day nor a year, but I trust in the near future our citizens will be furnished with an ample supply of pure, wholesome water, worthy of this great municipality.

AN ORDINANCE

To provide for an increase of indebtedness in the amount of twelve millions (12,000,000) dollars, for the construction and installation of works for and the improvement of the water supply of the City of Philadelphia; authorizing the submission to a vote of the people and fixing the day of holding an election for the purpose of obtaining the assent of the electors to such increase of indebtedness; authorizing the corporate authorities of this municipality to make the necessary announcement, by public advertisements, to the electors, as required by law, and directing the City Commissioners to prepare and distribute the necessary ballots as provided for in the laws of the State of Pennsylvania governing the increase of indebtedness of municipalities.

Digitized by Google

SECTION 1. *The Select and Common Councils of the City of Philadelphia do ordain,* That the debt of the said City should be increased in the sum of twelve million (12,000,000) dollars for the following purpose: The construction and installation of works for and the improvement of the water supply of the said City of Philadelphia.

SECT. 2. That for the purpose of obtaining the assent of the electors to the increase of indebtedness as set forth in Section 1, an election shall be held in pursuance of the Act of June 9, 1891, at the usual place or places of holding elections, at the general election to be held on the Tuesday next following the first Monday of November, 1899. That notice of said election shall be given by weekly advertisement in three newspapers of the said City at least thirty days prior to the general election, and the said notice shall contain a statement of the amount of the last assessed valuation of the taxable property in the said City, the amount of the existing debt, the amount and percentage of the proposed increase and the purpose for which the indebtedness is to be increased. That the corporate authorities of this municipality be and are hereby authorized and directed to make the necessary announcement of this election by public advertisements to the electors as required by law; and the City Commissioners are hereby authorized and directed to prepare and distribute the necessary ballots as provided for in the laws of the State of Pennsylvania governing the increase of indebtedness of municipalities.

Director's Office.

The work of the Director's office was of the usual routine character incident to large operations. The extensions planned and the increased amount of work performed by the several Bureaus of this Department during the year added largely to the work of this office.

Digitized by Google

The chief clerk and his assistants are at work early and late, and to their intelligence and conscientious discharge of their duties is to be ascribed the prompt dispatch of the business of the office.

The following is a statement of the expenditures of the Director's office during the year 1899:

Item.		1899.
1	Salaries	$20,420 00
2	Keep of horses	1,400 00
3	Printing, stationery, etc	2,438 42
4	Appraisement of Philadelphia Gas Works	2,750 00
5	To pay bills for gas pipe, etc	455 79
6	To pay Pennsylvania Railroad Company for expenses incurred in removing debris washed upon tracks at Powelton avenue, and for expenses incurred in repairing round house and tracks at Thirty-first and Powelton avenue	437 70
	Total	$27,901 91

Receipts and Expenditures.—The appropriations, expenditures and receipts of the Department for the year 1899 are set forth in the following table in detail by Bureaus:

Digitized by Google

LIC WORKS DURING THE YEAR 1899.

Balance available 1900.	Total.	Amount merging.	Receipts.	Number of employees Dec. 31, 1899.
.....	$27,901 91	$61 58	.....	9
.....	30,334 70	2,065 30	$72 45	8
.....	7,510 76	78	.....	6
$812,973 29	3,470,629 99	28,188 11	142,164 20	99
.....	.....	.....	21,844 86	10
.....	288,676 49	513 51	.....	4
....	921,284 50	2,585 50	.....	14
2,676,766 71	5,230.015 13	19,993 23	41,889 72	258
.....	.....	.....	106,973 51	13
786,514 02	2,522,057 68	48,853 72	3,123,954 20	1,217
$4,276.254 02	$12,498,361 16	$96,761 73	$3,436,848 44	1,638

veys.

* Bureau of Gas reorganized June 1st, 1899.

Digitized by Google

Digitized by Google

Appropriations, 1900.—The following is an abstract from the ordinance making an appropriation to this Department for the year 1900, with a statement of balances available from previous years for work ordered for which contracts are executed:

Bureaus.	Annual Appropriation for the Year 1900.	Balance Available from Previous Years.	Total.
Director's Office	$25,445 50		$25,445 50
City Ice Boats	32,400 00		32,400 00
Gas	10,000 00		10,000 00
Highways	1,660,423 50	$812,973 29	2,473,396 79
Lighting	295,940 00		295,940 00
Street Cleaning	961,209 00		961,209 00
Surveys	1,101,119 96	2,676,766 71	3,777,886 67
Water	1,371,565 45	786,514 02	2,158,079 47
Total	$5,458,103 41	$4,276,254 02	$9,734,357 43

In closing this report I desire to pay my tribute of praise to the Chiefs of the Bureaus and their assistants, who, by the faithful and able discharge of their duties, have assisted largely in making this a prominent year in the history of this Department.

In conclusion, for myself and for the officers of this Department, I desire to thank you for the assistance and support you have given us in our efforts to discharge the onerous duties of our several places.

Respectfully submitted,

WM. C. HADDOCK,
Director.

Digitized by Google

Digitized by Google

ANNUAL REPORT

OF THE

BUREAU OF WATER

FOR THE YEAR 1899.

Digitized by Google

Digitized by Google

OFFICERS

OF THE

BUREAU OF WATER

Chief,

JOHN C. TRAUTWINE, JR., November 15, 1899.

Acting Chief,

F. L. HAND, from November 15.

Assistants,

ALLEN J. FULLER, WILLIAM WHITBY.

Draughtsmen,

John E. Codman, John R. Gorman, F. C. Dunlap
Martin Murphy.

Chief Clerk—Job T. Hickman.
Assistant Clerk—Thomas Spence.
Correspondence Clerk—P. de Haven.
Search Clerk—H. J. Johnson.
Assistant Search Clerk—Wm. J. Duffy.
Clerk—George G. Whitby.
Assistant Clerk—K. McNeal.
Assistant Clerk—J. J. Barney.
Time Clerk—W. J. Innes.
Pipe Inspector—Theodore S. S. Baker.
Pipe Clerk—Vacancy.
Messenger—Haines Lewis.

Telephone Operators,

Frances Shields, Calvin Craner.

General Superintendent,

F. L. HAND.

Clerk to General Superintendent—John A. Hayes.
Assistant Clerk to General Superintendent—John B. Wright.

Digitized by Google

Works—General.

Foreman Machinist—Robert Bromiley.

Foreman Carpenter—Henry Guest.

Foreman Bricklayer—Frank A. Mooney.

Foreman Stonemason—Michael Farrell.

Foreman Rigger—James Forrest.

Foreman Painter—Joseph Work.

Foreman Laborer—William Calhoun.

General Storekeeper—S. C. Buchanan.

Electrician—Henry P. Morgan.

Superintendent of Shop—James H. Dean.

Clerk to Superintendent of Shop—Morris P. Getz.

Lineman—D. McDougall.

Purveyors.

First District, John H. Holmes.
Clerk—William J. Mackey.
General Foreman—Thos. Preston. *Foreman of Repairs*—W. W. Wellington.
Office, 1120 Wharton street.

Second District, David A. Craig.
Clerk—Charles H. Green.
General Foreman—Michael Young. *Foreman of Repairs*—Edw. Homan.
Office, 918 Cherry street.

Third District, Charles J. Lowry.
Clerk—J. A. Spanagle.
General Foreman—Elias Abrams. *Foreman of Repairs*—William Magee.
Office, Beach street and Susquehanna avenue.

Fourth District, John Montgomery.
Clerk—Arthur B. Cook.
General Foremen—George W. Showaker, James Hutchinson.
Foreman of Repairs—John Richards.
Office, Twenty-sixth and Master streets.

Fifth District, Henry Dawson.
Clerk—F. J. Cornman. *General Foreman*—Charles Frank.
Office, 4377 Manayunk avenue.

Sixth District, George H. Laut.
Clerk—Wm. D. Kinsler.
General Foreman—Samuel Loeb. *Foreman of Repairs*—James W. DeHart.
Office—Town Hall, Germantown.

Digitized by Google

ANNUAL REPORT

OF THE

BUREAU OF WATER

FOR THE YEAR 1899.

THIRTEENTH ANNUAL REPORT

OF THE

BUREAU OF WATER.

NINETY-EIGHTH ANNUAL REPORT

OF

OPERATIONS CONNECTED WITH THE CITY WATER SUPPLY.

Philadelphia, January 20, 1900.

WILLIAM C. HADDOCK, ESQ.,
Director, Department of Public Works.

DEAR SIR:—In transmitting the report of the Bureau, I beg to remind you that it was on the 15th day of November last that the Bureau was placed under my charge.

Mr. John C. Trautwine, Jr., who had filled the position of Chief since June 3, 1895, tendered his resignation, to take effect upon the naming of his successor.

The operations of the Bureau during the greater part of the year were, therefore, under the direction of Mr. Trautwine.

Digitized by Google

Future Supply.

The past year has developed marked advancement toward the solution of the water problem, and never in the history of the City has the question of a future water supply so nearly reached a final settlement.

This gratifying condition is the result of the findings of the Commission on the Extension and Improvement of the Water Supply of the City of Philadelphia, appointed by his Honor the Mayor in accordance with a resolution of the Select and Common Councils, adopted April 20, 1899.

The resolution required that the members of the Commission should act in conjunction with the Director of the Department of Public Works and the Chiefs of the Bureaus of Water and Surveys, and provided that a preliminary report upon the subject under investigation should be made by them within sixty (60) days from the date of their appointment, and the final report not later than three months thereafter.

Commission on the Extension and Improvement of the Water Supply of the City of Philadelphia.

The members of the Commission appointed by his Honor the Mayor consisted of Messrs. Rudolph Hering, of New York; Joseph M. Wilson, of Philadelphia, and Samuel M. Gray, of Providence, R. I., all of whom are engineers of exceptional ability and wide experience.

His Honor the Mayor in outlining what was desired of the experts, divided the subject upon which they were to report into three parts, viz.:

"1. What is necessary for the immediate betterment of our water system?

"2. If the remedy be filtration, what is the best method?

"3. In what direction is it most desirable to extend our present supply, so that for years to come the water problem may not give anxiety to our people?"

Digitized by Google

He also requested them to consider first, "the question of the immediate relief of present conditions," and "to visit all of our pumping stations and reservoirs and to make a thorough investigation of everything appertaining thereto;" also, to compare the water of the Schuylkill river with that of the Delaware as a source of supply, calling particular attention to the danger of future pollution of the Schuylkill river by reason of the rapid increase of industrial enterprises on its watershed.

The experts were further instructed, in the event of their recommending filtration, to state what system would be most desirable; also, to estimate upon the cost of installation and of maintenance of such system (the plant to be of a capacity sufficient to supply the entire City), and to make their suggestions "broad enough to provide for a subsequent extension of the system proposed, so that the water problem could be solved for at least a century."

The experts immediately began studying the data already collected in relation to a future water supply for the City and a solution of the water problem, and carefully examined the previous reports of the Bureau of Water, the results of the surveys made under the direction of Colonel (now General) Ludlow, and the published results of experiments on filtration at Providence, R. I.; Louisville, Ky.; Cincinnati, O., and Pittsburg, Pa. They visited the water-sheds available for supply in the Schuylkill, the Perkiomen, the Lehigh and the Upper Delaware Valleys; also, various points along the courses of the Schuylkill and Delaware rivers.

On July 3, in compliance with the provisions of the resolution of Councils under which they were appointed, the experts submitted to his Honor the Mayor a preliminary report, which was simply a report upon the progress of their work to date.

An inspection of the water purification plant at Wil-

Digitized by Google

mington, Del., was made by the experts; also of the filter plants at Poughkeepsie, and at Albany, N. Y., and of the sewage filtering plant at Reading, Pa. Various processes for the purification of water were carefully investigated, and proper consideration was given to other possible sources of supply.

The projects which were studied in detail were divided under two heads, viz.:

Mountain waters, supplied by gravity in their natural state, and

Filtered waters, supplied from the Delaware and the Schuylkill rivers.

Under the head of mountain water supply, estimates were made for bringing 200 million gallons daily from the upper Perkiomen creek and Lehigh tributaries, and for bringing 450 million gallons daily from the upper Perkiomen creek and Lehigh river, with tributaries, and another estimate was made for the same quantity to be brought from the Delaware river tributaries, near the Water Gap, upper Perkiomen creek and the Lehigh river tributaries.

The estimates made under the head of filtered water supply are grouped under two methods—slow filtration and rapid filtration.

The experts present two estimates for filtering, daily, 200 and 450 million gallons, respectively, by the slow filter method. These estimates are based on the use of waters from the Schuylkill and the Delaware rivers, and limit the quantity to be taken from the Schuylkill river to 150 million gallons daily. They also provide for future extensions to be made on the Delaware river. The reasons for limiting the quantity of water to be taken from the Schuylkill river to 150 millions gallons daily are, as stated in their report, as follows:

"As to quantity of water obtainable from the sources at "command under present conditions, it is self-evident that

Digitized by Google

"the minimum flow is all that can be relied upon through-
"out the year in any stream without reservoir storage, and
"the minimum flow usually occurs at a time of year when
"water is most needed." * * * * *

"Various opinions have been given as to the extreme
"minimum flow of water in the Schuylkill river. After con-
"sidering these we have decided that it would not be safe
"to rely upon taking from the river in times of drought,
"more than 150,000,000 gallons per day. This quantity
"may be less than the minimum flow, but even if the City
"had a plant for purifying the water, we do not consider it
"safe or proper to provide for using the entire flow, par-
"ticularly at a time when the relative pollution of the river
"is greatest."

The estimates presented under the head of rapid filter supply are based on filtering 450 million gallons daily.

There are three of these projects, as follows:

1. Delaware river water filtered at Portland.

2. Two hundred and sixty million gallons daily from tributaries of the Delaware above the Water Gap, and 190 million gallons daily from the Delaware, filtered at Portland, and

3. Delaware river water filtered at Torresdale.

These estimates show that the cost of installation for the slow filter supply would be less than that for any of the other projects, and the annual cost of such supply would exceed that for mountain water supply by less than 2 per cent.

The experts, in their report, make the following comparison of the advantages of a filtered water supply over a mountain water supply:

"Where ample supplies of relatively pure water are ob-

Digitized by Google

"tainable at sufficient elevations and within short distances "of the community to be supplied, it will usually be found "best to take advantage of them; but where, as in our case, "these sources are found at long distances from the City, "it is necessary to estimate very carefully, and to balance "still more carefully, the relative costs and advantages of "different methods.

"A gravity supply obviates the heavy operating expenses "incident to a supply by pumpage, and thus naturally com- "mends itself at first sight, but it may readily happen that "the interest on the cost of construction of the gravity sup- "ply considerably overbalances the saving due to this con- "sideration.

"To utilize a gravity source of supply in our case re- "quires not only the construction of long and expensive "aqueducts, but also that of large and numerous impound- "ing dams on the various small streams which would be "taken as sources. These dams are necessary in order that "the heavy winter and spring flows may be saved and made "to compensate for the droughts of summer; thus regulat- "ing and rendering more nearly uniform the available "yield of the stream throughout the year.

"An advantage of the pumpage over the gravity system "consists in this, that the former is capable of indefinite "extension by small additions, whereas, when the capacity "of an aqueduct has been fully taxed, a second one, usually "of at least equal capacity, must be built.

"In comparing the relative advantages and disadvantages "of a mountain and a filtered water supply, it must be borne "in mind that a filtered water supply is ordinarily suscepti- "ble of gradual and indefinite extension, as the demands "upon it increase; whereas the construction of a gravity "system, for a growing community, requires an outlay "much in advance of requirements. It is true, also, "that, owing to the greater length of time required for the

Digitized by Google

"construction of a gravity system, large sums of money "must be invested long before the system can be put into "operation.

"The adoption of any project for bringing mountain "water to the City by gravity, at sufficient elevation to flow "into our reservoirs, involves, of course, the abandonment "of the pumping stations supplying these reservoirs.

"In our case, another consideration to be borne in mind "is that the sums represented by the present value of the "pumping plants would be lost in the case of the construc- "tion of a gravity supply.

"In comparing the relative advantages of filtered and "mountain water supplies, it is important to bear in mind "the lengths of time which would probably be required "for their installation. It is quite safe to say that the com- "pletion of all plants of any one of the slow filter systems "herein suggested could be accomplished within three "years; whereas the construction of any of the mountain "water systems would probably require not less than seven "or eight years.

"In bringing mountain water to the City, there would "always be a question as to its absolute purity, because "there is no guarantee against an accidental pollution. "Nor is there a guarantee that the water coming from ter- "ritory sometimes densely covered with forests, would not, "in the late summer, have a slight vegetable taste, such "as we find in most supplies from similar sources. In view "of recent progress in the methods of water purification, "and of the growing demand for better water, it seems not "at all improbable that water procured from the Blue "Mountains might in the future require filtration before "being delivered to the City, thus adding materially to "the expense of the project. The New York supply, al- "though not coming from the mountains, is derived from a "territory which is carefully protected against pollution,

Digitized by Google

"but it is almost an annual occurrence that, in the summer "the water has a vegetal taste. A former Health officer "of New York City, Dr. Jenkins, is on record as saying "that the New York water would no doubt eventually have "to be artificially filtered in order to remove thistaste and "a slight turbidity.

"Another advantage of a filtered water supply lies in the "fact that in case it should ever, in the future, be found "necessary to change the source of supply—as, for in- "stance, to abandon the Schuylkill and take filtered water "from the Delaware—the loss in money would be less than "if a mountain source had been used and a purification of "such water had been found necessary.

"In cases where the issue was doubtful, as to yield of "water, or as to cost of construction and operation, we have, "as a rule, given the benefit to the mountain water supply."

The resumé and conclusions of the Commission of Experts as given in their final reports, submitted under date of September 15, to his Honor the Mayor, read as follows:

"We now desire to re-state briefly what has been stated "at length in the preceding pages, and to present the con- "clusions derived from our examinations.

"The deplorable condition of the City's water supply, "which it is sought to remedy, is due to the pollution of its "sources, to the lack of effective pumping machinery, and "to the insufficient capacity of the distributing system.

"The question of first importance is the source of supply, "and to this nearly all of our thought and time have been "devoted.

"Most of the water is now obtained from the Schuylkill "river, within the City limits. Five pumping stations take "from it about 200,000,000 gallons daily. One pumping "station is located on the tidal estuary of the Delaware

Digitized by Google

"river at Lardner's Point, and supplies about 15,000,000 "gallons daily.

"The Schuylkill water is being polluted at many points "from its source down to the City line. Beginning with "the mine waters, the coal dust and some sewage from the "upper parts of the water-shed, the pollution is increased "below by the sewage of cities and villages situated along "the river and its chief tributaries, by the manufacturing "refuse and by the surface water from agricultural dis- "tricts, all of which render the water sometimes turpid, un- "palatable, impure and dangerous to health.

"The Delaware water at Lardner's Point is less turbid "after rains than the Schuylkill water; it is also softer and "less polluted. Its flow is many times larger. While this "water is, therefore, now somewhat better than the Schuyl- "kill water, the growth of the City, the newly built or pro- "jected sewers above and below the intake, and the tidal "oscillation of the water, tend to a continually increasing "pollution also of the water taken from the Delaware "river.

"It, therefore, becomes imperative either to select a new "source of supply or to improve the present one, so that it "will become thoroughly satisfactory to the citizens both "as to quality and quantity. The first project requires the "bringing of Blue Mountain water to the City; the second "requires a thorough filtration of the Schuylkill and Dela- "ware waters taken within the City limits. A decision as "to which of these alternative projects is the better one "must be based on the quality and quantity of water to be "supplied and on the cost.

"It was, therefore, necessary first to make certain prelimi- "nary assumptions, then to make designs for both projects, "and to ascertain the cost of construction and operation. "The assumptions as to the populations, and as to quality "and quantity of water, are as follows:

Digitized by Google

"The present population, to be supplied from the City's "pipe system as soon as practicable, is taken at 1,300,000 "persons. The population to be held in view in the design "for new works is assumed at 3,000,000 persons.

"It was considered that the waters collected from the "affluents of the Delaware and Lehigh rivers in the Blue "Mountains, and from the upper Perkiomen creek, could "be used in their natural condition. While these natural "sources are the best obtainable at a reasonable cost, and "while their average standard of purity is high, it must "be remembered that a guarantee against an occasional "and temporary pollution of the water by disease germs "from man and animals, cannot be given for such large "and exposed water-sheds. Nor can an occasional taste, "due to vegetal matter, be entirely avoided.

"The alternative source of supply is the water of the "Schuylkill and Delaware rivers, within or near the City "limits, artificially purified to the required standard. The "purification is obtained by filtering the water through "sand; no better and cheaper method is known.

"The progress made in this country and in Europe in "ascertaining the laws of the mechanical and biological "process of filtration, and the practical success obtained in "filtering water for many years in large cities of Europe, "confirm and warrant the conclusion that this method of "purification can furnish this City, from both rivers, with "water that will be clear and palatable, and will conform "to the best bacterial and chemical standards.

"When the raw river water carries much suspended mat- "ter with it, this must be allowed to subside, as a prelimi- "nary to filtration, so as to lengthen, as much as practicable "the time between the filter cleanings. Settling reservoirs "are, therefore, essential as preliminaries to the filtration "of the water of these two rivers. In order to secure the "greatest practicable efficiency, the filter plant must not

Digitized by Google

"only be built with skill, and be provided with the best "means for regulating the flow, and for cleaning the sand, "but it must also be carefully operated by trained men, in "accordance with the daily condition of the river water and "of the filters.

"The quantity of water required for City consumption "depends on local conditions. In some cities much less "water is used than in others. The quantity with which "Philadelphia has generally been credited, is somewhat "misleading, due to the absence of proper measuring ap- "pliances; as a matter of fact, it is less than appears on the "records. There is also, in this City, an undoubted waste "of water, the amount of which cannot now be accurately "determined, and which confers no benefit whatever, either "to persons or property, or for street or sewer cleaning. "It, therefore, subjects the citizens at large to an entirely "useless expenditure, which should be stopped at the earliest "practicable moment.

"We consider that, at present, a daily supply of 200,- "000,000 gallons, being 150 gallons per capita, is a very "liberal allowance. We recommend that this quantity of "pure water be immediately provided for. At the same "rate, a population of 3,000,000 persons will require a "daily supply of 450,000,000 gallons.

"Comparative estimates of cost have been made for even- "tually supplying these quantities. In order to indicate "the legitimate outcome of an extravagant use of water, "we have made a further estimate of cost for supplying "the City daily with 700,000,000 gallons of mountain "waters.

"The Blue Mountain water projects deliver water to the "City reservoirs by gravity. In one, mountain water is "obtained from the upper Perkiomen creek and from the "Lehigh river, with its tributaries. In another, mountain "water is taken from the Delaware tributaries near the

Digitized by Google

"Water Gap. Still another project was considered using "the Delaware water at Portland, below the Water Gap, "but after filtration. Other projects were considered, but "were found to possess no special advantages, and were "also more expensive.

"The filtered water project, which has been specially "considered, is confined to taking water from the Schuyl- "kill and Delaware rivers within the City limits.

"Two methods of filtration are in common use; one al- "lows the waater to percolate slowly through a bed of sand, "while the other allows it to pass through much more "rapidly, and, in order to give it the same degree of purity, "requires the use of a coagulating substance to prevent ob- "jectionable organisms and suspended matter from passing "through the filter. The first we have called a slow, and "the second a rapid, filtration.

"Inasmuch as it has been impossible, in the time at our "disposal, to make the necessary experiments showing the "precise effects of filtering both the Schuylkill and Dela- "ware waters, either through slow or rapid filters, it is also "impossible now to state which of the two systems would "be the more economical. But we know, and can positively "assert, from experience obtained elsewhere, that, for the "plants which we have recommended, a slow filter system "will not materially differ in annual expense from a rapid "filter system. We likewise know that the slow filters. "from long experience, and from their successful operation "in many cities, can, without question, yield satisfactory "results with the waters of the above-mentioned rivers. The "rapid filters have only recently been sufficiently devel- "oped to command a high degree of confidence in their "results under all circumstances.

"We are of the opinion that for the present supply, "slow filters should be adopted at every station in the City, "excepting at the one near East Park Reservoir. We be-

Digitized by Google

"lieve that at the latter station a rapid filter plant would be "more serviceable.

"A comparison of the estimates of cost shows the fol- "lowing results:

"The most economical project for a supply of mountain "water is that taken from the upper Perkiomen and from "the Lehigh water-sheds. For immediate needs, its "cost of construction is $33,410,000. Its annual cost, for "operation, interest on investment, and all expenses, to de- "liver the water into the City reservoirs, is $1,205,000.

"For a daily supply of $450,000,000 gallons, the total "first cost would be $66,740,000, and the annual cost $2,- "480,000.

"The most economical project for a supply of filtered "water is that by which the waters of the Schuylkill and "Delaware rivers are filtered within the City limits. Its "cost of construction, for present requirements, would be "$10,974,000. Its annual cost, for operation, interest "and all other expenses, to deliver the water into the City "reservoirs, is $1,227,000.

"For a daily supply of $450,000,000 gallons, the total "cost of the filter plant, including special mains from "Torresdale to the centre of the City, would be $34,155,- "000, and the annual cost $2,972,000.

"The estimates of cost have shown three important re- "sults:

"1. The original cost of any of the mountain water sup- "plies is very great for the large quantities of water which "the City requires.

"2. A filtered water supply can be obtained at a first "cost, which is within the present borrowing capacity of "the City, and the plant can be operated at a cost which "will not exceed the probable annual net earnings of the "water works.

Digitized by Google

"3. The total annual cost of delivering the water into "the City reservoirs, by either method, is about the same, "and the annual earnings will cover the operation and ex- "tension.

"In conclusion we recommend:

"1. The adoption of that project by which the waters "of the Schuylkill and Delaware rivers, taken within the "City limits, are purified by filtration.

"2. The immediate improvement of the existing plant, "in accordance with the detailed recommendations of our "report.

"The necessity for the second of these recommendations "is manifest. Our reasons for the first are as follows:

"The entire works can be built for a sum which the City "can secure at this time through a loan.

"A supply of pure water for the entire City can be ob- "tained within a comparatively short time, and the City "can thus at an early day be protected against a contin- "uance of those diseases which are known to be caused by "the present polluted water supply.

"A filtered water supply, under skillful management, "offers a greater security against the effects of accidental "pollution of the water than is possible when the supply is "taken from open, unprotected water courses. Filtration "can, without difficulty, be made to render the water "thoroughly wholesome.

"The two large rivers at Philadelphia, or even the Dela- "ware river alone, can furnish, at all times, a quantity of "water sufficient for a very large city."

In order to provide means to carry out the plans recommended by the Commission, City Councils, acting on the recommendation of his Honor the Mayor, passed an ordi-

Digitized by Google

nance providing for the issuance of a $12,000,000 loan, and for its submission to a vote of the people at the November elections. The Loan Bill was passed by the people by a majority of over 90,000 votes.

City Councils now have under consideration an ordinance making an appropriation of $3,200,000 out of the loan authorized June 17, 1898, for the improvement and filtration of the water supply at Belmont and Roxborough, and for some urgently needed mains in the Wentz Farm distribution system; also other ordinances appropriating the $12,000,000 loan for the extensions and improvements as recommended by the experts and not provided for in the $3,200,000 ordinance.

Proposed Basin No. 3, Belmont Reservoir.

An ordinance approved July 12, 1898, appropriates five hundred thousand (500,000) dollars for a reservoir, pumping machinery and mains for the supply of that portion of the City which lies west of the Schuylkill river.

The site selected for this reservoir adjoins the present Belmont reservoir on the north, and is within the boundary of Fairmount Park.

A survey was made and test holes sunk for the purpose of ascertaining the character of the underlying material.

The final plans and specifications were finished on February 28.

The capacity of the basin, as designated, is 85 million gallons, and it is triangular in shape.

The plans provide for masonry walls on two sides, and a sloping inner embankment on the side nearest George's Hill driveway.

This departure from the usual method of constructing reservoirs with the sloping inner embankments, was for the purpose of obtaining as large a storage capacity as possible, and, at the same time, to comply with a resolution of

Digitized by Google

the Committee on Plans and Improvements of the Park Commission, which granted permission to the City to construct a reservoir on the site selected, with the proviso that the reservoir should have sloping inner banks, to resemble a natural lake.

Hopper Closet Ordinance.

Before Councils adjourned for the summer they passed an ordinance, which was approved May 17, providing for an increase of from one to five dollars each, per annum, in the water rent of the old-style hopper flushes in closets. This ordinance was to go into effect on January 1, 1900, but, by an ordinance approved December 29, 1899, the date was extended to January 1, 1901.

It is well known that the "hopper closets" are water wasters, and the high tax fixed by Councils on this style of valve was for the purpose of reducing the number in use, thereby effecting a reduction in the waste of water.

As it is not incumbent upon the property owner to notify the Bureau of changes made in these closets, the number of such changes since the passage of the "hopper ordinance" can only be approximated. There were 250,000 hopper closets in use in the City at the time of the approval of the ordinance, May 17, and it is probable that the major portion of the changes—estimated to be from 60 to 70 per cent.—were made within the last three months.

The diagram below shows a material decrease in the consumption of water during October, November and December, the greater portion of which was undoubtedly effected by the changes in the hopper closets:

Digitized by Google

Digitized by Google

Digitized by Google

The average daily consumption, which was 295 million gallons during the first nine months of the year, dropped to 275 million gallons during the last three months.

The total consumption during the year was nearly 6 per cent. greater than that for 1898, while for the last three months it was nearly 3 per cent. less than that for a similar period in 1898.

It should be noted, however, that a small portion of this reduction in the consumption was due to the fact that the weather conditions were more favorable to a low consumption during October, November and December than they were for a similar period in 1898, and to a decrease in waste in the Germantown district, resulting from a thorough inspection of the water appliances in over 17,000 houses. In 1,761 of these, leaky or defective appliances were found, and the owners of the properties were notified to remedy the defects within a specified time, otherwise the water would be shut off from the premises. Re-inspections were made later to ascertain whether the owners had complied with the notices, and where no action had been taken by them in this respect the supply was shut off.

As already stated, the weather conditions during the latter part of the year, as compared with those of a similar period in 1898, were more favorable to a low consumption. During extremely cold weather many hydrants are opened and the water allowed to flow therefrom continuously as a precaution against the freezing of the pipes. The latter part of 1899 was much warmer than the corresponding period in 1898, and it is probable that the waste resulting from this practice was much less during that time.

General Conditions.

As a result of the liberal legislation of Councils during the past fifteen months on matters relating to this Bureau, many of the most urgent needs of the system have been

Digitized by Google

supplied, and numerous improvements are under way, which, when completed, will greatly increase the efficiency of the service. The appropriations granted during the past year provide adequate means to avert serious disaster and to remove some of the critical features of the works, which, for several years, have been sources of great anxiety. This condition is very gratifying, especially when it is remembered that for the last three summers it has been difficult, owing to insufficient appropriations for needed extensions, etc., to prevent absolute water famine in some districts.

It will be necessary, however, before all sections of the City can be furnished with an adequate supply of water and the demands upon the service be fully met, to make to the pumping and distribution systems the repairs and extensions recommended by the experts in their final report to his Honor the Mayor. Knowing, however, your intention to prosecute this work with all possible despatch, I shall not urge upon you the necessity of it.

The following is a statement showing the additions and improvements to the pumping machinery contracted for during the year:

Station.	Additions and Improvements.	Date, 1899.
Spring Garden Pump'g Sta'n,	6 Pump Chambers & Valves,	June 14
Queen Lane Pump'g Sta'n,	2 Pump Chambers & Valves,	Sept. 19
Roxborough Pump'g Sta'n,	2 Five-million gallon Pump'g Engines,	May 8
Roxborough Pump'g Sta'n,	2 Five-million gallon Pump'g Engines,	Sept 19
Roxborough Pump'g Sta'n,	3 Pump Chambers & Valves,	Sept. 1
Roxborough Pump'g Sta'n,	2 Boilers,	Aug. 22
Roxborough Pump'g Sta'n,	Engine & Boiler-houses & Intake,	Sept. 19
Roxborough High-service Sta'n,	1 Five-million gallon Pump'g Engine,	Sept. 19
Belmont High-service Sta'n,	1 Five-million gallon Pump'g Engine,	Sept. 19
Frankford High-service Sta'n,	Engine & Boiler-house & Stack,	Aug. 22

Digitized by Google

Station.	Additions and Improvements.	Date, 1899.
Frankford High-service Sta'n,	1 Three-million gal. Pump'g Engine,	Aug. 22
Frankford High-service Sta'n,	3 Boilers,	Aug. 22
Frankford High-service Sta'n,	Stand-pipe,	Dec. 30

Upon completion of the additions and improvements named above it will be possible to make much needed repairs to some of the boilers and engines which have been strained to their utmost during the last three years. Until then we shall be obliged to continue them in service, as we cannot dispense with their assistance for the time required to make these repairs.

The following tables shows the pumpage—annual, maximum, average daily and daily per capita—as compared with that for the year 1898; also the cost of raising one million gallons one hundred feet high, as compared with that for 1898; the volume and cost of pumpage, etc., for the years 1889 to 1899, both inclusive, and the nominal, minimum and average daily pumpage for 1898 and 1899:

Digitized by Google

Comparison of Pumpage for 1898 and 1899.

	1898. Gallons.	1899. Gallons.	Increase. Gallons.
Annual pumpage:			
From rivers	100,254,834,542	105,876,751,022	5,621,916,480
High service	1,987,000,830	2,114,620,582	127,619,752
Total	102,241,835,372	117,991,371,604	5,749,536,232
Maximum daily pumpage:			
From rivers	334,062,741	335,901,484	1,838,743
High service	5,612,595	6,466,660	854,065
Total	339,675,336	342,368,144	2,692,808
Average daily pumpage:			
From rivers	274,670,779	290,073,290	15,402,511
High service	5,443,837	5,793,481	349,644
Total	280,114,616	295,866,771	15,752,155
Average daily pumpage:			
From rivers, per capita	196.2	199.6	3.4

Digitized by Google

Volume and Cost of Pumpage for the Years 1889 to 1899, Inclusive.

Year.	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.
1889	42,518,919,781	69,034,118,434	$3 87	110	1,050,000
1890	51,698,508,090	84,501,451,686	3 05	131	*1,046,000
1891	55,665,648,000	93,490,106,725	2 99	140	1,071,000
1892	59,787,584,178	102,443,373,631	2 68	143	†1,142,650
1893	65,352,736,978	110,590,708,479	3 22	150	1,190,493
1894	72,073,724,238	121,199,588,387	3 48	159	1,238,112
1895	78,775,849,104	132,040,954,195	3 69	162	1,329,957
1896	87,693,642,529	161,776,711,713	3 43	172	1,367,815
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	1,452,843

* United States Census. † City Census.
‡ Including repumpage or high service.

Cost of Raising 1,000,000 Gallons 100 Feet during 1898 and 1899.

Stations.	1898.	1899.	Increase.	Decrease.
Fairmount	$1 36	$1 31		$0 05
Spring Garden	2 99	2 89		10
Belmont	4 06	3 25		81
Belmont High Service	31 05	26 00		5 05
Queen Lane	2 14	2 11		03
Roxborough	3 45	3 80	$0 35	
Roxborough High Service	6 60	6 55		05
Mt. Airy High Service	12 03	13 92	1 89	
Chestnut Hill High Service	69 22	78 52	9 80	
Frankford	3 95	3 83		12
Average	$2 97	$2 90		$0 07

Digitized by Google

DAILY PUMPAGE.

Table showing the Nominal, Maximum, Minimum and Average Daily Pumpage for 1898 and 1899.

Name of Station.	Nominal.		Maximum.		Minimum.		Average.	
	1898	1899	1898	1899	1898	1899	1898	1899
Fairmount	33,290,000	33,290,000	41,626,170	41,284,221	1,021,115	2,131,820	24,423,039	23,612,697
Spring Garden	170,000,000	170,000,000	154,343,440	156,694,520	37,348,500	79,982,640	120,440,447	126,632,562
Belmont	38,000,000	38 000,000	34,591,422	40,828,320	20,864,035	23,686,995	29,112,162	31,352,537
Queen Lane	80,000,000	80,000,000	78,920,950	81,030,050	19,263,550	27,621,350	65,283,471	70,354,933
Roxborough	24,500,000	31,000,000	24,273,740	25,167,623	11,949,400	15,879,570	20,329,722	21,692,527
Totals from Schuylkill	345,790,000	352,290,000	333,755,722	345,004,734	90,442,600	149,302,375	259,588,841	273,645,256
Increase		6,500,000		11,249,012		58,859,775		14,056,415
Decrease								
Frankford	42,000,000	42,000,000	20,528,310	24,727,152	8,437,580	6,784,100	15,081,936	16,428,034
Total from Delaware	42,000,000	42,000,000	20,528,310	24,727,152	8,437,580	6,784,100	15,081,936	16,428,034
Increase				4,198,842				1,346,098
Decrease						1,653,480		
Totals from Delaware and Schuylkill	387,790,000	394,290,000	354,284,032	369,731,886	98,880,180	156,086,475	274,670,777	290,073,290
Increase		6,500,000		15,447,854		57,206,295		15,402,513
Decrease								

Digitized by Google

Nominal, Maximum, Minimum and Average Daily Pumpaye for 1898 and 1899.—Continued.

Name of Station.	Nominal.		Maximum.		Minimum.		Average.	
	1898	1899	1898	1899	1898	1899	1898	1899
Belmont High Service	2,500,000	2,500,000	1,161,200	1,105,380	228,285	264,333	457,015	643,771
Roxborough High Service	5,000,000	5,000,000	5,444,010	5,203,440	953,370	1,407,780	3,726,540	3,976,027
Mt. Airy High Service	3,000,000	3,000,000	2,388,750	2,088,750	243,750	90,000	1,161,464	1,078,033
Chestnut Hill High Service	750,000	750,000	944,640	865,920	36,900	62,400	98,817	95,650
Total High Service	11,250,000	11,250,000	9,938,600	9,263,490	1,462,300	1,824,513	5,443,836	5,793,481
Total daily	399,040,000	405,540,000	364,222,632	378,995,376	100,342,480	157,910,988	280,114,613	295,866,771
Increase		6,500,000		14,772,744		57,568,508		15,752,158
Decrease								

Digitized by Google

The following is a summary of the work done at the several pumping stations and reservoirs:

Fairmount Station.

In pursuance of our practice in former years, all the wheels and pumps at the Fairmount Station, while out of service on account of low water in the Schuylkill during the summer, were carefully examined, readjusted and repaired, and the basin and grounds received every attention necessary to keep them in first-class condition.

Spring Garden Pumping Station.

The engines at the Spring Garden Pumping Station, with the exception of No. 6, which was shut down on August 25, 1898, on account of a broken flywheel, have been operated continuously throughout the year. The broken flywheel of No. 6 was replaced by a new one and the engine put into service again on May 9, 1899.

No. 3 (30-million gallon) Holly engine has been kept in operation with only two of the three pumps running, thus reducing its capacity to 20 million gallons. This condition was due to the breaking of a valve chamber in the engine in 1898.

On June 14 last, six new chambers for Nos. 2 and 3 engines at this station were contracted for, and on December 1st No. 3 engine was shut down and the broken and other cracked chambers were removed. The work in connection with the substitution of new chambers is now under way.

With the exceptions noted, all the machinery at this station has been operated to its maximum capacity during the past year.

Belmont Pumping Station.

Important additions have been made within the year to the plant at the Belmont Pumping Station, and it is grati-

Digitized by Google

fying to be able to state that the service at this station is in far better shape than it has been for years. These additions are the first of the many improvements proposed looking to a betterment of the water system for West Philadelphia, and we have every reason to believe that before the close of another year much will be accomplished in this direction.

The installation of seven new boilers, which were put into operation on March 16, has been of exceptional advantage to the service. With the aid of these we were enabled, when necessary, to run all the engines simultaneously—an impossibility before the introduction of the boilers—with the result that during the entire year we succeeded in keeping the reservoir full, and were not once obliged to resort to direct pumpage for the supply of West Philadelphia—a practice which we were enforced to adopt, under former conditions, in order to keep this reservoir from being entirely emptied.

No. 4 (20-million gallon Worthington) engine at this station has at no time during 1899 been out of service for twenty-four hours at one time. Nos. 1, 2 and 3 (Worthington) engines have been shut down at intervals for repairs, but only for short periods.

Boilers Nos. 1 to 5 were reset so as to return the gases underneath to a new flue in front, and a new flue was built to connect with boilers Nos. 10 to 12 to the brick chimney, instead of to the old iron stack, which was afterwards torn down.

Two additional coal scales, with tracks connecting the coal pocket and fire-room, were also installed during the year.

The erection of a new building, for use as machine, blacksmith and carpenter shops, is among the much-needed and important additions made recently at this station.

Digitized by Google

Much work in connection with the building of retaining walls, grading of ground, etc., has been accomplished, and the condition of the station and grounds greatly improved.

Queen Lane Pumping Station.

Notwithstanding the fact that the engines and pumps at the Queen Lane Pumping Station have been run under the unfavorable conditions reported in 1898, they have given good service during the year.

On February 28, the broken pump chambers in both Nos. 2 and 4 engines became so badly cracked that it was found to be unsafe to keep the engines in service, and both engines were accordingly shut down. The pump chambers of these engines being interchangeable, the cracked chamber of No. 2 was replaced by the remaning sound one of No. 4, and by this substitution we have since been enabled to utilize uninterruptedly the services of No. 2 engine. Two new pump chambers for No. 4 engine were ordered from the builders of these pumps, and when completed were placed in the engine and the latter put into operation on April 8, since which date it has been running continuously.

The coal supply to this station still continues to be hauled from the Reading Railroad, at Wissahickon Station, and this method of furnishing coal adds much to the cost of pumpage at these works.

Roxborough Pumping Station.

The Roxborough Pumping Station has required more attention than any of the others by reason of the fact that both the engines and boilers have been in a very critical condition, and it is due only to the exercise of the utmost care and attention that the pumps have been kept working.

The No. 1 (12-million gallon Southwark) engine, the bed-plate of which had been broken on the west side, be-

Digitized by Google

gan giving trouble in February last. The discovery of new cracks gave serious alarm, but, by the use of bolts and wedges, it was kept in service until August 23, when it was thought to be unsafe to run it any longer at full capacity. The west side of the pump was therefore disconnected, and only the east side operated.

This condition was reported to you at the time, with the statement that it would be impossible to keep the district supplied from this station in its then crippled condition. Acting under instructions which you gave me upon receipt of this information, I visited, on August 25, the works of the Henry R Worthington Company, Brooklyn, N. Y., for the purpose of examining a 4-million gallon pump, in the event of its being purchased by the City, could be turned over in about ten days or two weeks. This fact was reported to you upon my return, and, on August 26, the pump was bought and ordered to be sent to the Roxborough Pumping Station, where it arrived on September 13. Between the dates of its purchase and its arrival, foundations were built for it, and suction, discharge and steam pipes were placed in readiness for its immediate installation.

The engine was put into operation on September 20 (one week after it reached the station), on which date there was a depth of 6 feet 5 inches of water in the New Roxborough reservoir. On December 31, three months and eleven days after the installation of the engine, there was a depth of 20 feet 5 inches in the reservoir—the greatest quantity it has ever held.

By the aid of this pump we succeeded in keeping the district supplied during the remainder of the year.

On February 10, the 2½ million gallon d'Auria pump, until then located at the Roxborough high-service station, was moved to the lower station, but, owing to the bursting of the cylinders (by frost), in transit, it was not started

Digitized by Google

until March 16, from which date it worked until July 20, when it was again thrown out of service by the breaking of the pump chambers.

The purchase of this pump by the City within the past year adds another instalment to the pumping machinery of the Bureau.

A new stack and flue and boiler foundations were built, and six new boilers were erected. The boilers were started on September 1, and on the same date six of the old boilers were put out of service for the purpose of making the much needed repairs required to them.

On May 8 a contract was awarded to the Henry R Worthington Company for the erection, at this station, of two 5-million gallon engines, and, under date of September 19, contracts were awarded these builders for two more engines of identical design and capacity, and for three new pump chambers, to replace those which had broken in Nos. 2 and 3 pumps.

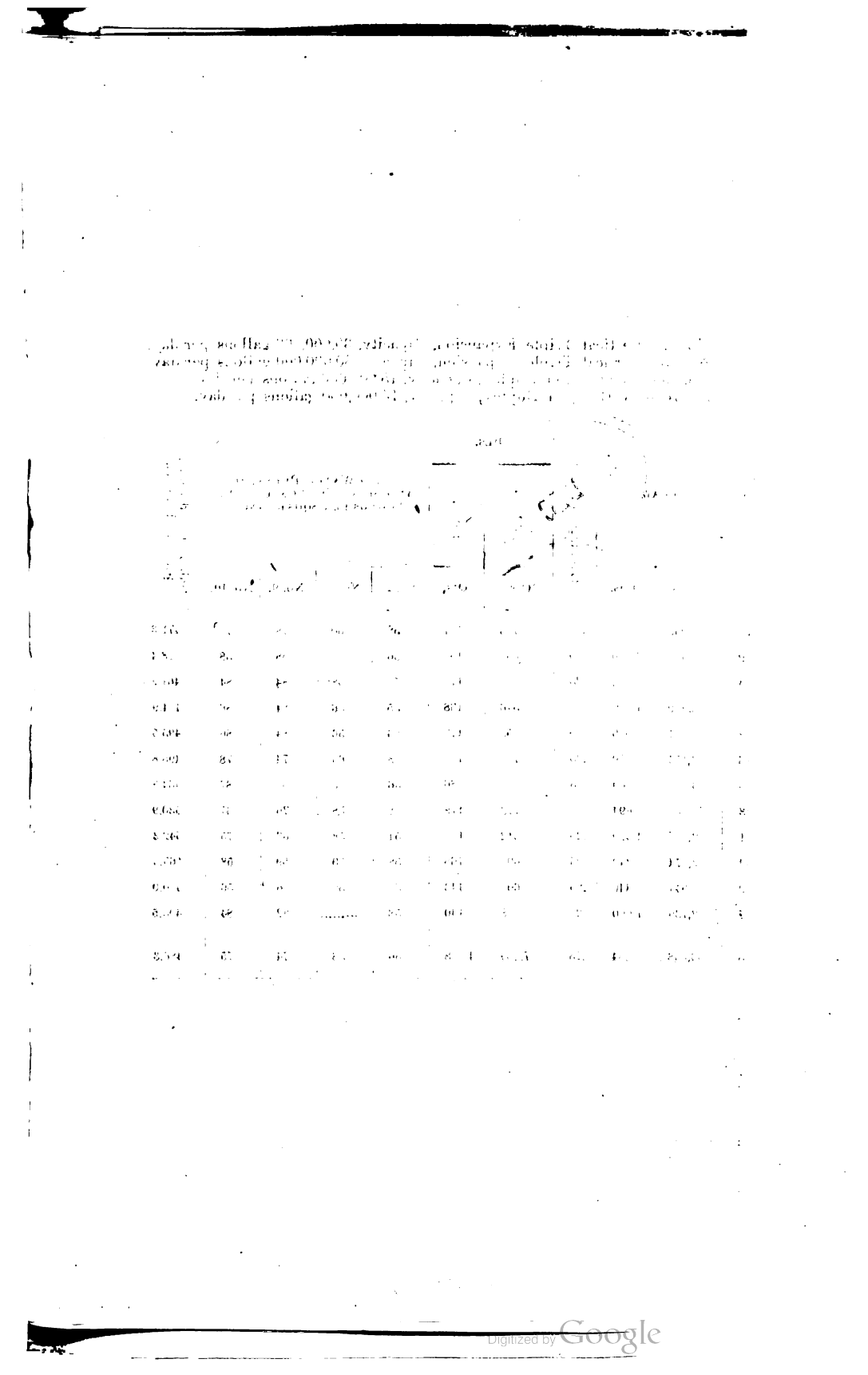
When this work is completed the station will be in condition to furnish subsided water from the New Roxborough Reservoir to the large district at present supplied by direct pumpage.

Another important contract awarded under date of September 19, was one for the building of new engine and boiler houses, and intake, at this station. The engine house, as designated, will be ample in size for the accommodation of six engines, and the boiler house will be constructed so as to provide all the space and proper protection required for the old and the new boilers.

Frankford Pumping Station.

At the Frankford Station we are not obliged to tax the engines and the boilers to their full capacity, and when repairs are needed they can readily be made. We are,

Digitized by Google



Digitized by Google

Total Capacity 80,000

1899.	Running	
	No. 5.	N
January	598	....
February	583	....
March	716	....
April	720	....
May	681	
June	718	
July	739	
August	691	
September	714	
October	723	
November	616	
December	739	
Totals and averages.	8,228	1

Jonval
horiz
Total c
per

189	
January	
Februar	
March	
April	
May	
June	
July	
August	
Septemb	
October	
Novemb	
Decemb	
Totals Avera	

Digitized by Google

therefore, able to keep this station in excellent working condition.

The High-Service Stations.

The high-service stations, with the exception of Chestnut Hill, are all in good condition, notwithstanding the fact that the engines at the Roxborough and the Belmont high-service stations are never out of service. The plants at these two stations are, however, to be increased by the addition of a 5-million gallon engine at each, for which a contract was awarded to the Henry R. Worthington Company on September 19th, the date on which contracts were let for similar engines for the Roxborough pumping station.

These engines will be installed at the high-service stations before the heavy pumpage of the summer begins.

Under date of August 22d a contract was awarded for the erection of engine and boiler houses and stack for a new station, to be located at the Wentz Farm Reservoir. A contract was also let, on the same date, for a 3-million gallon engine, three boilers and a stand-pipe. This station, when completed, will supply the high-level district north of the reservoir, including Fox Chase.

The buildings, grounds and reservoirs have all been kept in good condition.

Respectfully submitted,

F. L. HAND,
Acting Chief of Bureau.

Digitized by Google

Total Capacity—2,500,000 gallons per day.

BELMONT AUXILIARY STATION.

No. 1.—Worthington Duplex—Capacity, 2,000,000 gallons per day.
No. 2.—Snow—Capacity, 500,000 gallons per day.

1899.	Running Time of each Engine in Hours.		Gallons Pumped by each Engine.		Total Pumpage per Month.	Average Pumpage per Day.	Coal.		Percentage of Ashes.	Oils.		Mean Water Pressure.	
										Cylinder.	Engine.		
	No. 1.	No. 2.	No. 1.	No. 2.	Gallons.	Gallons.	Tons.	Lbs.		Qts.	Qts.	No. 1.	No. 2.
January	270	5	12,642,971	60,750	12,703,721	409,797	61	2,205	.25	47	8	62	62
February	340	.....	16,852,375	....	16,852,375	584,013	80	50	.25	42	7	62	
March	273	....	12,711,870	.....	12,711,870	410,060	68	750	.25	46	8	62	
April	342	....	16,470,490	.....	16,470,490	549,016	78	245	.25	45	8	62	
May	447	.....	21,620,915	.....	21,620,915	697,448	91	2,175	.25	47	8	62	
June	523	.....	25,574,925	....	25,574,925	852,497	99	460	.25	45	8	62	
July	576	.....	27,434,800	.....	27,434,800	884,994	109	1,485	.25	46	8	62	
August	528	.....	25,363,165	....	25,363,165	818,166	92	2,175	.25	46	8	62	
September	474	.....	22,704,470	.....	22,704,470	756,815	83	775	.25	46	8	63	
October	436	2	20,878,190	24,300	20,902,490	674,273	82	1,770	.25	46	8	62	62
November	351	.....	16,880,985	.....	16,880,985	562,699	71	1,610	.25	45	7	63	
December	338	.....	16,256,295	.....	16,256,295	524,396	71	1,480	.25	46	8	63	
Totals and averages	4,898	7	234,891,451	85,050	234,976,501	643,771	991	1,740	.25	547	94	62	62

Digitized by Google

Worthington Duplex, Capacity 5,000,000 Gallons per Day.
Worthington Duplex, Capacity 5,000,000 Gallons per Day.
Worthington Duplex, Capacity 8,000,000 Gallons per Day.
Worthington Duplex, Capacity 20,000,000 Gallons per Day.

Percentage of Ashes.	Oils.		Mean Water Pressure and Mean Suction Lift in Pounds per Square Inch.				Gallons Raised 100 Feet per Pound of Coal.
	Cylinder.	Engine.					
	Qts.	Qts.	No. 1.	No. 2.	No. 3.	No. 4.	
25	938	194	.....	85	85	85	544.8
25	847	175	85	85	85	85	519.3
25	938	194	85	85	85	85	548.1
25	908	187	86	87	87	87	544.3
25	938	194	95	95	95	95	548.2
25	907	187	95	95	95	95	540.0
25	938	194	95	95	95	95	471.3
25	938	194	95	95	95	95	496.9
25	907	187	95	95	95	95	492.6
25	937	193	95	95	95	95	479.3
25	907	187	95	95	95	95	475.1
25	938	194	95	95	95	95	477.9
25	11,041	2,280	92	92	92	92	510.9

Digitized by Google

Total capacity of Goods per Railway car &c.

Year.	Number of Goods Cars on Railways.												Total.
January	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
February	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
March	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
April	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
May	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
June	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
July	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
August	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
September	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
October	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
November	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
December	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Average [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Digitized by Google

Total Capacity, 5,000,000 gallons per day.

ROXBOROUGH AUXILIARY STATION.

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

1899.	Runni'g time of Engine in hours.	Gallons Pumped by Engine.	Total Pumpage of each Month.	Average Pumpage per Day.	Coal.		Percentage of Ashes.	Oils.		Mean Water Pressure.
								Cylinder.	Engine.	
	No. 1.	No. 1.	Gallons.	Gallons.	Tons.	Lbs.		Qts.	Qts.	
January	743	116,878,410	116,878,410	3,770,271	186	770	.25	124	8	56
February	668	113,271,550	113,271,550	4,045,412	188	80	.25	112	7	56
March	741	127,663,090	127,663,090	4,118,164	187	830	.25	124	8	56
April	718	121,568,830	121,568,830	4,052,294	174	980	.25	120	8	56
May	744	128,357,460	128,357,460	4,140,563	177	350	.25	124	8	56
June	720	132,724,347	132,724,347	4,424,144	186	2,100	.25	120	7	56
July	744	143,192,610	143,192,610	4,629,116	200	1,550	.25	124	8	56
August	738	111,631,270	111,631,270	3,601,008	163	320	.25	124	8	56
September	690	104,953,860	104,953,860	3,498,462	158	80	.25	119	7	56
October	744	119,029,690	119,029,690	3,839,667	180	1,140	.25	124	8	56
November	717	116,442,560	116,442,560	3,881,418	176	20	.25	120	7	56
December	739	115,536,070	115,536,070	3,726,970	183	850	.25	124	8	56
Totals and Averages	8,706	1,451,249,747	1,451,249,747	3,976,027	2,162	110	.25	1,459	92	56

Digitized by Google

Total Capacity 3,000,000 gallons per day.

MOUNT AIRY PUMPING STATION

No. 1—Davidson Rotary, Capacity 1,000,000 gallons per day.
No. 2—Davidson Rotary, Capacity 1,000,000 gallons pey day.
No 3—Knowles Rotary, Capacity 1,000,000 gallons per day.

1899.	Running Time of each Engine in Hours.			Gallons Pumped by each Engine.			Total Pumpage of each month.	Average Pumpage per day.	Coal.		Percentage of Ashes.	Oil.		Mean Water Pressure and Mean Suction Lift in Pounds per sq. in.			Gallons raised 100 feet per pound of Coal.
												Cylinder.	Engine.				
	No. 1.	No. 2.	No. 3.	No. 1.	No. 2.	No. 3.	Gallons.	Gallons.	Tons.	Lbs.		Qts.	Qts.	No. 1	No. 2	No. 3	
January	12	732	.....	555,000	33,990,000	.....	34,545,000	1,114,354	83	80	.25	81	31	60	60	.....	257.4
February	.....	479	.....	.....	22,403,900	.....	22,403,900	800,139	57	1,220	.25	58	18	.....	60	.....	240.8
March	18	486	.....	877,500	22,461,500	.....	23,339,000	752,870	62	220	.25	62	18	60	60	.....	232.5
April	131	359	.....	6,225,000	17,014.250	.....	23,239,250	774,641	60	600	.25	57	15	60	60	.....	237.8
May	66	508	.....	3,176,250	24,511,250	.....	27,687,500	893,145	70	300	.25	70	19	60	60	.....	244.2
June	210	550	.....	9,967,500	26,525,000	.....	36,492,500	1,216,416	91	1,660	.25	87	22	60	60	.....	246.1
July	220	458	.....	10,871,250	22,467,500	.....	33,338,750	1,075,444	90	900	.25	78	16	60	60	.....	228.1
August	705	336	.....	34.953,750	15,77[illegible],750	.....	50,732,500	1,636,532	129	1,040	.25	95	19	60	60	.....	276.9
September	260	462	.....	13,016,750	22,969,500	.....	35,986,250	1,199,541	100	2,000	.25	85	17	60	60	.....	220.6
October	16	735	.....	780,000	35,047,500	.....	35,827,500	1,155,725	104	540	.25	82	16	60	60	.....	212.6
November	.....	720	.....	.....	34,155,000	.....	34,155,000	1,138,500	100	1,000	.25	65	15	.....	60	.....	210.3
December	16	744	.....	750 000	34,985,000	.....	35,735,000	1,152,741	104	1,040	.25	62	16	60	60	.....	211.6
Totals and averages...	1,654	6,569	.....	81,173,000	312,309,150	.....	393,482,150	1,078,033	1,054	1,640	.25	882	222	60	60	.... ..	230.8

Digitized by Google

Total Capacity, 750,000 gallons per day.

CHESTNUT HILL STATION.

No. 1—Knowles, Capacity, 250,000 gallons per day.
No. 2—Worthington Duplex, Capacity, 500,000 gallons per day.

1899.	Running Time of each Engine in Hours.		Gallons Pumped by each Engine.		Total Pumpage of each Month.	Average Pumpage per day.	Coal.		Percentage of Ashes.	Oils.		Mean Water Pressure and Mean Suction Lift in pounds per sq. inch.		Gallons raised 100 feet per pound of Coal.
										Cylinder.	Engine.			
	No. 1.	No. 2.	No. 1.	No. 2.	Gallons.	Gallons.	Tons.	Lbs.		Qts.	Qts.	No. 1.	No. 2.	
January	.....	160	.....	5,874,480	5,874,480	189,499	23	576	.25	11	.....	.....	50	130.2
February	.....	151	.....	5,409,540	5,409,540	193,197	25	255	.25	15	.....	.....	50	111.0
March	.....	58	.....	2,127,960	2,127,960	68,643	17	1,309	.25	6	.....	.....	50	62.4
April	.....	62	.....	2,351,680	2,351,680	78,359	12	1,153	.25	6	.....	.....	50	96.9
May	.....	123	.....	3,875,920	3,875,920	125,029	21	127	.25	15	.....	.....	50	94.9
June	31	15	1,041,300	553,500	1,594,800	53,160	10	626	.25	5	.....	50	50	79.9
July	.....	46	.....	1,707,240	1,707,240	55,072	11	1,030	.25	4	.....	.....	50	76.8
August	.....	98	.....	3,539,120	3,539,120	114,165	17	1,905	.25	9	.....	.....	50	102.2
September	.....	57	.....	2,026,444	2,026,444	67,548	13	1,907	.25	5	.....	.....	50	75.4
October	.....	57	.....	2,231,220	2,231,220	71,974	14	625	.25	4	.....	.....	50	80.5
November	14	42	436,800	1,640,820	2,077,620	69,254	14	40	.25	4	.....	50	50	76.4
December	6	48	187,200	1,908,960	2,096,160	67,618	14	200	.25	4	.....	50	50	76.7
Totals and averages	51	917	1,665,300	33,246,864	34,912,184	95,650	195	793	.25	88	.....	50	50	92.1

Digitized by Google

Total Capacity, 42,000,000 gallons per day.

FRANKFORD PUMPING STATION.

No. 1—Marine Compound Rotary, Capacity, 10,000,000 gallons per day.
No. 2—Corliss Compound Rotary, Capacity, 10,000,000 gallons per day
No. 3—Vertical Compound Rotary, Capacity, 22,000,000 gallons per day.

1899.	Running Time of each Engine in Hours.			Gallons Pumped by each Engine.			Total Pumpage of each Month.	Average Pumpage per Day.	Coal.		Percentage of Ashes.	Oils.		Mean Water Pressure and Mean Suction Lift in Pounds per Sq. Inch.			Gallons Raised 100 feet per Pound of Coal.
												Cylinder.	Engine.				
	No. 1.	No. 2.	No. 3.	No. 1.	No. 2.	No. 3.	Gallons.	Gallons.	Tons.	Lbs.		Qts.	Qts.	No. 1.	No. 2.	No. 3.	
January	19	.....	715	7,256,130	.....	462,291,346	469,547,476	15,146,692	641	1,965	.25	170	496	67	.....	67	574.1
February	.....	.....	663	.....	.....	440,741,119	440,741,119	15,740,754	622	1,370	.25	154	448	.....	.....	67	555.5
March	310	258	430	107,618,970	97,364,871	274,816,000	479,799,841	15,477,414	753	138	.25	170	496	73	75	67	560.0
April	317	227	439	115,777,620	60,788,574	283,422,790	459,988,984	15,332,966	758	618	.25	165	480	75	77	69	476.0
May	131	65	648	52,130,340	24,871,530	447,039,250	524,041,120	16,904,552	767	1,262	.25	171	496	73	75	70	535.8
June	534	432	250	203,865,090	162,450,140	162,996,310	529,311,540	17,643,718	821	527	.25	165	480	72	74	73	505.8
July	649	542	122	258,734,320	205,266,590	79,206,330	543,207,240	17,522,814	861	2,097	.25	170	496	75	75	72	494.6
August	521	410	319	189,353,870	150,367,255	206,760,220	546,481,345	17,692,946	904	273	.25	241	422	75	71	73	474.3
September	403	188	473	161,063,980	70,740,480	320,112,080	551,916,540	18,397,218	927	2,220	.25	355	571	78	75	72	466.7
October	344	189	463	136,074,200	69,769,870	316,976,310	522,820,380	16,865,173	893	513	.25	354	559	78	75	71	459.3
November	82	32	537	31,542,420	11,242,340	416,737,340	459,522,100	15,317,403	787	856	.25	325	537	79	75	72	458.0
December	530	276	254	198,747,520	104,174,377	165,932,737	468,854,634	15,124,343	880	1,527	.25	328	535	77	74	71	417.8
Totals and averages.	3,840	2,619	5,313	1,462,164,460	957,036,027	3,577,031,832	5,996,232,319	16,428,034	9,619	2,167	.25	2,768	6,016	75	75	70	489.1

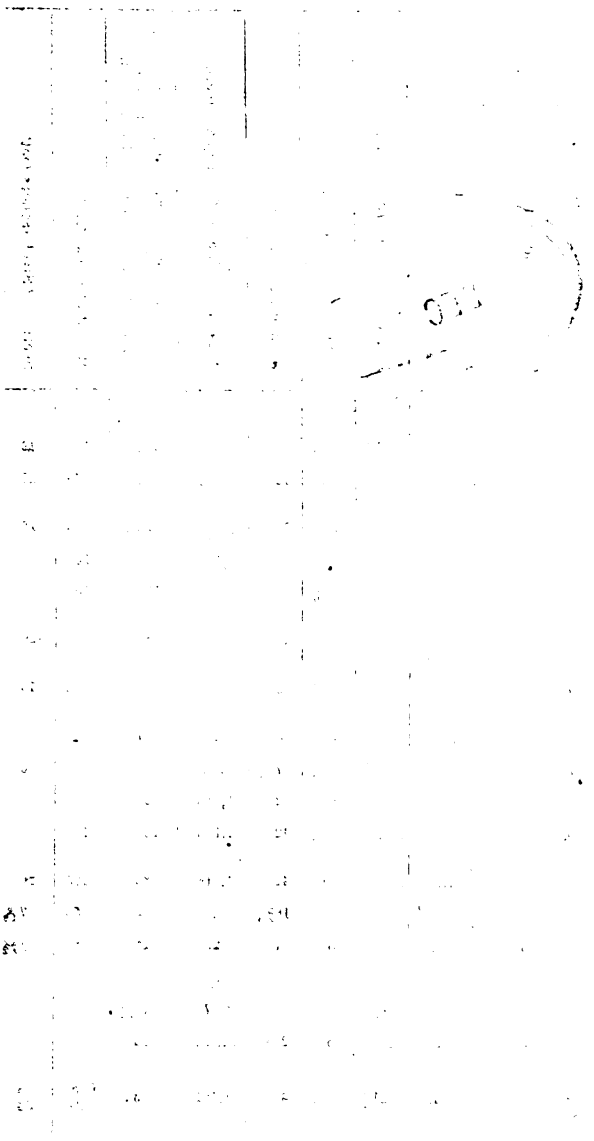
Digitized by Google

189

PUMP

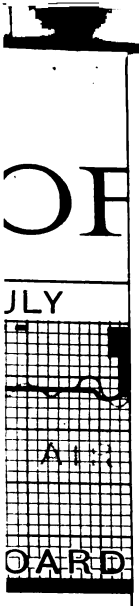
Spring

Belmo



Digitized by Google

Digitized by Google



Digitized by Google

Digitized by Google

E YEAR 1899.

al ases.	Total Gallons Pumped.	Lift in Feet, including Suction and Friction.	Gallons Pumped 100 Feet High, Suction and Friction included.	Cost of Raising One Million Gallons One Hundred.	Percentage of Work done at each Station.	Height of Surface of Basins Above Pumps in Feet.
38 45	8,618,634,347	100.0	8,618,634,347	$1 31	3.72	90.00 115.00 120.00
16 18	46,220,885,248	163.1	75,388,599,775	2 89	32.52	* 102.00 179.00 215.00
38 74	11,443,676,179	292.0	33,413,862,249	3 25	14.41	198.08
35 91	284,976,501	143.2	336,486,849	26 00	.14	† 160.00
72 73	25,679,550,570	280.1	71,942,464,515	2 11	31.93	231.00
39 68	7,917,772,359	367.6	29,106,393,071	3 80	12.56	310.00 366.00
33 00	1,451,249,747	129.3	1,876,465,922	6 55	.81	‡ 140.00
38 24	398,482,150	138.6	545,366,159	13 92	.24	‡ 128.00
10 78	34,912,184	115.5	40,323,572	78 52	.02	128.0 0
71 50	5,996,232,319	175.8	10,545,090,669	3 33	4.55	108.53
25 64	107,991,371,604	214.6	231,813,686,728	$2 90	100.00	.....

h.

Digitized by Google

Digitized by Google

Digitized by Google

Digitized by Google

The following appendices accompany this report:

A. Report of Chief Clerk.

B. Report of Assistant in Charge of Distribution.

C. Report of Superintendent of Construction and Repair Shop.

D. Report of Chief Draftsman and Assistant in Charge of Hydrographic Work.

Digitized by Google

Digitized by Google

APPENDIX A

REPORT OF CHIEF CLERK

Philadelphia, January 22, 1900.

F. L. HAND, ESQ.,
Acting Chief, Bureau of Water.

DEAR SIR:—I have the honor to transmit herewith tables showing the receipts from the operations of this Bureau, also receipts, estimates, amounts rendered available, etc., and the detailed expenditures of the Bureau for the year 1899.

Yours respectfully,

J. T. HICKMAN,
Chief Clerk.

Digitized by Google

Detailed Expenditures of the Bureau for 1899.

General Appropriation.	Amount appropria'd.	Amount expended.	Amount merging.	Amount not merging
An Ordinance to make an appropriation to the Bureau of Water, approved Dec. 31, 1898...$1,264,439 00				
Balance from books of 1898..... 90,845 81				
Increased by additional appropriations and transfers.....$1,215,626 59				
	$2,570,411 40			
Diminished by transfer... 50,786 40				
Net appropriation.....	$2,519,425 00			
Item 1—Salaries..... $331,964 00				
Diminished by transfer... 8,000 00				
Net appropriation to Item.....	323,964 00			
For Salary of Chief of Bureau.....	6,000 00	$6,000 00		
Chief clerk.....	2,000 00	2,000 00		
Assistant clerk.....	1,200 00	1,200 00		
Correspondence clerk...	900 00	900 00		
Time clerk.....	1,000 00	1,000 00		
Messenger.....	720 00	720 00		
Draughtsmen.....	4,700 00	4,700 00		
General superintendent	3,500 00	3,062 43		
Clerks to general superintendent.....	2,000 00	1,954 04		
Assistant to chief.....	3,600 00	3,600 00		
Pipe inspector and clerk	2,200 00	1,491 66		
Search clerks.....	2,200 00	2,200 00		
Assistant clerks.....	2,750 00	2,750 00		
Chief inspector.....	1,200 00	1,200 00		
Inspectors.....	19,000 00	18,973 08		
Permit clerks.....	2,300 00	2,300 00		
Purveyors.....	9,200 00	9,200 00		
Clerks to purveyors.....	4,800 00	4,800 00		
Assistant clerks to purveyors.....	4,500 00	4,471 71		
Hydrant inspectors.....	7,050 00	5,810 56		
General foremen.....	6,634 00	6,321 00		
Foreman of repairs.....	3,900 00	3,900 00		
Superintendent of shop	1,500 00	1,500 00		
Clerk to superintendent of shop.....	900 00	900 00		
Watchmen (offices and yards).....	6,075 00	5,938 76		
Storekeepers.....	1,400 00	1,400 00		
Foreman machinist.....	1,500 00	1,500 00		
Foreman bricklayer.....	1,100 00	1,100 00		
Foreman carpenter.....	1,000 00	1,000 00		
Foreman stonemason...	900 00	900 00		
Foreman painter.....	900 00	900 00		
Foreman rigger.....	900 00	900 00		
Foreman laborer..... ...	840 00	840 00		
Janitor, main office.....	720 00	720 00		
Lineman	1,000 00	798 39		
Telephone operators....	1,100 00	1,100 00		
Electrician	1,200 00	1,200 00		
General storekeeper.....	1,000 00	1,000 00		
Yard keeper, Fourth District.....	915 00	915 00		

Digitized by Google

Detailed Expenditures of the Bureau for 1899—Continued.

General Appropriation.		Amount appropria'd.	Amount expended.	Amount merging.	Amount not merging
SALARIES AT PUMPING STATIONS.					
Fairmount, engineers, oilers, etc.		$13,210 00	$13,193 09		
Spring Garden		82,840 00	80,505 71		
Belmont		24,640 00	29,498 79		
Belmont High Service		6,350 00			
Queen Lane		38,480 00	36,381 33		
Roxborough		20,320 00	26,941 36		
Roxborough High Service		7,700 50			
Mt. Airy		4,660 00	4,454 00		
Chestnut Hill		3,100 00	2,225 09		
Frankford		17,760 00	17,563 35		
Total			$321,929 35	$2,084 65	
Item 2. For the purchase of coal	$300,000 00				
Increased by additional appropriations	125,000 00				
Net appropriation to item		$425,000 00			
COAL FOR OFFICES AND SHOP.					
1 ton bituminous	$3 50				
4 tons bituminous, at $3.42	13 68				
6 tons nut, at $5.43	32 58				
19 tons stove, at $5.13	97 47				
48.06 tons bituminous, at $2.49	116 02				
28 tons stove, at $5.00	140 00				
48.01 tons stove, at $4.53	217 71				
344.04 tons pea, at $2.97	1,026 57		$1,647 53		
COAL FOR STATIONS.					
150 tons egg, Fairmount, at $4.23	$634 50				
155.5 tons pea, Sp'g Garden, at $2.69	417 62				
219.15 tons pea, Chestnut Hill, at $2.92	641 67				
566.07 tons stove, Queen Lane, at $4.05	2,293 72				
600.10 tons stove, Roxborough, at $3.86½	2,320 93				
1,044.06 tons buck., Mt. Airy, at $2.07	2,161 69				
1,470.04 tons buck, Belmont, at $1.91	2,808 09				
9,238.13 tons buck. Frankford, at $1.96	18,107 77				
28,912.02 tons pea, Belmont, at $2.68	77,484 43				
30,883.15 tons pea, Roxborough, at $2.69	83,077 29				
38,969.06 tons pea, Queen Lane, at $2.92	113,790 37				
60,236.03 tons buck, Spring Garden	116,858 15		420,596 23		
Total			$422,243 76	$2,756 24	

Digitized by Google

Detailed Expenditures of the Bureau for 1899.—Continued.

General Appropriation.		Amount appropria'd	Amount expended.	Amount merging.	Amount not merging
Item 3. For the purchase of oil, lubricants, paints, brushes, wood and coke, and for the hauling of coal	$8,000 00				
Increased by additional appropriations	4,600 00				
Net appropriation to item		$12,600 00			
Coke			$539 75		
Hauling coal, 2,215 tons, at 29¾c			658 95		
Lubricant, 13,979 lbs., at 10c			1,397 90		
Lubricant cups, 21, at $1.60			33 60		
OIL.					
5 gals. castor, at 77.80c	$4 28				
53 gals. cylinder, at 18c	9 54				
483 gals. gasoline, at 8½c	39 26				
254 gals. electric, at 14½c	36 83				
424½ gals. black, at 7c	29 71				
215 gals. lard, at 39.98c	85 96				
4,500½ gals. headlight, at 8c.	360 04				
1,837½ gals. engine, at 32c	588 00				
1,560½ gals. cylinder, at 44c.	686 62				
3,454 gals. engine, at 35c	1,208 90				
7,484 gals. engine, at 22c	1,646 48				
4,170½ gals. cylinder, at 45c.	1,876 73				
6,596½ gals. cylinder, at 30c.	1,978 95				
			8,551 40		
Paints			1,208 23		
Tallow			21 21		
Wood, 4 cords, at $7.00			28 00		
Total			$12,439 04	$160 96	
Item 4. For wages of mechanics, laborers, and other workmen, employed upon repairs to machinery, and the maintenance and repairs to buildings, grounds and reservoirs, and the transportation of workmen incident thereto	$75,000 00				
Increased by additional appropriations	72,000 00				
Net appropriation to item		$147,000 00			
Transportation			$2,886 90		
Wages:					
Repairs, telephone line	$121 55				
Bricklayers	13,370 68				
Carpenters	8,184 50				
Draughtsman	72 00				
Helpers	9,451 89				
Horses, carts and drivers	8,724 00				
Laborers	74,862 83				
Machinists	17,883 01				
Painters	5,328 50				
Stone Masons	5,378 50		$143,377 46		
Total			$146,264 36	$735 64	

Digitized by Google

Detailed Expenditures of the Bureau for 1899.—Continued.

General Appropriation.	Amount appropria'd.	Amount expended.	Amount merging.	Amount not merging
Item 5. For wages of mechanics, drillers, caulkers, laborers, and other workmen connected with the repairs to and improvement of the distribution, and the laying of service mains, and the transportation of workmen engaged in repairs.... .....$115,000 00				
Increased by additional appropriations..... 115,000 00				
$230,000 00				
Diminished by transfer..... 2,000 00				
Net appropriation to Item.....	$227,000 00			
Transportation.....	.....	$1,149 40		
Wages, Improvement.....$19,528 21				
" First District..... 19,425 33				
" Second District..... 39,471 45				
" Third District..... 52,396 11				
" Fourth District..... 40,036 71				
" Fifth District..... 13,858 46				
" Sixth District..... 35,912 18	.....	220,628 45		
Total.....	.....	$221,777 85	$5,222 15	
Item 6. For the wages of mechanics, helpers, laborers, and other workmen at the city construction and repair shop.....$20,000 00				
Increased by additional appropriation..... ..... 13,000 00				
Net appropriation to Item.....	$33,000 00	$32,547 23	$452 77	
Item 7. For the purchase of iron water pipe, special pipe castings and pig lead..... .....$120,000 00				
Increased by additional appropriations 15,000 00				
$135,000 00				
Diminished by transfer..... 5,000 00				
Net appropriation to Item.....	130,000 00			
Iron water pipe and special castings:				
15,000 6-in., 5,446,197 lbs., at .8193c.....$44,615 17				
1,046 8-in., 509,353 lbs., at .882c..... 4,492 49				
1049 10-in., 713,184 lbs., at .8080c..... 5,762 52				
1,995 12-in., 1,807,686 lbs., at .8080c..... 14,603 13				
100 16-in., 134,050 lbs., at .8080c..... 1,083 12				
200 20-in., 364,646 lbs., at .8080c..... 2,946 35				
15 30-in., 72,615 lbs., at 1.259c..... 914 22				
258,072 lbs., specials, at 1.85c..... 4,681 84				
478,885 lbs., specials, at 1.58c..... 7,566 38				

Digitized by Google

Detailed Expenditures of the Bureau for 1899—Continued.

General Appropriation.		Amount appropria'd.	Amount expended.	Amount merging.	Amount not merging
Item 7—Continued.					
30,502 lbs., specials, at 2.02c	671 04				
21,502 lbs., breeches pipe, at 4c	1,263 68				
1723½ hours, machine work, at 60c	1,034 00				
		.....	$89,636 94		
PIG LEAD.					
Shop ..... 30,110 lbs.					
First District ..... 50,307 lbs.					
Second District... 100,104 lbs.					
Third District.... 75,198 lbs.					
Fourth District.. 65,511 lbs.					
Fifth Distlict..... 95,575 lbs.					
Sixth District.... 85,674 lbs.					
502,479 lbs. at 4.975c.		.....	24,998 34		
Total		.....	$114,635 28	$15,364 72	
Item 8. For wages of engineer corps	$5,500 00				
Increased by additional appropriation	4,600 00				
Net appropriation to item		$10,100 00	$9,533 87	$566 13	
Item 9. For the purchase of hardware, bolts and nuts		6,000 00	5,505 45	$494 55	
Item 10. For the purchase of iron, steel and malleable castings	$17,000 00				
Increased by additional appropriations	4,000 00				
Net appropriation to item		21,000 00			
215 lbs. steel castings, at 8½c.		.....	18 28		
Steel forging		.....	19 50		
Machine work		.....	31 00		
360 lbs. steel castings, at 9½c.		.....	34 20		
66,652 lbs. grate bars, at 1 1-5c.		.....	799 83		
55,727 lbs. stop-box castings, at 1 8-10c.		.....	1,900 00		
102,844 lbs. frames and covers, at 1.c.		.....	1,028 44		
71,714 lbs. pump machinery, at 2¾c.		.....	1,972 14		
166,242 lbs. stop castings, at 1¼c.		.....	2,078 08		
143,491 lbs. miscellaneous castings, at 1½ cents		.....	2,152 38		
74,928 lbs. pump machinery castings, at 3½ cts		.....	2,622 48		
237,854 lbs. stop box castings, at 1⅛		.....	2,675 83		
272,762½ lbs. fire hydrant castings, at 1¾ cts.		.....	3,817 55		
			$18,249 76	2,750 24	
Item 11. For the purchase of gum goods and packing	9,200				
Increased by additional appropriation	2,000				
Net appropriation to item		$11,200 00			
Gum goods		.....	4,133 48		
Packing		.....	6,618 36		
			$10,751 84	443 16	

Digitized by Google

Detailed Expenditures of the Bureau for the Year 1899.

General Appropriation.	Amount appropria'd.	Amount expended.	Amount merging.	Amount not merging
Item 12. For repairs to boilers $16,000				
Increased by additional appropriation..... 8,500				
Net appropriation to item.....	24,500 00			
Fairmount.....	.....	10 00		
City shops.....	.....	10 75		
Evaporation tanks.....	.....	37 50		
Roxborough High Service.....	.....	25 00		
Belmont High Service.....	.....	124 31		
Frankford.....	.....	765 66		
Queen Lane.....	.....	2,948 28		
Spring Garden.....	.....	5,208 88		
Belmont.....	.....	7,078 48		
Roxborough.....	.....	8,211 81		
		$24,420 67	79 33	
Item 13. For the purchase of chandlery.....	5,000 00	4,466 48	533 52	
Item 14. For the purchase of wrought iron pipe and fittings..... $2,000				
Increased by additional appropriation..... 1,500				
Net appropriation to item.....	3,500 00	2,039 24	1,460 76	
Item 15. For the purchase of fire bricks and fire clay.....	1.000 00	800 13	199 87	
Item 16. For the purchase of brass fittings, cocks and valves for steam and water..... $7,000				
Increased by additional appropriation..... 5,000				
Net appropriation to item.....	12,000 00			
Brass fittings.....	.....	5,095 02		
Corporation cocks:				
10,401 1½ in. at 32½c..... $3.380 35				
500 ⅝ in. at 37½c..... 187 51				
300 ¾ in. at 53½c..... 160 51				
200 1 in. at 80c..... 160 00				
50 1¼ in. at $1 50..... 75 00				
50 1½ in. at $1 50..... 75 00				
57 2 in. at $2 12..... 120 84				
	.....	$4,159 21		
Curb stops:				
5000 ½ in. at 33c.....	.....	1,650 00		
Total.....	.....	$10,904 23	$1,095 77	
Item 17. For covering steam pipes and boilers.....	$2,000 00			
Belmont..... $187 20				
Frankford..... 261 45				
Storehouse..... 285 00				
Roxborough..... 287 04				
Queen Lane..... 355 09				
Spring Garden..... 435 89				
	.....	1,811 67	188 33	
Item 18. For the purchase of lumber..... $8,000 00				
Increased by additional appropriation..... 1,000 00				
Net appropriation to item.....	9,000 00	8,902 89	97 11	

Digitized by Google

Detailed Expenditures of the Bureau for 1899—Continued.

General Appropriation.		Amount appropria'd.	Amount expended.	Amount merging.	Amount not merging
Item 19. For the purchase of forage,	$4,000 00				
Increased by additional appropriation	2,000 00				
Net appropriation to item		$6,000 00	$6,000 00		
Item 20. For hauling water pipe and machinery		6,000 00	4,717 55	$1,282 45	
Item 21. For the purchase of cement	$4,000 00				
Increased by additional appropriation	1,500 00				
Net appropriation to item		5,500 00	4,558 36	941 54	
Item 22. For the purchase of iron and steel	$2,000 00				
Increased by additional appropriation	1,500 00				
Net appropriation to item		3,500 00	1,994 83	1,505 17	
Item 23. For the purchase of bricks, blocks, lime and building stone,	$3,000 00				
Increased by additional appriation	4,000 00				
Net appropriation to item		7,000 00	4,360 95	2,639 05	
Item 24. For the purchase of Electrical supplies		2,500 00	2,467 48	32 52	
Item 25. For repairs to roofs	$1,500 00				
Increased by additional appropriation	1,000 00				
Net appropriation to item		2,500 00	2,401 84	98 16	
Item 26. For purchase of granite curb and coping stones		1,000 00	993 38	6 62	
Item 27. For the purchase of brass castings		5,500 00			
10,388 lbs. Lead coating, at 4½c	$467 46				
14,052 2/3 lbs. yellow brass at 9 88/100c	1,391 19				
12,174½ lbs. red brass, at 12 39/100c	1,570 49				
13,498 lbs. Ajax metal at 23½c	3,172 02				
	$6,601 16				
Cr.					
134 lbs. yellow brass at 9c	$12 06				
1000 lbs. scrap copper, at 12c	120 00				
4816 lbs. scrap brass, at 8⅛c	391 30				
9640 lbs. brass trimmings, at 6c	578 40				
	$1,101 76				
		.....	5,499 40	60	

Digitized by Google

Detailed Expenditures of the Bureau for 1899—Continued.

General Appropriation.	Amount appropria'd.	Amount expended.	Amount merging.	Amount not merging
Item 28. For the purchase of stationery, blank books, engineer's supplies and printing..... $6,000 00				
Increased by additional appropriation..... 4,000 00				
Net appropriation to item.....	$10,000 00			
Engineer's supplies.....	.....	$559 40		
Printing and blanks.....	.....	1,525 99		
Stationery and blank books..	.....	6,028 27		
Total.....	.....	$8,113 66	$1,886 34	
Item 29. For clerk hire in writing up duplicates.....	$2,275 00	$2,275 00		
Item 30. For keep of horse for Chief of Bureau, General Superintendent and assistant..... $1,2 0 0				
Diminished by transfer..... 366 00				
Net appropriation to item.....	834 00	800 00	$34 00	
Item 31. For the purchase of horses...	1,000 00	716 00	284 00	
Item 32. For the purchase of meters to measure the flow of water through large pipes.....	2,500 00			
Two 30-in. Venturi, at $1,175.....	.....	2,350 00	150 00	
Item 33. For the purchase of tapping machines and fittings... $6,000				
Diminished by transfer..... 500				
Net appropriation to item..	$5,500 00	$4,627 26	$872 74	
Item 34. For the purchase of wagons and carts.....	300 00	160 00	140 00	
Item 35. For the purchase of harness and stable supplies.	500 00	4 5 47	34 53	
Item 36. For the purchase of donkey pumps and tools..... $1,000				
Increased by additional appropriation..... 1,000				
$2,000				
Diminished by transfer..... 1,00				
Net appropriation to item..	1,000 00			
Two (2) donkey pumps, at $432.50	.....	865 00	135 00	
Item 37. For asphalt paving and repairs to asphalt paving $1,000				
Diminished by transfer..... 1,000				
Item 38. For advertising, office supplies, text books and incidentals..... $2,000				
Increased by additional appropriation..... 2,500				
Net appropriation to item...	4,500 00			
Advertising.....	.....	235 20		
Care of clocks.....	.....	15 00		

Digitized by Google

Detailed Expenditures of the Bureau for 1899—Continued.

General Appropriation.	Amount appropria'd.	Amount expended.	Amount merging.	Amount not merging
Item 38—Continued.				
Cleaning wells		$52 59		
Disinfector (rental)		144 00		
Fire insurance (city shop)		242 00		
Frames for plans		10 80		
Furnishing light, Frankford and Queen Lane		138 57		
Ground rent (918 Cherry street)		26 66		
Incidentals		433 25		
Inspectors' badges		45 00		
Map		574 25		
Office supplies		278 89		
Privilege of dumping dirt		7 80		
Professional services		110 75		
Rent of office, Fifth District		144 00		
Rent of shop, Fifth District		50 00		
Repairing clocks		9 00		
Serving daily papers		27 05		
Subscription periodicals		21 50		
Telegraph and messenger service		39 77		
Text books		11 80		
Typewriting and supplies		58 73		
Traveling expenses (pipe inspector)		1,385 43		
Transportation		208 70		
Washing towels		159 76		
Writing duplicates		26 50		
		$4,457 00		$43 00
Item 39. For the purchase of special articles, small stores, repairs to wagons, harness, tools, etc., and for horseshoeing $1,500 00				
Increased by additional appropriations 4,500 00				
Net appropriation to item	$6,000 00			
Boiler compound		128 34		
Climax clamps		141 50		
Dynamite		155 10		
Glasses for bearings		16 00		
Horseshoeing		1,056 57		
Ice		1,072 53		
Plants		62 90		
Reconstructing gas mains		61 62		
Repairs to harness		280 10		
Repairs to jacks		18 20		
Repairs to pipes		53 63		
Repairs to pumps		3 00		
Repairs to wagons and carts		1,218 75		
Special articles		196 56		
Supporting tracks		4 29		
Water motor		72 00		
Viscosimeter		65 00		
		$4,576 09	1,423 91	
Item 40. For the purchase of lead pipe $5,000 00				
Increased by additional appropriation 7,500 00				
Net appropriation to Item	12,500 00			
233,154 lbs., at 5¼c		12,240 59	259 41	
Item 40½. For the purchase of meters.	1,000 00			
1—1½ in. Crown $50 00				
5—3 in. Crown, at $135 675 00				
Parts of meters 277 00				
$1,002 00				
Less amount paid for freight 2 00				
		1,000 00		

Digitized by Google

Detailed Expenditures of the Bureau for 1899—Continued.

General Appropriation.	Amount appropria'd.	Amount expended.	Amount merging.	Amount not merging
Item 41. For emergencies	$5,000 00			
Changing gas mains		$235 46		
Grate bars		296 46		
Hauling coal		21 00		
Raising sunken barge		100 00		
Repairs to engines		2,030 78		
Repairs to pavement		100 00		
Repairs to siding		103 00		
Services of diver		390 00		
Total		$3,276 70	$1,723 30	
Item 42. For the purpose of furnishing water to the citizens of Fox Chase	$50 000 00			
Increased by transfer	12,650 00			
Net appropriation to item	$62,650 00			
Bricks, lime and sand		$510 83		
Engine and boiler house and stack	$3,550 00			
Less 20 per cent	710 00			
		2,840 00		
Total		$3,350 83		$59,299 17
Item 43. For the improvement of the Roxborough Pumping Station,	$100,000 00			
Diminished by transfer	16,000 00			
Net appropriation to item	$84,000 00			
Bricks, lime and sand		$1,306 36		
2 pumping engines, at $7,000		14,000 00		
Total		$15,306 36	$193 64	$68,500 00
Item 44. For extensions, bal. Jan, 1, 1899	$4,611 63			$4,611 63
Item 45. For smoke stack, flue, boiler house and boilers at Belmont Pumping Station, bal. Jan. 1, 1899,	$25,305 00			
Diminished by transfer	880 50			
Net amount to item	$24,424 50			
Fittings for boilers		$99 50		
Seven (7) boilers, at $3,600	$25,200 00			
Less penalty	875 00			
		24,325 00		
Total		$24,424 50		

Digitized by Google

Detailed Expenditures of the Bureau for 1899—Continued.

General Appropriation.		Amount appropria'd.	Amount expended.	Amount merging.	Amount not merging
Item 46. For boiler house and boilers at the Roxborough Pumping Station, bal. Jan. 1, 1899		$30,000 00			
Bricks, lime and sand			700 00		
Six (6) boilers			20,806 50		
Stack and flue			8,487 00		
Total			$29,993 50	$6 50	
Item 47. For new pumping main from Queen Lane Pumping Station to Queen Lane Reservoir. Balance January 1st, 1899	$30,429 18				
Diminished by taansfer	15,239 90				
Net amount to item		$15,189 28			
Excavating pipe trench:					
716.93 cubic yds. rock, at 87c	$623 73				
10,228.5 cubic yds. earth, at 43c	4,398 32				
	$5,022 05				
Less 20 per cent	1,004 40		$4,017 65		
Wages, Fifth District			8,919 28		
Total			$12,936 93		$2,252 35
Item 48. For the employment of three experts relative to the improvement, filteration and extension of the water supply. Appropriation May 6, 1899	$25,000 00				
Increased by additional appropriation	1,876 59				
Net appropriation to item		$26,876 59			
Examination of water			$332 00		
Incidentals			609 83		
Maps for, and printing report			2,767 71		
Personal expenses of experts			1,057 89		
Services of assistants			3,907 02		
Service of experts			18,000 00		
Stenographer and typewriter			181 70		
Total			$26,856 15	$20 44	
Item 49. For repairs to engines; appropriation May 12, 1899		$20,400 00			
Condenser			$450 00		$19,950 00
Item 50. For improvement in West Philadelphia; Ordinance June 17 and July 12, 1898		$500,000 00			
Iron water pipe:					
1,233 30-in., 4,532,637 lbs., at 1.259c	$57,065 92				
Less 10 per cent	5,706 59		$51,359 33		
Inspecting pipe			353 05		
Wages, Second District			4,041 04		
Total			$55,753 42		$444,246 58

Digitized by Google

Detailed Expenditures of the Bureau for 1899.—Continued.

General Appropriation.	Amount appropria'd.	Amount expended.	Amount merging.	Amount not merging
Item 51. For two pumping engines, engine house and boiler house at Roxborough Pumping Station, 36-inch main from Roxborough to Reservoir, pumping engine at Roxborough High Service Station, pumping engine for Belmont High Service Station, lowering suction main Queen Lane Pumping Station, and 48-inch main on Nicetown Lane.				
Ordinance June 12th, 1899. Temporary Loan	$255,000 00			
Engine and boiler house and intake	$15,020 00			
Less 20 per cent	3,004 00	$12,016 00		
Excavating pipe trench, 5,918.7 cu. yds. at 65c.	3,847 15			
Less 20 per cent	769 42	3,077 73		
Inspecting pipe		140 65		
Iron water pipe:				
390–36-in. 2,398,449 lbs. at 1.259c	30,196 47			
240–48-in. 1,540,636 lbs. at 1.259c	21,914 86	52,111 33		
		$67,345 71		$187,654 29

RECAPITULATION.

General Appropriation.			
Balance from books, 1898	$90,345 81		
Additional appropriations	1,215,626 59		
		$1,305,972 40	
Annual appropriations		1,264,439 00	$2,570,411 40
Expended for maintenance	1,461,583 36		
Expended for extensions	222,973 90	$1,684,557 26	
Amount merging	48,353 72		
Amount not merging	786,514 02		
Amount transferred	50,986 40		
		885,854 14	2,570,411 40

Digitized by Google

The following table shows the receipts from the operations of this Bureau during several recent years, together with estimates of requirements, the amounts rendered available by appropriations, etc., and the amounts expended:

Year.	Receipts.	Estimates.	Available appropriations.	Expended.
1892	$2,634,456 02	$1,500,000 00	$2,476,628 37	$1,372,157 31
1893	2,674,275 24	2,871,800 00	3,813,973 92	2,593,390 81
1894	2,759,630 59	4,230,564 00	3,888,326 05	2,912,856 04
1895	2,829,857 17	4,385,366 00	2,616,077 32	1,897,225 20
1896	2,829,133 26	4,385,604 00	2,231,671 15	1,825,610 80
1897	2,971,357 52	4,948,379 00	1,882,628 42	1,665,153 21
1898	3,065,665 86	5,443,379 00 3,088,124 00	1,611,616 93	1,495,996 84
1899	3,123,954 20	1,691,114 00 6,324,000 00	2,570,411 40	1,684,557 26

Appropriation for 1900 ..... $1,371,625 00
Balance from 1899 ..... 786,514 02

Digitized by Google

List of Miscellaneous Receipts for the Year 1899.

Jan. 5	Delaplaine & West	6-inch pipe	$9 50
12	Zimmerman & Nixon	Stop-box	6 00
Feb. 2	J. H. Laughlin & Co	½-inch ferrule	7 13
11	University of Pennsylvania	Fire hydrant	8 96
14	United Gas Improvement Co	Fire hydrant and cutting pipe	26 03
20	H. Harris	Rent of farm, site of Cambria Basin	100 00
20	United Gas Improvement Co	Digging	36 48
Mar. 22	United Gas Improvement Co	Fire plug	28 89
22	Union Traction Co	6-inch stop	19 33
17	United Gas Improvement Co	Shut-off	1 25
Apr. 26	John T. Newbold	Stop-box	6 43
May 4	Philadelphia Market Co	3-inch stop	31 87
8	John Hevener	Six months rent of farm No. 3, site of Cambria Basin	78 50
10	United Gas Improvement Co.	Fire hydrant and pipe	48 08
13	J. F. Manley	Cutting out joint	4 45
18	Blind Asylum	Stop-box	6 43
19	John Morrison	Digging up service pipe	30 20
22	Bureau of Water	Sale of horse	40 50
22	Bureau of Water	Overdrawn warrant, No. 512	11 61
22	Bureau of Water	Bureau of Surveys, for material	57 85
June 8	Wallace & Jones	6-inch main	16 74
8	Wallace & Jones	6-inch main	8 32
8	Wallace & Jones	6-inch main	68 08
10	J. H. Lougheim & Co	6-inch main and ferrule	14 37
10	Thomas F. Dempsey	4-inch stop	2 02
10	J. H. Lougheim & Co	6-inch main	9 14
13	Matthew & Co	3-inch stop	1 86
21	Union Traction Co	6-inch stop	25 16
27	David McMahon	Shut-off	2 75
July 10	Jones and Wallace	3½ inch ferrule	5 00
18	George B. Newton & Co	6 inch main	80 89
20	David McMahon	Shut-off	2 61
21	Doyle and Doak	6 inch main	33 20
Aug. 11	Robert Forderer	Repairing stop	13 11
16	J. H. Lougheim	Repairing service attachment	10 77

Digitized by Google

List of Miscellaneous Receipts for the Year 1899.

Aug. 16	J. H. Lougheim	Repairing service attachment	$9 00
17	P. W. & B. R. R. Co	Shifting 6 inch pipe	54 93
29	H. H. Houston	6 inch main	1 75
Sept. 5	George W. Ruch	Cut-off	3 62
5	George W. Ruch	6 inch main	13 65
6	Chas. Land	Shut-off	2 75
28	Walter Stout	Fire hydrant	5 74
Oct. 10	Bureau of Water	Overdrawn warrants, Nos. 1755 and 1780	7 50
16	Wm. Achuff	12 inch supply main	42 53
18	W. W. Oliver	9 empty oil barrels	5 04
18	W. P. Queen	6 inch service main	8 14
20	Union Traction Company	2 fire hydrants	36 30
20	Union Traction Co	6 inch stop	15 25
20	Union Traction Co	8 inch stop	17 55
20	Union Traction Co	6 inch stop	13 91
20	Union Traction Co	6 inch stop	21 00
21	Henry Hitner & Sons	Old scrap iron and rope	1,742 12
26	R. Ryan	Drawing ferrule	2 13
Nov. 6	Wm. Achuff	3 service connections	9 31
9	United Gas Improvement Co	Service pipe and ferrule	1 45
9	Penna. R. R. Co	Cutting off 6 inch pipe	22 01
16	G. & H. Barnet	Fire hydrant	20 18
Nov. 23	Girard Iron and Metal Co	Cast scrap iron	1,000 00
24	Vare Bros	Labor used in repairing	4 95
24	David France	Fire hydrant	12 90
25	Bureau of Water	City warrant No. 509 and Holmesburg Prison	64 95
25	Bureau of Water	City warrant No. 3,348 and Bureau of Surveys	239 25
27	McCallum & McCallum	4-inch stop	6 75
27	John Morrison	Shut-off and 2½-inch ferrules	51 09
27	Allison Manufacturing Co	Stop-box 4-inch supply	14 15
28	J. H. Lougheim	Shut-off	3 25
Dec. 14	Edison Electric Light Co	Drawing ferrule	1 13
5	W. H. Quigg	Fire hydrant	8 68
6	M. & J. B. McHugh	2 Ferrules	3 00
	M. & J. B. McHugh	2 Ferrules	3 13

Digitized by Google

Digitized by Google

1899.	By Sc		Totals.
	On Existing Connec		
	Current. a	Delinq	
January		$6	$56,646 09
February	$221,332 82	1	240,370 16
March	200,775 43	2	221,583 05
April	317,410 58	1	352,428 02
May	1,547,994 14	3	1,581,740 15
June	65,181 70	5	86,601 54
July	32,262 10	5	70,358 19
August	99,148 50	1	130,950 69
September	25,182 95		44,455 89
October	100,183 17	1	148,533 74
November	36,990 20		67,030 69
December	47,270 40	1	123,805 99
Totals for 1899	$2,693,731 99	$31	$3,123,954 20
Totals for 1898	2,605,449 06	30	3,065,665 86
Increase	$88,282 93	$1	68,288 34
Decrease			

a "Current."—Water rents by schedule rates for the yea eptember These are due in advance, but the books are not open fo paid on Hence such rents do not appear under January. Certain s "delin- are charged only 15 per cent. of the schedule and meter rs

b "Delinquent."—Water rents by schedule rates for the mains to

c "On new connections."—Schedule rents on new connec fronting year, and the consumer is charged for that fraction only. following or 20 days before the expiration of the year, the rent char xpiration entire year. Hence, these rents on new connections were

d "By Meter."—The meter rent is 30 cents per 1,000 c for pipe "Charitable," at end of note a. The minimum meter charg the City schedule charge on a ferrule of the same size, except in mounted mum meter charge ($5 per annum) is the same as the sch quarterly, except in cases where the amount, at the end from the fraction of the annual minimum meter charge. Unpaid n twice in each year, and the delinquents are thereupon n days the water will be shut off.

Digitized by Google

List of Miscellaneous Receipts for the Year 1899.

Dec. 7	George Ruch	Drawing ferrule	2 13
7	Howard Ruch	6-inch pipe	13 92
11	John Hevener	6 months' rent, farm No. 3, site of Cambria Basin	78 50
11	J. H. Lougheim	½-inch ferrule	2 75
12	Robert Ryan	Drawing ferrule	10 50
19	M. P. Quinn	Repairing service attachment	1 22
20	Girard Estate	2 Fire hydrants	81 12
27	John Morrison	Drawing ferrules	15 62
29	D. McMahon	Private pipe	2 15
29	D. McMahon	Shutting off	15 38
29	D. McMahon	Repairing service pipe	1 35
29	John McBride	3-inch main	9 62
29	John McBride	3-inch main	12 65
29	John McBride	3-inch main	8 23
29	John McBride	3-inch main	18 17
	Total		$4,590 42

Digitized by Google

APPENDIX C

REPORT

OF THE

ASSISTANT IN CHARGE OF DISTRIBUTION

Philadelphia, January 19, 1900.

F. L. HAND, ESQ.,
Acting Chief, Bureau of Water.

DEAR SIR:—I have the honor to submit the following report on the distribution system for the year 1899:

Contrary to expectations at the beginning of the year, the average pressures on the mains in the several districts have exceeded those of the preceding year, resulting in a gratifying decrease in the number of "no water" complaints; also in a decrease in the number of complaints as to the quality of the water supplied.

The increase in the pressure on the mains below Vine street, between the Delaware and the Schuylkill rivers, averaged about four pounds.

In the northeast section of the City a part of the area north of Vine street and east of Sixth street was taken off of the East Park supply and added to the Queen Lane system, which resulted in a somewhat improved pressure in the area remaining upon the East Park supply.

The supply to the area bounded by Sixth, Broad and Vine streets and Girard avenue, also supplied from the

Digitized by Google

East Park system, was slightly better than during 1898, but additional distribution mains are needed in this section, and should be laid at once.

The Wentz Farm supply, to the upper northeast section of the City, especially above Lehigh avenue, is still inadequate for either domestic or fire purposes, and the laying of the proposed 48-inch main for the relief of this district cannot be accomplished too soon.

The lower section of the Queen Lane system, though somewhat extended in area since my last report, is amply supplied with water, except in the extreme northeast, and this locality could be relieved by the completion of the No. 3 Queen Lane supply main from Twenty-second and Huntingdon streets to Broad and Dauphin streets.

In the Tioga district the No. 4 Queen Lane supply main was extended on Hunting Park avenue, from Thirty-second to Cottage streets.

The completion of this main will enable us to increase the supply to Tioga, but to obtain entirely satisfactory results, the main should be completed in Thirty-second street to the reservoir, and should be extended from Hunting Park avenue and Cottage street to Hunting Park avenue and Germantown avenue.

At the beginning of the year the pumping machinery at Shawmont was in such a deplorable condition that it was fully expected that the higher levels of the low service district in Germantown would be almost entirely without water. The only available means for immediate relief was to endeavor to prevent the waste of water in this locality as much as possible, and for this purpose a number of men from the Sixth District were detailed to make a "house to house inspection." This work was carried on from March 16th to December 31st, with the result that during the summer months, when the consumption is of course the greatest, this section of the City had a far better

Digitized by Google

supply of water than during the corresponding period of last year.

The following data relative to this inspection are submitted:

Total number of properties inspected	17,000
Total number of re-inspections	12,090

Total number of leaky fixtures discovered and afterwards repaired:

Spigots	972
Water-closets	419
Hydrants	169
Service-pipes	68
Wash-paves	18
Stop-cocks	15
Total	1,661

Number of water-closets found turned on and wasting water, which practice has since been stopped	100	
Total number of fixtures found wasting water	1,761	
Total cost of inspections and re-inspections	$2,078	85
Average cost per property inspected		12¼
Average cost per inspection		07½
Average cost per leaky fixture found	1	17

The approximate quantity of water saved by this inspection, as based upon the waste from similar fixtures, may be conservatively stated at 1,131,370 gallons per day, which, at the cost of pumping water at Roxborough Station, per million gallons, during 1898, would amount to $5,840 for the period covered by the inspection, showing a saving, in excess of the cost of the inspection, of $3,761.15.

I had hoped to use the Pitot meters to ascertain with some degree of accuracy the reduction in the consumption in this district as a result of this house to house inspection, and requested permission to employ the necessary force to make a twenty-four hours' test, but this permission was not granted, and the only evidence of the beneficial results

Digitized by Google

accomplished was the improvement in the supply of the district, as compared with that of the summer of 1898.

The supply in the high service district in Germantown has been satisfactory throughout the year, but such has not been the case in Chestnut Hill. This section is dependent upon one pump, located at the Roxborough Auxiliary Station, and any intermission in the operation of this pump seriously affects the supply at Chestnut Hill.

The breaking of the pumping main between the Roxborough Auxiliary Station and Chestnut Hill has also been a frequent source of annoyance and short supply, serious breaks in this main having occurred no less than seven times during the past year.

This main was originally intended to supply the works at Chestnut Hill, by gravity, from the upper Roxborough reservoir, but it has been converted into a pumping main, and is subjected to 77 feet greater head than it was intended to withstand.

The pipes of this line, at the lowest levels west of the Wissahickon Creek, were laid in rock excavation, without the usual concrete foundation.

In view of these conditions, and of the frequent breaking of this main, I recommend that wrought iron bands be placed around each section of the pipe in the Wissahickon valley west of the Wissahickon creek for a distance of about 1,000 feet, and that at the same time concrete foundations be put in under each pipe.

It is unusual to find any of the mains in this City charged with electricity, but on September 26th the breaking of the Roxborough and Chestnut Hill pumping main led to the discovery that a very strong electrical current was passing over this line of pipe.

An examination was subsequently made by Mr. David R. Walker, Chief of the Electrical Bureau, who reported that the source from which the current emanated was the

Digitized by Google

Manayunk and Roxborough Incline Plane Railway Company's system, and stated that "an examination of the frag-"ments of the broken pipe failed to show the least trace of "any approach to electrolysis," and that "the trolley com-"pany has been notified to thoroughly bond around their "frogs, switches, etc., to reduce, as much as possible, any "escape of current to the City's pipes."

Owing to the breaking down of pump No. 1, at Roxborough, on August 23d, a large part of the area supplied with water from Roxborough reservoir was transferred to the Queen Lane system, and a supply which was satisfactory as to quantity was maintained throughout the balance of the year.

The supply to West Philadelphia also showed considerable improvement during the year, which was principally due to the maintenance of the water level in the reservoir at high water mark.

A new 30-inch main is now being laid from George's Hill reservoir to Thirty-eighth street and Lancaster avenue, the completion of which will insure a better distribution throughout this section of the City, and better pressures will prevail in localities where water is now obtained with difficulty on second and third floors.

New Pumping Mains.

The laying of No. 2 Queen Lane pumping main was commenced December 6th, 1898, and completed and put into service on June 26, 1899.

Previous to the laying of this main, and when the four 20-million gallon pumps at the Queen Lane Works were in service at one time, and discharging through this single line of pipe, the pump gauges showed a pressure of 121 pounds to the square inch; with but two engines pumping into one line the pressure is 106 pounds, showing a very material reduction of 12.5 per cent. in the friction head.

Digitized by Google

The laying of the 36-inch Roxborough pumping main was commenced on November 2d, 1899, and fully three-fourths of the work has been completed. The main will be finished in ample time for use in connection with the new pumps to be erected at Roxborough Station.

The following table shows the mains to be laid during the year 1900:

Street.	From	To	Distance, feet.	Size, inches.
Locust	Thirty-eighth street	Fortieth street		
Locust	Forty-second street	Forty-third st.		
Locust	Forty-fourth street	Fifty-second st.	6,150	16
Thirty-eighth	Lancaster avenue	Woodland ave.	3,650	20
Old Second	Wentz Farm Reservoir	Front street		
Front	Old Second street	Juniata street	14,300	48
Front	Juniata street	Allegheny ave.	6,750	36
Allegheny ave.	Kensington avenue	Second street	5,600	30
Second	Allegheny avenue	Lehigh avenue	2,900	30
Old Second	Wentz Farm Reservoir	Verree street	7,350	20
Oxford Pike	Verree street	Fox Chase	4,300	16

Venturi Meters.

Venturi meters were placed on the 30 and 36 inch pumping mains at Belmont works in June last, and have since been in constant operation, except for a few days when the recording apparatus on the 36 inch meter failed to work, owing to the stoppage of the time mechanism.

The following table shows the total discharge through the two meters. The first five months of the year are estimated on the discharge recorded during the early part of June, 1899, and January, 1900. For the few days when the register of the 36-inch meter failed to record, an average addition was made to compensate for the loss.

Digitized by Google

Belmont Pumpage During 1899.

Average Gallons Pumped Per Day.

Month.	Estimated.	Measured by Plunger Displacement.
January	23,562,000	30,487,276
February	25,432,000	35,757,360
March	23,936,000	33,147,840
April	24,310,000	32,846,779
May	24,684,000	32,119,616
Average	24,384,800	32,871,770

Month.	Measured by 30 and 36-inch Venturi Meters.	Measured by Plunger Displacement.
June	26,461,360	33,413,415
July	27,900,400	32,247,817
August	27,563,800	31,509,352
September	24,684,000	30,961,432
October	22,440,000	29,299,772
November	23,015,960	27,733,860
December	23,704,120	27,117,534
Average	25,109,949	30,326,170

The discharge through the Venturi meter on the 20-inch main supplying Shawmont water to the Roxborough and Manayunk districts was as follows:

Digitized by Google

Month.	Average gallons per day.	Gallons per month.
January	No record	No record
February	2,147,700	60,135,600
March	1,905,000	59,055,000
April	1,657,500	49,725,000
May	1,413,750	43,826,250
June	1,527,000	45,810,000
July	1,275,000	39,525,000
August	1,338,000	41,478,000
September	1,377,500	41,315,000
October	1,164,750	36,107,250
November	1,275,000	38,250,000
December	1,107,000	34,217,000
Average	1,471,655	44,944,126

Owing to the disuse and subsequent removal of the d'Auria pump at the Roxborough Pumping Station, the 20-inch Venturi meter on No 2 discharge main has been out of service throughout the year.

The 12-inch Venturi meter at Chestnut Hill has also been out of service during the past year, owing to the difficulty of supplying the whole of this district through so small a meter.

There are two 48-inch Venturi meters on No. 3 Frankford pumping main. The one located at Wentz Farm Reservoir should be moved to the Queen Lane Pumping Station. The one at the Frankford Pumping Station has not received proper attention, the reading of the register having been irregularly done, and no satisfactory log having been kept of the times when the register failed to record. Arrangements will be made during the coming year to have the records of this meter properly kept.

Digitized by Google

Pitot Meters.

Pitot meters were applied to a number of supply mains, in order to ascertain the quantities of water consumed in the several water districts named below. As previously stated, permission was not given for the continuance of this investigation, and the following figures are of value only as indicating the quantity of water consumed in the localities mentioned at the times stated:

Date.	Water District.	Consumption in gallons per 24 hours.
May 4, 1899.....	South of South street, between the Delaware and Schuylkill rivers.....	29,785,000
May 4, 1899.....	Between South and Vine streets, Delaware and Schuylkill rivers.....	34,740,900
May 26, 1899.....	E. P. Water, E. of Broad street, and N. of Vine street.....	56,059,000
April 24, 1899.....	Germantown and Chestnut Hill, High Service.....	3,362,000
April 24, 1899.....	Germantown and Chestnut Hill, Low Service.....	9,635,000
June 10, 1899.....	Germantown and Chestnut Hill, High Service.....	4,312,500
June 10, 1899.....	Germantown and Chestnut Hill, Low Service.....	9,642,500

Meters for Private Supplies.

The appropriation of $1,000 for the purchase of new meters was soon exhausted. Owing to the lack of an appropriation for the purchase of new parts with which to replace those worn out, few of the old meters could be repaired, with the result that many applicants for meters were denied the privilege granted by ordinance of Councils of paying for water at meter rates. For the same reason the Bureau has been unable to comply in all cases with the ordinance which requires that City water shall be charged for at meter rates on all premises where a consumer is supplied from both City and private sources.

As a result of inability to promptly repair meters which have broken down, it is necessary to average the charges

Digitized by Google

for water rents according to the amount charged for a corresponding period during the preceding year. As a consumer is well aware that a broken down meter does not register, there is no restriction in the quantity of water used in such cases, and the City is often a loser, and is, moreover, at a great disadvantage in the settlement of claims for a reduction of amounts charged on meter bills.

Adequate provision should be made for the purchase of a sufficient number of meters to enable the Bureau to comply with the provisions of the ordinances of Councils; also for the keeping in thorough repair of the meters now in use.

During the year only ninety (90) meters were set in new locations. In cases where a meter was defective, or where a different size or style was required, one hundred and thirty (130) meters were exchanged. In two hundred and six (206) cases the use of water by meter was discontinued and the meters removed.

The total number of meters in use December 31, 1899, was one thousand three hundred and forty-four (1,344), being a decrease in the number in use on January 1, 1900, as compared with the previous year of one hundred and thirty-seven (137).

Prior to this year all meter records, etc., were kept at the meter shop, 918 Cherry street, and the office of the Bureau was almost without data for the inspection and supervision of this branch of the service.

On March 2d last Mr. William J. Patrick, formerly clerk at the meter shop, was transferred to the distribution office, and now has charge of the meter records. The benefits of the change are already apparent, and it is expected that this work will soon be as systematically organized as is the work of the several purveyor's districts.

Digitized by Google

District Yards.

On March 20th the Second District storage yard was moved from South street and Meadland avenue to Thirtieth and South streets. Both of the properties mentioned, with others adjacent to them, have been transferred to the University of Pennsylvania, so that the occupancy of the present situation is by suffrance only.

I can, therefore, but repeat the suggestion made in my report of 1897, that a suitable storage yard be purchased for the use of the Second District. The Third, Fifth and Sixth Districts also require storage yards, which should be purchased immediately, while suitable sites are yet available for the purpose.

Mains.

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

New Work.

Service mains laid	97,656 feet.
Supply mains laid	9,891 feet.
Pumping mains laid	7,833 feet.
Connections, etc	13,413 feet.
Total	128,793 feet.

Digitized by Google

Comparison of Conditions Relating to the Distribution. 1898—1899.

	1898.	1899.	Increase.	Decrease.
Service mains, 4 inches to 16 inches	150,264	97,656	.....	52,608
Supply mains, 10 inches to 48 inches	18,896	9,891	.....	9,005
Pumping mains, 20 inches to 48 inches	2,387	7,833	5,446	
Connections and miscellaneous work	11,281	13,413	2,132	
Totals in feet	182,828	128,793	7,578	61,613
Relaid, 4 inches to 48 inches	38,555	86,727	48,172	
Miscellaneous repairs, 3 inches to 48 inches	5,796	4,408	.....	1,388
Taken up, 3 inches to 48 inches	34,793	69,880	35,087	
Lowered, raised, shifted, 4 inches to 48 inches.	6,570	3,773	.....	2,797
Totals in feet	85,714	164,788	83,259	4,185
Pipe cut off and abandoned, 3 ins. to 20 ins	10,583	20,798	10,215	

Meters.

	1898.	1899.	Increase.	Decrease.
Meters in use	1,481	1,344	.....	137

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

	1898	1899	Increase.	Decrease.
Dwellings with water	225,958	232,334	6,376	
Dwellings without water	12,605	12,264	.....	341
Water-closets	202,399	216,850	14,451	
Baths	161,463	167,464	6,001	
Wash-paves	92,398	92,744	346	
Basins and sinks	85,401	89,826	4,425	
Urinals	4,892	5,012	120	

Digitized by Google

Repairs.

Mains relaid	86,727 feet.	
Repairs and connections	4,408 feet.	
		91,135 feet.
Old pipe taken up	69,880 feet.	
Pipes lowered, raised and shifted	3,773 feet.	
		73,653 feet.
Total		164,788 feet.

Abandoned.

Three-inch	7,004 feet.
Four-inch	11,082 feet.
Six-inch	2,532 feet.
Eight-inch	107 feet.
Ten-inch	23 feet.
Twelve-inch	17 feet.
Twenty-inch	33 feet.
Total	20,798 feet.

The total quantity of pipe handled, for all purposes, throughout the year, was 293,581 feet, weighing 16,997,854 pounds.

The total quantity of new pipe laid was 128,793 feet, or 24.39 miles, making, in addition to that previously laid, 1,301.66 miles now in use.

Fire Hydrants.

New style fire hydrants in new locations	711
Old style fire hydrants in new locations	0
New style fire hydrants in place of old style	188
Old style fire hydrants in place of other of the old style	3
Total	902
New style fire hydrants taken out	63
Old style fire hydrants taken out	99
Total	162

The total number of new style fire hydrants added to the distribution system was 549, and the total number in

Digitized by Google

use December 31, 1899, was 12,170, of which 740 are of the old style and 11,430, or 93.9 per cent., are of the new pattern.

Drills for Attachments.

The following new attachments were made to the mains:

One-half inch	5,232 area of openings	1,027 square inches
Five-eighth inch	337 area of openings	103 square inches
Three-quarter inch	132 area of openings	58 square inches
One inch	110 area of openings	86 square inches
One and one-quarter inches	16 area of openings	20 square inches
One and one-half inches	31 area of openings	55 square inches
Two inches	73 area of openings	229 square inches
Three inches	7 area of openings	49 square inches
Four inches	14 area of openings	176 square inches
Total	5,952 area of openings	1,803 square inches

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 Captain Theodore S. S. Baker, Chief Pipe Inspector, relative to the inspection of pipe and other castings during the year, also accompanies this report.

Respectfully submitted,

ALLEN J. FULLER,
Assistant in Charge of Distribution.

Digitized by Google

Philadelphia, January 26, 1900.

A. J. FULLER, ESQ.,
Assistant in Charge of Distribution.

DEAR SIR:—I have the honor to submit the following report of inspections of pipe and special castings made with the assistance of two assistants and one temporary assistant, during the year 1899, for the Department of Public Works, Bureau of Water, at the following named foundries:

Donaldson Iron Co.
McNeal Pipe and Foundry Co.
Reading Foundry Co., Limited.
Camden Iron Works.
J. Howard Bing's Foundry.
Greger Manufacturing Co.

The quantities of castings inspected, rejected, cancelled and accepted are given in list attached hereto.

Yours respectfully,

THEO. S. S. BAKER,
Chief Inspector.

Digitized by Google

Schedule of Pipe and Special Castings Rejected and Accepted during the Year 1899.

	Manufacturer.	Size—Inches.		Ordered.	Inspected.	Rejected.	Cancelled.	Accepted.	
		Pipe.	Special Castings.					Quantity.	Cost.
Bureau of Water.	Donaldson Iron Co., Emaus, Pa.	6		15,000	17,041	2,041		15,000	$44,615 17
		10		1,050	1,163	111	1	1,049	5,762 52
		12		2,005	2,322	317		2,005	14,606 13
		16		100	108	8		100	1,083 12
		20		200	230	30		200	2,946 35
	Camden Iron Works, Camden, N. J.	8		1,046	1,201	155		1,046	4,492 49
		30		1,375	1,490	115		1,375	64,075 64
		36		390	412	21		390	30,196 47
		48		240	262	22		240	21,914 86
	Donaldson Iron Co.		3 to 18	3,675	4,039	364		3,675	7,566 38
	Reading Foundry Co., Ltd., Reading, Pa.		20 to 48	127	125	3	5	122	6,616 56
	J. Howard Bing, Philadelphia.		Stop Boxes.	532	553	21		532	3,675 88
			Covers.	532	553	21		532	
	Gregor Manufacturing Co., Philadelphia.		Frames.	600	632	72	29	571	1,028 44
			Covers.	650	643	72	89	561	
			Mch. work.						1,034 00
	Total.			27,522	30,774	3,373	124	27,398	209,614 01

Digitized by Google

Schedule of Pipe and Special Castings Rejected and Accepted—Continued.

	Manufacturer.	Size—Inches.		Ordered.	Inspected.	Rejected.	Cancelled.	Accepted.	
		Pipe.	Special Castings.					Quantity.	Cost.
Bureau of Survey, account of Penna. Ave. Subway	McNeal Pipe and Foundry Co., Burlington, N. J.	.....	30 to 48	12	12	.....	.....	12	$993 63
For Contractors (Private).	Donaldson Iron Co., Emaus, Pa.	4	....	30	36	6	.....	30	$81 75
	Grand Total	.....	.....	27,564	30,822	3,379	124	27,440	$210,689 39

Digitized by Google

SERVICE AND SUPPLY MAINS LAID DURING 1899.

First District.

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

	Purposes for which used.		Sizes in inches. 3	4	6	8	10	12	16	Total in feet and pounds.
New pipe or feet added.	Service mains				5,739		1,360	470		7,569
	Supply mains								1,762	1,762
	Supply main connections						21			21
	Fire hydrant connections				871					871
	Supply connections (private)			7						7
	Total	Feet		7	6,610		1 381	470	1,762	10 230
		Pounds		133	218,130		75,955	33,840	193,820	521,878
Pipe used, but adding nothing to feet in the ground.	Pipe relaid				3,011			2,584		5,595
	Repairs general		4		375	13	6	7		405
	Pipe taken up		658	3,758	1,212					5,628
	Total	Feet	662	3,758	4,598	13	6	2,591		11,628
		Pounds	9,930	71,402	151,734	546	330	186,552		420,494
Total handled		Feet	662	3,765	11,208	13	1,387	3,061	1,762	21,858
		Pounds	9,930	71,535	369,864	546	76,285	220,392	193,820	942,372
Pipe cut off and abandoned				48	87					135

Digitized by Google

Second District.

Comprising the 5th, 6th, 7th, 8th, 9th, 10th, 24th, 27th, 34th and 40th 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		.....	.....	28,357	4,361	3,254	2,523	60	.....	.....	38,555
Supply mains		.....	.....	.....	.....	.....	.....	.....	125	2,044	2,169
Pumping mains		.....	.....	.....	.....	.....	.....	.....	84	.....	84
Supply main connections		.....	.....	.....	.....	.....	.....	.....	24	.....	24
Pumping main connections		.....	.....	.....	.....	.....	.....	.....	55	.....	55
Bye-pass connections		.....	.....	.....	.....	.....	.....	36	.....	.....	36
Fire hydrant connections		.....	.....	2,948	.....	.....	.....	.....	.....	.....	2,948
Fire connections (private)		.....	29	170	.....	.....	.....	.....	.....	.....	199
Supply connections (private)		51	339	329	.....	.....	.....	.....	.....	.....	719
Drains		.....	.....	360	362	206	.....	.....	.....	.....	928
Total	Feet	51	368	32,164	4,723	3,460	2,523	96	288	2,044	45,717
	Pounds	765	6,992	1,061,412	198,366	190,300	181,656	10,560	45,792	678,608	2,374,451
Pipe used, but adding nothing to feet in ground.											
Pipe relaid		.....	.....	17,755	107	1,520	520	1,050	.....	.....	20,952
Repairs general		.....	138	1,050	86	100	109	.....	21	.....	1,504
Pipe taken up		4,696	4,897	2,618	154	.....	578	.....	1,170	.....	14,113
Pipe lowered		.....	100	473	.....	.....	.....	.....	.....	.....	573
Pipe shifted		.....	.....	39	.....	.....	.....	.....	.....	.....	39
Total	Feet	4,696	5,135	21,935	347	1,620	1,207	1,050	1,191	.....	37,181
	Pounds	70,440	97,565	723,855	14,574	89,100	86,904	115,500	189,369	.....	1,387,307
Total handled	Feet	4,747	5,503	54,099	5,070	5,080	3,730	1,146	1,479	2,044	82,898
	Pounds	71,205	104,557	1,785,267	212,940	279,400	268,560	126,060	235,161	678,608	3,761,758
Pipe cut off and abandoned		6,693	1,724	1,073	107	.....	17	.....	.....	.....	9,614

Digitized by Google

Third District.

Comprising the 11th, 12th, 16th, 18th, 19th, 23d, 25th, and part of 22d, 33d and 37th Wards.

	Purposes for which used.		Size in Inches. 3	4	6	8	10	12	48	Total in feet and pounds.
New Pipe or feet added.	Service mains				15,459	3,350	380	3,353		22,542
	Supply mains						2,396			2,396
	Service main connections				17					17
	Supply main connections					19				19
	Service supply connections			176						176
	Fire hydrant connections				2,051					2,051
	Fire connections (private)				24					24
	Supply connections (private)			97	26					123
	Total	Feet		273	17,577	3,369	2,776	3,353		27,348
		Pounds		5,187	580,041	141,498	152,680	241,416		1,120,822
Pipe used but adding nothing to feet in the ground.	Pipes relaid				29,611	77	168	50		29,906
	Repairs, general		3	16	695	20	17	4	25	780
	Pipe taken up			28,549	497	23				29,069
	Pipe lowered				657					657
	Pipe raised				1,058					1,058
	Pipe shifted				16					16
	Total	Feet	3	28,565	32,534	120	185	54	25	61,486
		Pounds	45	542,735	1,073,622	5,040	10,175	3,888	14,625	1,650,130
	Total handled	Feet	3	28,838	50,111	3,489	2,961	3,407	25	88,834
		Pounds	45	547,922	1,653,663	146,538	162,855	245,304	14,625	2,770,952
	Pipe cut off and abandoned			453	707					1,160

Digitized by Google

FOURTH DISTRICT.

Comprising the 13th, 14th, 15th, 20th, 28th, 29th, 32d and part of the 37th and 38th Wards.

	Purposes for which used.	Size in Inches. 3	4	6	8	10	12	20	30	36	48	Total in feet and pounds.
New pipe or feet added.	Service mains	.....	75	7,263	2,619	.....	1,010	.....	.....	.....	.....	10,967
	Service main connections	.....	.....	.....	12	.....	.....	.....	.....	.....	.....	12
	Bye-pass connections	.....	.....	.....	27	.....	.....	.....	.....	.....	.....	27
	Service supply connections	.....	349	.....	.....	.....	.....	.....	.....	.....	.....	349
	Fire hydrant connections	.....	.....	2,013	.....	.....	.....	.....	.....	.....	.....	2,013
	Supply connections (private)	89	81	.....	383	.....	.....	.....	.....	.....	.....	553
	Supply connections laid to curb	.....	29	.....	.....	.....	.....	.....	.....	.....	.....	29
	Total — Feet	89	534	9,276	3,041	.....	1,010	.....	.....	.....	.....	13,960
	Total — Pounds	1,335	10,146	306,108	127,722	.....	72,720	.....	.....	.....	.....	518,031
Pipe used, but adding nothing to feet in the ground.	Pipe relaid	.....	.....	21,224	921	38	.....	153	38	.....	222	22,596
	Repairs, general	.....	14	995	13	57	10	26	51	.....	9	1,175
	Pipe taken up	467	18,641	1,181	.....	32	.....	116	.....	187	226	20,850
	Pipe lowered	.....	.....	412	.....	500	.....	.....	.....	.....	.....	912
	Total — Feet	467	18,655	23,812	934	627	10	295	89	187	457	45,533
	Total — Pounds	7,005	354,445	785,796	39,228	34,485	720	46,905	29,548	78,914	267,345	1,644,391
	Total handled — Feet	556	19,189	33,088	3,975	627	1,020	295	89	187	457	59,483
	Total handled — Pounds	8,340	364,591	1,091,904	166,950	34,485	73,440	46,905	29,548	78,914	267,345	2,162,422
	Pipe cut off and abandoned	311	1,151	624	.....	23	.....	33	.....	.....	.....	2,142

Digitized by Google

Fifth District.

Comprising the Twenty-first and part of the Thirty-eighth Wards.

	Purposes for which used.	Size in Inches.									Total in feet and pounds.
		4	6	8	12	16	20	30	36	48	
New pipe or feet added.	Service mains	.....	973	.....	8	.....	.....	.....	.....	.....	981
	Supply mains	.....	.....	.....	.....	.....	.....	.....	.....	2,327	2,327
	Pumping mains	.....	.....	.....	.....	.....	.....	.....	2,488	5,311	7,749
	Pumping main connections	.....	.....	.....	.....	28	.....	.....	.....	133	161
	Bye pass connections	.....	16	.....	.....	.....	.....	.....	.....	.....	16
	Fire hydrant connections	.....	57	.....	.....	.....	.....	.....	.....	.....	57
	Supply connections (private)	79	.....	.....	.....	.....	.....	.....	.....	.....	79
	Drains	.....	204	38	.....	.....	.....	.....	.....	.....	242
	Total Feet	79	1,250	38	8	28	.....	.....	2,488	7,771	11, 12
	Total Pounds	1,501	41,250	1,596	576	3,080	.....	.....	1,028,836	4,546,035	5,622,874
Pipe used, but adding nothing to feet in the ground.	Pipe relaid	4	34	.....	.....	.....	.....	.....	.....	.....	38
	Repairs general	4	234	.....	17	.....	13	70	.....	14	352
	Pipe taken up	76	19	.....	.....	.....	.....	.....	.....	.....	95
	Pipe lowered	.....	120	.....	.....	.....	.....	.....	.....	.....	120
	Pipe shifted	.....	.....	.....	104	.....	.....	.....	.....	.....	104
	Total Feet	84	407	.....	121	.....	13	70	.....	14	709
	Total Pounds	1,596	13,431	.....	8,712	.....	2,067	23,240	.....	8,190	57,236
	Total handled Feet	163	1,657	38	129	28	13	70	2,488	7,785	12,321
	Total handled Pounds	3,097	54,681	1,596	9,288	3,080	2,067	23,240	1,028,836	4,554,225	5,680,110

Digitized by Google

SIXTH DISTRICT.

Comprising Parts of the 22d, 33d, 37th, and 38th Wards

	Purposes for which Used.	Size in Inches. 3	4	6	8	10	12	16	20	48	Total in Feet and Pounds.
New pipe or feet added.	Service mains			14,751	803	1,488					17,042
	Supply mains									1,237	1,237
	Supply main connections						16				16
	Pumping main connections					15					15
	Bye-pass connections			185			58				243
	Service supply connections		20								20
	Fire hydrant connections			1,314							1,314
	Fire connections (private)		28								28
	Drains			21							21
	Total Feet		48	16,271	803	1,503	74			1,237	19,936
	Total Pounds		912	536,943	33,726	82,665	5,328			723,645	1,383,219
Pipe used, but adding nothing to feet in the ground.	Pipe relaid			5,590	2,050						7,640
	Repairs, general	3		140		12	35	1	1		192
	Pipe taken up		79	46							125
	Pipe lowered			150							150
	Pipe shifted						144				144
	Total Feet	3	79	5,926	2,050	12	179	1	1		8,251
	Total Pounds	45	1,501	195,558	86,100	660	12,888	110	159		297,021
Total handled	Feet	3	127	22,197	2,853	1,515	253	1	1	1,237	28,187
	Pounds	45	2,413	732,501	119,826	83,325	18,216	110	159	723,645	1,680,240
Pipe cut off and abandoned			7,706	41							7,747

Digitized by Google

Pipe cut off and abandoned.	7,004	11,082	2,532	107	28	17	.....	33	.....	.....	.....	20,798	

Digitized by Google

Purposes for which Used	
New pipe or feet added.	
Service mains	
Supply mains	
Pumping mains	
Service main connections	
Supply main connections	
Pumping main connections	
Bye-pass connections	
Service supply connections	
Fire-hydrant connections	
Fire connections private)	
Supply connections (private)	
Supply connections laid to curb	
Drains	
Total — Feet	3
Total — Pounds	5
Pipe used but adding nothing to feet in the ground.	
Pipe relaid	7
Repairs general	8
Pipe taken up	0
Pipe lowered	12
Pipe raised	58
Pipe shifted	03
Total — Feet	788
Total — Pounds	579
Total handled — Feet	581
Total handled — Pounds	854
Pipe cut off and abandoned	798

Digitized by Google

Recapitulation by Districts.

	Districts.	Size in Inches. 3	4	6	8	10	12	16	20	30	36	48	Feet.	Pounds.
New pipe or feet added.	First	.....	7	6,610	.....	1,381	470	1,762	.....	.....	.....	.....	10,230	521,878
	Second	51	368	32,164	4,723	3,460	2,523	96	288	2,044	.....	.....	45,717	2,374,451
	Third	.....	273	17,577	3,369	2,776	3,353	.....	.....	.....	.....	.....	27,347	1,120,822
	Fourth	89	534	9,276	3,041	.....	1,010	.....	.....	.....	.....	.....	13,950	518,031
	Fifth	.....	79	1,250	38	.....	8	28	.....	.....	2,438	7,771	11,612	5,622,874
	Sixth	.....	48	16,271	803	1,503	74	.....	.....	.....	.....	1,237	19,936	1,383,219
	Total Feet	140	1,309	83,148	11,974	9,120	7,438	1,896	288	2,044	2,438	9,008	128,793	
	Total Pounds	2,100	24,871	2,743,884	502,908	501,600	535,536	207,460	45,792	678,608	1,028,836	5,269,680	.....	11,511,275
Pipe used, but adding nothing to feet in the ground.	First	662	3,758	4,598	13	6	2,591	.....	.....	.....	.....	.....	11,628	420,494
	Second	4,696	5,135	21,935	347	1,620	1,207	1,050	1,191	.....	.....	.....	37,181	1,387,307
	Third	3	28,565	32,534	120	185	54	.....	.....	.....	.....	25	61,486	1,650,130
	Fourth	467	18,655	23,812	934	627	10	.....	295	89	187	457	45,533	1,644,391
	Fifth	.....	84	407	.....	.....	121	.....	13	70	....	14	709	57,236
	Sixth	3	79	5,926	2,050	12	179	1	1	.....	.....	.....	8,251	297,021
	Total Feet	5,831	56,276	89,212	3,464	2,450	4,162	1,051	1,500	159	187	496	164,788	
	Total Pounds	87,465	1,069,214	2,943,996	145,488	134,750	299,664	115 610	238,500	52,788	78,914	290,160	.....	5,456,579
Total handled	Feet	5,971	57,585	172,360	15,438	11,570	11,600	2,937	1,788	2.203	2,625	9,504	293,581	
	Pounds	89,565	1,094,115	5,687,880	648,396	636,350	835,200	323,070	284,292	731,396	1,107,750	5,559,840	.....	16,997,854
Pipe cut off and abandoned.		7,004	11,082	2,532	107	23	17	.....	33	.....	.....	.....	20,798	

Digitized by Google

Alterations to Water Pipes on line of Pennsylvania Avenue Subway.

Street.	Location.	Pipe. Size.	Pipe. Feet.
	Service Mains Relaid.		
Callowhill street,	from 5 feet 3 inches east of east house line of Thirteenth street, west	10	38
Thirteenth street,	from north house line of Carlton street, north	6	35
Thirteenth street,	from south house line of Callowhill street to 29 feet north of north house line of Hamilton street	6	606
	Service Main.		
Bride place,	from 15 feet 6 inches north of south house line of Hamilton street, north	4	15
Prescott place,	from 15 feet 6 inches north of south house line of Hamilton street, north	4	15
	Service Main Relaid.		
Hamilton street,	from centre of Thirteenth street, west	8	302
	Service Main Relaid across Tunnel.		
Sixteenth street,	from 187 feet 6 inches north of north house line of Callowhill street to 10 feet north of north house line of Pennsylvania avenue	6	109
	Supply Main Relaid across Tunnel.		
Sixteenth street, east side,	from 171 feet north of north house line of Callowhill street to 47 feet 9 inches north of north house line of Pennsylvania avenue	20	153
	Service Main.		
Pennsylvania avenue, north side,	from dead end 100 feet east of east house line of Sixteenth street, west, to connect	6	108
	Service Main Relaid under Subway.		
Seventeenth street,	from 158 feet north of north house line of Callowhill street to 10 feet 7 inches north of north house line of Pennsylvania avenue	6	165
	Supply Main Relaid over Tunnel.		
Green street,	from 128 feet 3 inches west of west house line of Twenty-fourth street, west, across tunnel	30 48	18 79
Fairmount avenue,	from 178 feet 6 inches west of west house line of Twenty-fifth street, west, across tunnel	30 48	19 143
	Supply Connections—Private.		
Hamilton street,	south side, 68 feet 6 inches west of west house line of Twenty-first street, for Philadelphia & Reading Railroad tank	4	40
Hamilton street,	south side, 98 feet 6 inches west of west house line of Twenty-first street, for Philadelphia & Reading Railroad tank	4	41
Twenty-first street,	in Railroad yard of Subway, for water columns	8	345

Digitized by Google

Total Feet of Pipe in Use December 31, 1899.

Size in inches.	Total in Use Dec. 31, 1898	Extensions and Relays During 1899.		Total.	Deductions During 1899.			Total in Use Dec. 31, 1899.
		Laid.	Relaid.		Taken up.	Abandoned.	Total.	
1	175	.....	.....	.....	.....	.....	.....	175
1½	3,566	.....	.....	.....	.....	.....	.....	3,566
2	3,855	.....	.....	.....	.....	.....	.....	3,855
3	100,301	140	.....	140	5,821	7,004	12,825	87,616
4	296,216	1,309	4	1,313	56,000	11,082	67,082	230,447
6	4,593,163	83,148	77,225	160,373	5,573	2,532	8,105	4,745,431
8	219,508	11,974	3,155	15,129	177	107	284	234,353
10	368,879	9,120	1,726	10,846	32	23	55	379,670
12	389,337	7,488	3,154	10,592	578	17	595	399,334
16	111,764	1,886	1,050	2,936	.....	.....	.....	114,700
18	16,085	.....	.....	.....	.....	.....	.....	16,085
20	217,220	288	153	441	1,286	33	1,319	216,342
22	606	.....	.....	.....	.....	.....	.....	606
23	27	.....	.....	.....	.....	.....	.....	27
24	2,696	.....	.....	.....	.....	.....	.....	2,696
30	208,076	2,044	38	2,082	.....	.....	.....	210,158
36	72,641	2,438	.....	2,438	187	.....	187	74,892
48	143,836	9,008	222	9,230	226	.....	226	152,840
Total..	6,747,951	128,793	86,727	215,520	69,880	20,798	90,678	6,872,792

Digitized by Google

BROKEN MAINS.

Breaks for which no Special Reason could be assigned occurred in the following named Mains.

Districts.	Size in Inches.									Total.
	3	4	6	8	10	12	20	30	48	
First	.....	.....	1	.....	.....	.....	.....	.....	.....	1
Second	2	.....	6	.....	.....	1	1	.....	.....	10
Third	.....	2	12	2	.....	.....	1	.....	2	19
Fourth	.....	4	10	.....	.....	.....	.....	.....	.....	14
Fifth	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sixth	1	1	7	1	1	.....	.....	2	.....	13
Total	3	7	36	3	1	1	2	2	2	57

The following named breaks were caused by sewer contractors and street cleaners in their rough usage of fire hydrants, by water freezing in the pipes and by various other causes.

Districts.	Size in Inches.							Total.
	3	4	6	10	12	20	30	
First	1	.....	2	.....	.....	.....	.....	3
Second	2	3	16	3	.....	.....	.....	24
Third	.....	1	3	.....	.....	.....	.....	4
Fourth	.....	.....	2	.....	.....	.....	.....	2
Fifth	.....	1	5	.....	1	2	6	15
Sixth	.....	1	2	.....	.....	.....	.....	3
Total	3	6	30	3	1	2	6	51

Digitized by Google

Recapitulation of Fire Hydrants Set, Renewed and Removed.

	Districts.	Style.				Total.
		O. S.	No. 1.	No. 2.	No. 3.	
Set.	First	.....	75	1	.....	76
	Second	.....	192	13	.....	205
	Third	.....	173	2	.....	175
	Fourth	.....	122	43	.....	165
	Fifth	.....	3	.....	.....	3
	Sixth	.....	82	5	.....	87
	Total	.....	647	64	.....	711
Renewed.	First	.....	18	.....	.....	18
	Second	3	60	13	.....	76
	Third	.....	14	3	.....	17
	Fourth	.....	4	4	.....	8
	Fifth	.....	20	.....	.....	20
	Sixth	.....	52	.....	.....	52
	Total	3	168	20	.....	191
	Total new hydrants	3	815	84	.....	902
Removed.	First	8	.....	4	1	13
	Second	39	6	7	4	56
	Third	1	4	3	11	19
	Fourth	38	2	6	10	56
	Fifth	1	1	.....	.....	2
	Sixth	12	3	.....	1	16
	Total	99	16	20	27	162
	Total added during 1899	.....	.....	.....	.....	549

Digitized by Google

Fire Hydrants by Wards.

Wards.	Style.						Total.
	O. S.	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	
First	7	194	68	8	.....	.....	277
Second	5	113	92	16	.....	.....	226
Third	4	73	43	6	.....	.....	126
Fourth	1	62	32	14	.....	.....	109
Fifth	22	100	52	11	.....	.....	185
Sixth	11	71	44	12	.....	.....	138
Seventh	10	131	83	8	.....	1	233
Eighth	11	106	99	6	.....	1	223
Ninth	.....	128	69	6	.....	1	204
Tenth	.....	106	66	3	.....	4	179
Eleventh	6	69	26	1	.....	.....	102
Twelfth	7	60	29	5	.....	.....	101
Thirteenth	29	53	61	9	.....	.....	152
Fourteenth	.....	81	88	.....	.....	.....	169
Fifteenth	9	201	177	10	1	2	400
Sixteenth	2	76	41	3	1	.....	123
Seventeenth	12	79	31	.....	.....	.....	122
Eighteenth	15	153	60	8	.....	.....	236
Nineteenth	35	304	123	2	.....	.....	464
Twentieth	30	116	126	1	.....	.....	273
Twenty-first	98	207	78	3	.....	.....	386
Twenty-second	109	911	251	33	.....	.....	1,304
Twenty-third	38	286	81	1	.....	.....	406
Twenty-fourth	70	252	125	16	.....	.....	463
Twenty-fifth	13	423	132	.....	.....	.....	568
Twenty-sixth	2	202	124	14	.....	.....	342
Twenty-seventh	47	270	91	6	.....	1	415
Twenty-eighth	1	133	123	22	.....	.....	279
Twenty-ninth	28	178	180	12	.....	1	399
Thirtieth	6	111	112	6	.....	.....	235
Thirty-first	.....	200	71	6	.....	.....	277
Thirty-second	11	120	86	11	.....	1	229
Thirty-third	24	500	184	20	1	.....	729

Digitized by Google

Fire Hydrants by Wards—Continued.

Wards.	Style.						Total.
	O. S.	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	
Thirty-fourth	32	396	68	12	...	1	509
Thirty-fifth	...	76	12	...	...	...	88
Thirty-sixth	12	225	101	29	...	...	367
Thirty-seventh	5	86	76	6	...	...	173
Thirty-eighth	20	313	103	9	...	...	445
Thirty-ninth	1	193	90	7	...	...	291
Fortieth	7	173	41	2	...	...	223
Total	740	7,531	3,539	344	3	13	12,170

Digitized by Google

Statement of the Number of Fire Hydrants by Districts and Wards during 1899, and total previous thereto.

	First District.									Second District.											Third District.															Fourth District.									Fifth District.			Sixth District.				Total.
	Wards.								Total.	Wards.										Total.	Wards.															Total.	Wards.								Total.	Wds		Total.	Wards.			Total.	
	1	2	3	4	26	30	36	39		5	6	7	8	9	10	24	27	34	40		11	12	16	17	18	19	22	23	25	31	33	35		13	14	15	20	28	29	32	37	38		21	38		22	33	38		
Prior to 1899.....	...	...	...	...	...	...	..	...	1,951	...	...	..	...	...	...	...	...	...	...	2,590	...	...	...	...	...	...	...	...	...	...	...	2,952	...	...	...	...	...	...	...	...	2,058	...	...	466	...	...	...	1,604	11,621
During 1899.....	9	12	2	...	15	2	28	8	76	4	4	28	5	5	9	47	50	37	16	205	1	10	9	2	13	30	6	...	32	26	36	10	175	8	14	29	11	16	39	21	14	13	165	1	2	3	70	5	12	87	711
Total.....	...	...	...	...	...	...	...	...	2,027	...	...	...	...	...	...	...	...	...	...	2,795	...	...	...	...	...	...	...	...	...	...	...	3,127	...	...	...	...	...	...	...	...	2,223		...	469	...	...	..	1,691	12,332
Taken out, 1899....	2	3	1	...	...	3	3	1	13	3	1	5	2	1	...	25	16	3	...	56	...	3	1	2	2	3	...	...	4	1	3	...	19	5	1	6	7	3	20	9	4	1	56	2	...	2	12	1	3	16	162
Total in city.....	...	...	...	...	...	...	...	...	2,014	...	...	...	...	...	...	...	...	...	...	2,739	...	...	...	...	...	...	..	..	...	...	...	3,108	...	...	...	...	...	...	...	...	2,167	...	...	467	...	...	...	1,675	12,170

Number of attachments for fire purposes previously reported..... 661

Made during 1899.....
- **First District..... —**
- **Second District..... 4**
- **Third District..... 1**
- **Fourth District..... —**
- **Fifth District..... —**
- **Sixth District..... 1**

Total..... 667

Digitized by Google

Fire Hydrants by Purveyors' Districts.

Districts.	Style.						Total.
	O. S.	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	
First	85	1,183	693	103	.....	.....	2,014
Second	204	1,782	709	85	.....	9	2,739
Third	154	2,154	757	41	2	.....	3,108
Fourth	121	1,024	955	62	1	4	2,167
Fifth	100	283	80	4	.....	.....	467
Sixth	126	1,155	345	49	.....	.....	1,675
Total	740	7,531	3,539	344	3	13	12,170

Digitized by Google

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 PERMITS.							WORK DONE WITHOUT PERMITS.				
	Sizes.										Reamed for larger attachments.	Re-driven.	Discontinued.	Transfer.	Repairs.			Drawn.				
	½-inch.	⅝-inch.	¾-inch.	1-inch.	1¼-inch.	1½-inch.	2-inch.	3-inch.	4-inch.	Total.					Not drawn.	Drawn and re-driven.	Total.	Discontinued and abandoned.	Delinquent.	Leak.	Total.	Drawn and re-driven.
First	719	13	15	12	....	6	6	1	.....	772	4	175	18	.....	.....	27	224	5	.....	164	169	.....
Second	1,634	126	52	29	7	7	30	.....	.....	1,885	90	131	237	13	.....	93	564	43	2	146	191	1,096
Third	1,409	20	31	39	6	11	17	2	13	1,548	.....	72	40	2	.....	89	203	157	3	175	335	4,210
Fourth	898	58	15	16	2	4	9	4	.....	1,006	38	125	28	.....	1	149	341	31	73	135	239	1,474
Fifth	117	3	3	3	.....	1	2	.....	.....	129	7	18	2	.....	1	21	49	1	.....	.....	1	11
Sixth	455	117	16	11	1	2	9	.....	1	612	23	43	22	109	19	.....	216	1	.....	.....	1	.....
Total	5,232	337	132	110	16	31	73	7	14	5,952	162	564	347	124	21	379	1,597	238	78	620	936	6,791

Digitized by Google

Permits Issued During the Year 1899.

Aquaria	1	Ice cream saloons	14
Bakeries	24	Lawn sprinklers	23
Barber shops	141	Laundries	78
Bars	61	Laboratories	1
Basins and sinks in dwellings	4,529	Machines for scouring and rinsing	19
Basins and sinks in offices and stores	277	Milk houses	28
Baths in dwellings	6,288	Motors, beer	66
Baths in hotels, etc	24	Motors, organ	12
Baths, shower	5	Photograph galleries	1
Bidets	3	Pantry sinks	271
Boats, etc., supply of	143	Pools, swimming	1
Bottling establishments	23	Pools in churches	3
Building purposes	368	Restaurants and eating saloons	36
Carriages and wagons	153	Slaughter houses	2
Cellar drainers	8	Stables	112
Dwellings, half	15	Stalls in stables	1,244
Drug stores	31	Steam boilers, number	97
Dye houses	3	Steam boilers, horse-power	2,299
Factories	6	Steam engines, number	34
Ferrules, number	6,016	Steam engines, horse-power	131
Filters	1	Street sprinklers	88
Fire hydrants, for use of	114	Tubs, vats and tanks	60
Fish troughs and stands	4	Urinals in stores, offices, etc	118
Forges	4	Urinal troughs	14
Fountains, counter	24	Wash-paves and screw-nozzles	3,556
Fountains, garden	2	Wash-paves for watering horses	44
Green houses	30	Wash-tubs, stationary	2,913
Heating boilers	24	Water-closets in dwellings	14,559
Hydrants in new buildings	6,186	Water-closets in stores, etc	275
Hydraulic elevators	3		

Digitized by Google

Premises Supplied and Appliances in Use Jan. 1, 1900.

Aquaria	10	Filters	14
Arsenals	2	Fire stations	44
Asylums	7	Fountains, garden	35
Bakeries	1,431	Fountains, counter	482
Barber shops	1,512	Forges	1,120
Bars	1,698	Furnaces	26
Basins and sinks in dwellings	63,956	Gas works and holders	6
Basins and sinks in offices and stores	25,870	Glass works	14
Baths in dwellings	165,943	Green houses	979
Baths, public	1,181	Grind stones	142
Baths, shower	238	Halls and club houses	216
Baths, foot	102	Hatters' planks, per set	16
Beam houses and tanneries	25	Hydrants	243,644
Bidets	428	Hospitals	46
Bottling establishments	621	Hotels	55
Brick yards	18	Hydraulic elevators	228
Brick yards, gangs of men	83	Ice cream saloons	286
Breweries	92	Institutions, charitable	84
Barrels brewed	2,143,610	Ice machines	143
Cars, steam and electric	1,271	Laundries	706
Carriages and wagons	8,614	Lawn sprinklers	266
Cellar drainers	26	Laboratories	35
Cemeteries	24	Machines for washing, scouring, etc.	2,583
Churches	508	Marble yards	74
Coal yards	248	Malt houses	18
Coloring rooms	161	Market houses	69
Condensers	13	Milk houses	271
Depots and railroad stations	104	Mint	2
Dwellings with water	232,334	Motors, beer	1,711
Dwellings without water	2,911	Motors, organ	206
Dwellings half without water	9,353	Photograph galleries	126
Dyers	698	Photograph galleries, operators	169
Drug stores	338	Police stations and patrols	48
Dye houses	637	Polishing wheels	23
Engines on railroads	281	Pools, swimming	22
Factories, foundries and mills	1,716	Pools in churches	78

Digitized by Google

Premises Supplied and Appliances in Use January 1, 1900.

Printing establishments	174	Steam saws	63
Prisons	4	Steam presses and hammers	61
Rectifying establishments	8	Shops and stores with water	5,167
Restaurants and oyster saloons	968	Shops without water	943
Shot tower	1	School houses	308
Slaughter houses	463	Theatres	18
Soap boiling establishments	21	Tubs, vats and tanks	2,104
Stand pipes for watering engines	27	Turbine wheels	32
Stables	7,484	Urinals in dwellings	171
Stalls in stables	49,514	Urinals in stores, offices, etc	4,296
Stalls in markets	6,921	Urinal troughs	545
Stalls, fish and trough	90	Vinegar establishments	8
Steam boilers, number	3,114	Wash paves and screw nozzles	92,744
Steam boilers, horse-power	102,537	Wash paves for watering horses	579
Steam boilers, heating, number	762	Wash tubs, stationary	26,201
Steam boilers, heating, horse-power	5,106	Water closets in dwellings	191,619
Steam engines, number	1,881	Water closets in stores, etc	25,231
Steam engines, horse power	32,815	Wool washers	87

Digitized by Google

TABLE "A."

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

Districts.	Number of Connections.			Total.	Length in Feet.			Total.
	½-inch.	⅝-inch.	1-inch.		½-inch.	⅝-inch.	1-inch.	
First	668	.....	.....	668	9,140	.....	.....	9,140
Second	658	10	.....	668	11,034	240	.....	11,274
Third	1,595	.....	1	1,596	20,408	.....	15	20,423
Fourth	600	2	1	603	7,842	24	8	7,874
Fifth	272	.....	.....	272	4,580	.....	.....	4,580
Sixth	570	.....	.....	570	8,924	.....	.....	8,924
Total	4,358	12	2	4,372	61,928	264	23	62,215

Account of Iron Stop-Boxes, New Stops and Check Valves for 1899.

Districts.	Iron Stop Boxes.	Bureau of Water.			Viney.		Smith Patent.	Check Valves.	Total.
		2-Way.	4-Way.	Butterfly.	3-Way.	4-Way.			
First	55	71	1	.....	.....	.....	.....	.....	72
Second	206	306	2	1	.....	.....	7	1	317
Third	55	150	.....	.....	.....	.....	2	.....	152
Fourth	306	178	.....	1	4	3	.....	.....	186
Fifth	3	23	.....	4	.....	.....	.....	1	28
Sixth	77	103	.....	.....	.....	.....	2	.....	105
Total	702	831	3	6	4	3	11	2	860

Digitized by Google

Repairs to Mains, Stops and Fire Hydrants, also Stops and Fire Hydrants Removed during 1899.

Districts.	Repairs to mains.	Stops.			Fire Hydrants.		
		Repaired.	Renewed.	Removed.	Repaired.	Renewed.	Removed.
First	35	78	31	.....	236	18	13
Second	172	355	44	26	213	76	56
Third	212	277	87	6	163	17	19
Fourth	330	489	8	20	1,606	8	56
Fifth	32	17	4	1	14	20	2
Sixth	90	18	6	9	9	52	16
Total	871	1,234	180	62	2,241	191	162

Check Valves Put In.

	Location.	Ward.	Size.
Shawmont avenue	1,706 feet N. E. of N. E. house-line of River road	21	36
Belmont Reservoir	W. S. 60 feet E. of stand pipe	34	20

Digitized by Google

Total Number of Stop Valves in the City Arranged by Districts.

Pattern.	Size.	Outlets.	Districts.						Total.
			1st.	2d.	3d.	4th.	5th.	6th.	
Single Gate. Bureau of Water.	3	2-way.	1	188	1	14	2	13	219
	4	2-way.	89	222	184	169	42	89	745
	6	2-way.	3,535	4,141	4,071	3,263	584	2,145	17,739
	8	2-way.	130	348	93	95	7	71	744
	10	2-way.	195	291	228	282	28	160	1,184
	12	2-way.	100	341	261	134	45	180	1,061
	16	2-way.	38	44	46	22	2	39	191
	18	2-way.	.....	.....	5	.....	.....	1	6
	20	2-way.	24	42	14	46	14	16	156
	30	2-way.	8	10	23	38	10	3	92
	36	2-way.	3	4	8	12	8	.....	35
	48	2-way.	.....	.....	3	9	.....	.....	12
		Total.....	4,123	5,631	4,887	4,084	742	2,717	22,184
Butterfly. Bureau of Water.	20	2-way.	.....	5	2	9	3	2	21
	30	2-way.	2	1	2	9	9	1	24
	36	2-way.	.....	.....	.....	17	.....	.....	17
	48	2-way.	.....	1	1	27	21	.....	50
		Total.....	2	7	5	62	33	3	112
Barton.	6	4-way.	4	4	.....	12	.....	.....	20
	8	4-way.	.....	.....	.....	5	.....	.....	5
	6	5-way.	12	32	.....	.....	.....	.....	44
	6	6-way.	.....	7	.....	.....	.....	.....	7
		Total.....	16	43	.....	17	.....	.....	76

Digitized by Google

Total Number of Stops, Valves, etc.—Continued.

Pattern.	Size.	Outlets.	Districts. 1st.	2nd.	3rd.	4th.	5th.	6th.	Total.
Viney.	6	2-way.	7	.....	4	3	.....	.....	14
	6	3-way.	52	67	36	235	6	10	406
	8	3-way.	.....	5	.....	.....	.....	.....	5
	10	3-way.	.....	.....	.....	3	.....	.....	3
	12	3-way.	.....	2	.....	3	.....	.....	5
	6	4 way.	24	45	24	125	3	15	236
	8	4-way.	1	6	2	.....	.....	.....	9
	10	4-way.	.....	5	.....	14	.....	.....	19
	12	4-way.	.....	.....	.....	.....	.....	2	2
	6	5-way.	25	6	2	28	.....	.....	61
		Total.....	109	136	68	411	9	27	760
Smith Patent.	3	2-way.	.....	13	.....	.....	.....	.....	13
	4	2-way.	.....	12	1	.....	.....	.....	13
	6	2-way.	.....	26	9	2	6	5	48
	8	2-way.	1	.....	7	.....	.....	.....	8
	10	2-way.	.....	.....	3	.....	.....	1	4
	12	2-way.	1	3	7	.....	.....	.....	11
	16	2-way.	4	.....	2	.....	.....	.....	6
	20	2-way.	.....	2	.....	.....	.....	.....	2
		Total.....	6	56	29	2	6	6	105
Ludlow.	3	2-way.	.....	1	.....	.....	.....	.....	1
Total number of stops.			4,256	5,874	4,989	4,576	790	2,753	23,238
Check valves. Bureau of Water.	20	.....	.....	1	.....	.....	.....	.....	1
	30	.....	.....	.....	1	.....	2	.....	3
	36	.....	.....	1	.....	.....	1	.....	2
	48	.....	.....	.....	4	4	6	.....	14
		Total.....	.....	2	5	4	9	.....	20

Digitized by Google

Number of Valves Raised in the several Districts during the year 1899.

Districts.	Barton.			Viney.		Single Gate.						Total.
	4-way.	5-way.	6-way.	3-way.	4-way.	4-inch.	6-inch.	10-inch.	12-inch.	20-inch.	30-inch.	
First	.....	.....	.....	.....	1	.....	21	.....	2	.....	.....	24
Second	.....	2	1	.....	1	1	6	2	.....	1	4	18
Third	.....	.....	.....	.....	1	.....	5	.....	.....	.....	.....	6
Fourth	6	.....	.....	6	6	2	23	2	.....	.....	1	46
Total	6	2	1	6	9	3	55	4	2	1	5	94

Digitized by Google

Number of Complants and Examinations during 1898 and 1899.

Months.	Hydrants.		Service pipes.		Wash-paves.		Spigots.		Water-closets.		Horse troughs.		No Leaks.		Total.	
	1898	1899	1898	1899	1898	1899	1898	1899	1898	1899	1898	1899	1898	1899	1898	1899
January	124	113	105	146	18	6	3	4	14	37	.....	1	15	13	279	320
February	104	95	97	231	19	10	4	5	22	27	1	1	13	13	260	382
March	90	158	74	127	8	9	3	1	14	67	.....	.....	6	8	195	370
April	67	100	57	66	3	12	.....	5	19	33	1	1	5	7	152	224
May	101	158	64	106	2	8	2	13	31	62	.....	4	11	5	211	356
June	90	184	73	87	6	6	4	8	27	101	.....	.....	10	5	210	391
July	69	117	55	101	7	7	1	6	13	40	1	.....	8	8	154	279
August	136	164	69	111	3	3	5	11	20	83	1	1	9	22	243	395
September	101	142	91	115	4	5	6	10	15	61	4	1	5	9	226	343
October	112	218	90	143	5	6	5	11	18	104	3	1	5	6	238	489
November	91	188	76	116	6	6	7	9	17	95	1	1	6	9	204	424
December	111	194	151	135	10	7	8	11	29	69	.....	.....	15	8	324	424
Total	1,196	1,831	1,002	1,484	91	85	48	94	239	779	12	11	108	113	2,696	4,397

Digitized by Google

NEW METERS SET.

Ward.	Occupant.	Location.	Business.	Date When Set.	Name of Meters.	Size.							Total.	Gallons Consumed.	Remarks.
						⅝-inch.	¾-inch.	1-inch.	1½-inch.	2-inch.	3-inch.	4-inch.	6-inch.			
2	Wyeth, J., & Bro.	1100 Washington ave., S. W. cor. 11th st.	Chemicals	Oct. 19.	Gem							1		1		No water used.
4	Galaher, Henry	743–45 South Front street	Stable	July 17.	Crown		1							1		No water used.
6	Lovegrove, J. E.	217 Race street	Store	March 17.	Crown			1						1	24,750	
6	Restein, Clement & Co.	137 North Second street	Store	July 17.	Crown		1							1	118,500	
7	American Bap. Pub. Soc.	N. W. cor. Juniper and Lombard streets	Office	Nov. 13.	Gem					1				1	7,260,000	
7	Gladstone Apt. House	328–38 South Eleventh street	Power House	Oct. 12.	Gem					1				1	702,000	
7	Philada. Rubber Co.	2417–21 South and 2414–22 Naudain street	Rubber Works	Aug. 28.	Crown						1			1	3,132,005	
8	Edison Electric Lt. Co.	904–12 Sansom street	Electric Light	Oct. 2.	Crown								1	1	14,257,500	
9	Adams Express Co	1713–23 Filbert street	Stables	Sept. 14.	Crown				1					1	57,000	
9	Howard, George	1739 Ludlow street	Machine Shop	March 27.	Crown		1							1	189,750	
9	Penn Mut'l Life Ins. Co.	919–21 Ludlow street	Offices	Nov. 28.	Gem						1			1	534,000	
9	Pennsylvania R. R. Co.	S. W. cor. Eighteenth and Filbert sts.	Stand Pipe	Nov. 16.	Gem								1	1	702,000	
9	Pennsylvania R. R. Co.	S. W. cor. Filbert and Twentieth sts.	Stand Pipe	Nov. 17.	Gem								1	1	129,000	
9	Sylvester, Fred	1416 Arch street	Filter	Jan. 13.	Crown		1							1	12,750	
9	W.E.Trust & Safe D. Co.	Broad st., w. side, S. W. cor. S. Penn Sq.	Office	Dec. 10.	Crown						1			1	900,000	

Digitized by Google

New Meters Set—Continued.

Wards.	Occupant.	Location.	Business.	Date When Set.	Name of Meter.	Size.							Total.	Gallons Consumed.	Remarks.
						⅝-inch.	¾-inch.	1-inch.	1½-inch.	2-inch.	3-inch.	4-inch.	6-inch.			
10	Evans, George B.	219 North Tenth street	Chemicals	Sept. 19	Crown					1				1	230,250	
10	Lea, H. C.	707-709 Arch street	Store	Oct. 19	Gem					1				1	633,750	
10	Sylvester, F., agent	246-48 North Broad street	Brass Works	March 13	Crown				1					1	498,750	
10	United Gas Imp. Co.	N.W.cor. Broad and Arch streets	Offices	April 20	Gem							1		1	2,490,750	
12	Dwyer, Michael	424 Orianna street	Morocco	August 29	Crown				1					1	607,500	
13	Harvey's, J., Estate	720-22 N. Marshall street	Stable	Jan. 25	Crown		1							1	57,750	
13	Jewitt, A., & Co.	906-24 Noble street	Cold Storage	April 21	Crown							1		1	5,612,250	
15	Fleer, Frank H., & Co.	2329-37 Hamilton street	Chewing Gum	April 28	Crown				1					1	358,500	
15	Terminal Land Co.	2500 Callowhill st., S. W. cor. Twenty-fifth	Wool Mill	Oct. 2	Crown			1						1		No water used.
16	Lea, Samuel, & Son	1136-48 N. American street	Wool Mill	Dec. 7	Gem						1			1	31,500	
17	Hemgaertner, Wm.	1226-28 Frankford avenue and 1235-41 Leopold street.	Brewery	Dec. 11	Crown				1					1	2,250	
17	Imperial Ice Mfg. Co.	1224-26 N. Front street	Ice Manufactory	March 27	Crown					1				1	5,976,750	
18	Bradlee & Co.	S. W. Beach st. and Susquehanna ave.	Chain Works	April 12	Crown		1							1	786,750	
18	Neafie & Levy	1338-40 Beach street	Shipyard	April 25	Crown				1					1	918,000	
18	Neafie & Levy	1365 Beach street, S. E. cor. Palmer	Shipyard	Oct. 28	Crown					1				1	1,703,250	

Digitized by Google

New Meters Set—Continued.

Ward.	Occupant.	Location.	Business.	Date When Set.	Name of Meter.	Size.								Gallons Consumed.	Remarks.
						5/8-inch.	3/4-inch.	1-inch.	1½-inch.	2-inch.	3-inch.	4-inch.	6-inch.		
19	Dolan, Thomas	Turner street, S. E. cor. Palethorp	Woolen Mill	March 6	Crown		1							1	161,250	
19	Dolan, Thomas	N. W. Oxford and Mascher streets	Woolen Mill	March 14	Gem							1		1	231,000	
19	Feister Printing Co	S. E. Sixth street and Columbia avenue	Printing Office	Sept. 22	Gem						1			1	515,250	
19	Heppe, L. A	2320 N. Front street	Confectioner	Nov. 3	Crown		1							1	75	
19	Northern Elec. Lt. Co	213 Susquehanna avenue	Electric Light	July 24	Crown							1		1	21,123,000	
19	Sheppard, Isaac A., & Co.	Fourth street, N. E. cor. Montgomery ave.	Stove Works	Sept. 12	Crown						1			1	263,750	
19	Sykes Bros.	Hancock street, 120 feet S. of Huntingdon	Woolen Mill	March 14	Crown				1					1	4,389,000	
19	A. Cox Stove Works	2301 American st, N. E. cor. Dauphin	Stove Works	Jan. 24	Crown		1							1	1,115,250	
20	United Gas Imp't Co	W. side 9th street, N. W. cor. Norris street.	Gas holder	Jan. 24	Crown					1				1	1,677,000	
21	Burgess Lee	5226-28 Ridge avenue	Saloon	Aug. 28	Crown		1							1	195,000	
21	Nordlinger, J., Estate	Nixon St., W. side, 285 ft. N. of Fountain	Mill	March 20	Crown			1						1	18,750	
22	Penn'a. Ins. Deaf-Dumb	W. side Germant'n ave., Gowan to Cresheim	School	Dec. 28	Crown			1						1		No water used.
23	Holden, E., & Co	S. W. Margaret and Dittman streets	Woolen mill	Nov. 24	Crown				1					1	294,750	
23	Klotz, F. H.	5334 Eadom street	Wood yard	Sept. 21	Crown		1							1	13,500	
23	Music Hall Co	4652 Frankford avenue	Hall	Nov. 3	Crown		1							1	42,000	

Digitized by Google

New Meters Set—Continued.

Ward.	Occupant.	Location.	Business.	Date When Set.	Name of Meter.	Size.								Gallons Consumed.	Remarks.
						⅝-inch.	¾-inch.	1-inch.	1½-inch.	2-inch.	3-inch.	4-inch.	6-inch.	Total.	
23	U. S. Arsenal	N. E. cor. Bridge and Tacony	Arsenal	Oct. 12	Crown								1	1	3,450,000	
23	Vulcanite Paving Co.	Torresdale ave., E. side, 600 ft. S. of Church.	Paving works	Aug. 25	Crown				1					1	120,000	
24	Penna. Bicycle Club	3940-42 Girard avenue	Club house	March 2	Crown			1						1	355,500	
24	Pharoh, John D.	S. W. Arch and Douglass streets	Apartment house	March 16	Gem							1		1	57,750	
24	P. & R. Terminal Co.	W. side Schuylkill river, 800 feet north of Callowhill Street Bridge	Office	Feb. 10	Crown		1							1	51,000	
24	Woodside Real Est. Co.	So. side Ford road, 319 ft. E. Monument ave.	Park	Aug. 22	Crown						1			1	267,000	
25	Masland, James W.	Clearfield street, N. W. cor. Jasper	Dye works	Dec. 2	Gem					1				1	429,750	
25	Phila & R. R. W. Co.	William street, N. E. cor. Brabant	Coal yard	Nov. 29	Gem							1		1		No water used.
25	Wiehle, C. A. Max	N. E. Tioga street and Trenton avenue	Paint works	Oct. 3	Trident	1								1	78,750	
26	O'Neill, John	N. E. Chadwick and McKean streets	Shoddy mill	Nov. 10	Crown					1				1	1,649,250	
27	Consumers' Ice-Coal Co.	3336-40 Market street	Ice manufactory	Oct. 4	Gem							1		1	7,355,250	
27	Hitchcock, Fanny R. M.	Rear 4038 Walnut street	Chemicals	Oct. 6	Crown			1						1		No water used.
27	Union Traction Co.	4100 Chestnut street, S. W. cor. 41st street	Car barn	Oct. 10	Crown		1							1	66,750	
27	University of Penna.	N. W. Thirty-fourth and Spruce streets	Power house	July 21	Crown						1			1	2,107,500	
27	University of Penna.	S. E. Thirty-fourth and Spruce streets	Museum	Oct. 13	Gem							1		1	64,500	

Digitized by Google

New Meters Set—Continued.

Ward.	Occupant.	Location.	Business.	Date when Set.	Name of Meter.	Size.							Total.	Gallons consumed.	Remarks.
						5/8-inch.	3/4-inch.	1-inch.	1 1/2-inch.	2-inch.	3-inch.	4-inch.	6-inch.			
29	Commonwealth Brg. Co	919 N. 28th st., S. E. cor. Cambridge	Brewery	Sept. 18	Gem	.....	.....	.....	.....	.....	1	.....	.....	1	252,000	
29	Girard Iron Works	1404-08 N. 22d st., S. W. cor. Stewart	Iron works	March 27	Crown	.....	1	1	.....	.....	.....	.....	.....	2	1,416,000	
29	Lea, Alice Van A	1915-17 Oxford street and rear	Cold storage	March 24	Crown	.....	.....	.....	.....	1	.....	.....	.....	1	2,031,750	
30	Thomas, Rufus R. & Co.	S. W. League and Nineteenth streets	Saw mill	Aug. 22	Crown	.....	.....	1	.....	.....	.....	.....	.....	1	246,750	
30	Thomas, Rufus R. & Co.	S. W. League and Nineteenth streets	Stable	Aug. 24	Crown	.....	1	.....	.....	.....	.....	.....	.....	1	62,250	
31	Kitchenman, James	S. E. Huntingdon and Jasper streets	Carpet mill	Dec. 6	Gem	.....	.....	.....	.....	.....	.....	1	.....	1	109,500	
32	Thomas, W. S.	3104-06 Ridge ave., N. W. cor. French	Hall	April 22	Crown	.....	1	.....	.....	.....	.....	.....	.....	1	78,750	
33	Holy Cross Luth. Ch	W. Lehigh ave., N. E. cor. Ninth street	Church	March 28	Crown	.....	.....	1	.....	.....	.....	.....	.....	1	30,000	
33	Myers, Robert	Rear 3939-61 North Fifth street	Dye works	Nov. 7	Gem	.....	.....	.....	.....	.....	.....	1	.....	1	1,652,250	
33	Pfund, G. F.	3958-60 Nice street	Packing house	Oct 18	Trident	.....	1	.....	.....	.....	.....	.....	.....	1	877,500	
33	Schmidt, Geo. & Bro	S. E. Dell and Luzerne streets	Hosiery mill	Sept. 11	Crown	.....	1	.....	.....	.....	.....	.....	.....	1	27,000	
33	Scott Paper Co	N. side Glenwood ave., 300 feet W. of Sixth	Paper mill	Dec. 8	Crown	.....	.....	.....	.....	1	.....	.....	.....	1	315,000	
33	The Oldham Mills Co	N. W. Allegheny ave. and Boudinot street	Woolen mill	Nov. 28	Gem	.....	.....	.....	.....	.....	1	.....	.....	1	49,500	
33	Wolf, Albert	3702 North Sixth street	Brewery	Sept. 28	Crown	.....	.....	.....	1	.....	.....	.....	.....	1	10,500	
33	York Mfg. Co	3423 N. Sixth st., N. E. cor. Glenwood ave	Ice manufactory	Nov. 21	Gem	.....	.....	.....	.....	.....	.....	1	.....	1	3,750	

Digitized by Google

New Meters Set—Continued.

Wards.	Occupant.	Location.	Business.	Date When Set.	Name of Meter.	Size.								Total.	Gallons Consumed.	Remarks.
						⅝-inch.	¾-inch.	1-inch.	1½-inch.	2-inch.	3-inch.	4-inch.	6-inch.			
34	Greene, D. H. & Co.....	Rear 4607 Girard ave.....	Stable.....	May 17.....	Crown....	.....	.....	1	.....	.....	.....	.....	.....	1	29,253	
34	Jones, Yendell & Bros..	S. W. cor. Fifty-fourth and Poplar sts.....	Wool mill.....	April 28.....	Gem.....	.....	.....	.....	.....	1	.....	.....	.....	1	1,155,000	
34	Jewell & Morland.....	4629 Girard avenue.....	Terra-cotta works.....	Sept. 12.....	Crown....	.....	.....	1	.....	.....	.....	.....	.....	1	17,250	
34	Penna. Inst. for Blind...	W. side 63d st., 96 ft. s. of Lancaster ave.....	School.....	May 17.....	Crown....	.....	.....	.....	.....	.....	.....	1	.....	1	1,519,000	
36	Ammonia Co. of Phila..	2901-29 Gray's Ferry road.....	Chemical works.....	Dec. 7.....	Crown....	.....	.....	.....	.....	1	.....	.....	.....	1	200,250	
36	Campbell, Geo. W.....	S. E. cor. Thirty-first and Reed streets.....	Woollen mill.....	March 1.....	Gem.....	.....	.....	.....	.....	.....	.....	1	.....	1	3,939,300	
37	Ehret, M., Jr.....	N. W. cor. Thirteenth and Cumberland sts..	Roofing.....	Jan. 27.....	Crown....	.....	1	.....	.....	.....	.....	.....	.....	1	424,500	
37	Feil, F.....	2210 Germantown avenue.....	Stable.....	Oct. 11.....	Trident...	1	.....	.....	.....	.....	.....	.....	.....	1	.....	No water used.
38	Elec. Storage Batt'y Co..	S. W. cor. 19th st. and Allegheny avenue.....	Storage battery.....	Sept. 13.....	Crown....	.....	.....	.....	.....	.....	1	.....	.....	1	308,250	
38	Fehlen, John & Co.....	4148 Germantown avenue.....	Packing house.....	April 27.....	Crown....	.....	.....	.....	.....	1	.....	.....	.....	1	7,125,000	
38	Mayer, Lena.....	N. W. cor. 20th st. and Allegheny avenue....	File Works.....	Oct. 24.....	Crown....	.....	.....	1	.....	.....	.....	.....	.....	1	36,750	
39	Magoffin, Wm. H.....	W. side Weccacoe av., 60 ft. N. of Wolf st....	Oil Works.....	April 27.....	Crown....	.....	.....	.....	.....	1	.....	.....	.....	1	81,750	
40	Brill, J. G. & Co.....	Sixty-second st. and Woodland avenue.....	Car Works.....	May 5.....	Gem.....	.....	.....	.....	.....	.....	1	.....	.....	1	327,000	
	Total.....	.....	.....	.....	.....	2	20	12	10	15	12	14	4	89	116,345,628	

Digitized by Google

New Attachments made and delivered to Districts during the Year 1899.

Districts.	Attachments made and delivered.	Lead Pipe. Feet.		Total.
		⅝-inch.	1-inch.	
First	855	12,017	.....	12,017
Second	864	15,130	.....	15,130
Third	1,721	23,263	.....	23,263
Fourth	626	8,671	25	8,696
Fifth	286	4,778	.....	4,778
Sixth	403	6,548	.....	6,548
Total	4,755	70,407	25	70,432

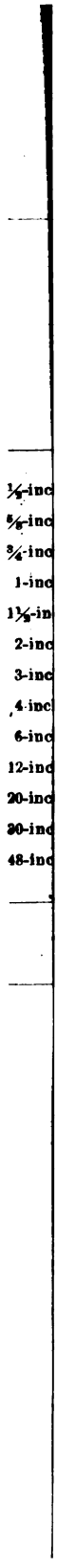
Digitized by Google

	In Use December 31,						
Total.	Crown.	Gem.	Nash.	Deacon.	Union.	Venturi.	Thompson.
3	30	.....	4	.....	.....	.....	.....
10	.....	.....	.....	.....	.....	.....	.....
59	188	.....	11	.....	.....	.....	.....
45	202	.....	6	.....	.....	.....	.....
26	126	.....	6	.....	3	.....	.....
31	163	91	.....	.....	.....	.....	.....
8	74	83	.....	.....	.....	.....	4
22	49	180	.....	1	.....	.....	.....
21	6	27	.....	6	.....	.....	.....
.....	.....	.....	.....	.....	.....	1	.....
.....	.....	.....	.....	.....	.....	2	.....
.....	.....	.....	.....	.....	.....	1	.....
.....	.....	.....	.....	.....	.....	1	.....
.....	.....	.....	.....	.....	.....	2	.....
206	838	381	27	7	3	7	4

do not show in above table.
nd do not show in above table.

Digitized by Google

Digitized by Google



Digitized by Google

Digitized by Google

DISTRIBUTION EXPENSES.

During the Year 1899.

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.	Distribution.	Meter Shops.	Main Office.	Total.
Lead	$2,502 78	$4,980 18	$3,741 10	$3,259 18	$4,754 85	$4,262 23	$1,625 24	$3,520 89	.....	$28,646 45
Gasket	31 20	39 12	.....	38 56	18 25	107 58	.....	.....	.....	234 71
Coke	44 20	101 35	68 25	105 00	103 50	121 50	.....	.....	.....	543 80
Wood	.....	.....	.....	.....	.....	28 00	.....	.....	.....	28 00
Pipes	.....	.....	.....	.....	.....	.....	197,315 12	.....	.....	197,315 12
Small specials	.....	.....	.....	.....	.....	.....	7,617 37	.....	.....	7,617 37
Large specials	.....	.....	.....	.....	.....	.....	7,618 16	.....	.....	7,618 16
Frames and covers	53 04	465 98	143 00	113 30	92 22	160 90	.....	.....	.....	1,028 44
Hauling transporation, hotel	110 00	180 00	65 00	50 00	5 00	125 00	6,057 14	400 00	.....	6,992 14
Supplies, tools, small stores, etc	1,168 43	716 93	839 27	2,220 97	694 60	677 84	10,796 52	5,189 43	$317 12	22,621 11
Plumbing and plumbing supplies	.....	.....	.....	.....	25 70	9 93	.....	75 00	.....	110 63
Meters, etc	.....	.....	.....	.....	.....	.....	.....	3,499 00	.....	3,499 00
Repairs to buildings, etc	74 34	8 50	.....	100 00	.....	.....	.....	.....	.....	182 84
Brick, stone, lime and cement	177 16	445 90	90 33	1,095 80	805 27	201 95	8 68	42 31	.....	2,867 40
Lumber	2,186 45	669 92	378 38	490 14	652 95	387 52	183 81	299 87	.....	5,249 04
Hay, feed, etc	706 98	776 37	1,094 70	878 15	209 33	102 56	.....	.....	.....	3,768 09

Digitized by Google

Distribution Expenses—Continued.

Material and Labor.	First District.	Second District.	Third District.	Fourth District.	Fifth District.	Sixth District.	Distribution.	Meter Shops.	Main Office.	Total.
Stable supplies	$172 56	$62 04	$44 51	$112 26	$179 00	$7 00				$577 37
Stable repairs	252 20	180 80	255 70	450 65	60 90	1 65				1,201 90
Stable medicines	40 75	12 00	23 00							75 75
Stable shoeing	206 00	131 50	174 75	168 50	31 14	24 00				735 89
Supplies, stationery	275 53	252 66	129 69	288 89	80 46	174 62	$392 47	$306 98	$134 07	2,035 37
Excavating for 48-in. pipe trench					6,208 89	891 49				7,095 38
Cast-iron stop boxes	459 62	923 19	67 22	1,788 32		437 54				3,675 89
Wages... Per diem	19,425 33	43,189 62	52,396 16	38,077 94	20,435 66	35,720 61	6,006 19	8,666 37	4,634 50	228,552 38
Wages... Salary	4,649 00	5,957 45	4,962 75	7,703 83	1,739 00	3,723 83				28,735 86
Total cost of labor and material on account of distribution	$32,535 57	$59,093 51	$64,473 81	$56,941 49	$36,091 72	$47,165 75	$237,620 70	$21,999 85	$5,085 69	$561,008 09
Buildings, grounds and reservoirs		$322 87		$1,958 76	$2,842 08	$191 57		$221 15		$5,036 43
Bureau of Surveys, labor				6,284 21						6,284 21
Bureau of Surveys, material				* 1,104 13						1,104 13
Total labor and material	$32,535 57	$59,416 38	$64,473 81	$66,288 59	$38,433 80	$47,357 32	$237,620 70	$22,221 00	$5,085 69	$573,432 86

* Of this amount $993.63 was paid by Bureau of Surveys.

Digitized by Google

APPENDIX D

REPORT

OF THE

Superintendent of Construction and Repair Shop

TWELFTH AND REED STREETS

FOR THE YEAR 1899

Philadelphia, January 12, 1900.

F. L. HAND, ESQ.,
Acting Chief, Bureau of Water.

DEAR SIR:—I herewith submit the annual report of the operations of the construction and repair shop at Twelfth and Reed streets for the year ending December 31, 1899.

Yours respectfully,

JAMES H. DEAN,
Superintendent of Shop.

Digitized by Google

MERCHANDISE.

	Dr.	
To stock, as per inventory, January 1, 1899.....	$34,700 25	
Bolts and nuts.....	842 00	
Hardware.....	335 76	
Steel.....	1,235 81	
Wrought iron.....	934 45	
Iron castings.....	10,572 70	
Brass castings.....	6,133 70	
Lead coating.....	467 46	
Lumber.....	494 46	
Paints, brushes, etc.....	91 57	
Oils and tallow.....	79 36	
Packing.....	13 28	
Chandlery.....	146 49	
Coal.....	1,079 40	
Coke.....	20 40	
Gum goods.....	268 87	
Plug valves.....	339 00	
Brass fittings.....	50 83	
Lead.....	1,497 97	
Wrought iron pipe and fittings.....	2 94	
Forage, stable supplies, etc.....	144 85	
Miscellaneous.....	475 50	
Wages.....	32,544 23	
		$82,471 28

MERCHANDISE.

	Cr.	
First District.....	$6,105 28	
Second District.....	12,156 31	
Third District.....	9,193 23	
Fourth District.....	7,727 49	
Fifth District.....	934 44	
Sixth District.....	4,963 51	
		$41,080 26
Spring Garden Pumping Station.....	$6,827 25	
Fairmount Pumping Station.....	328 64	
Belmont Pumping Station.....	4,207 04	
Queen Lane Pumping Station.....	1,151 40	
Roxborough Pumping Station.....	4,807 05	
Mount Airy Pumping Station.....	101 56	
Chestnut Hill Pumping Station.....	78 07	
Frankford Pumping Station.....	714 02	
		18,575 03

Digitized by Google

Distribution	$2,244 48	
Main Office	43 95	
Meter Department	290 53	
Hydrographic work	85 51	
General buildings and grounds	715 00	
Fixed patterns	526 32	
Shop machinery	401 08	
Construction and repair shop	1,180 17	
Old metals	1,209 44	
		6,696 48
		66,351 77
Total Cr.	$66,351 77	
Inventory, January 1, 1900	36,064 45	
	$102,416 22	
Total Dr.	82,471 28	
Balance		19,944 94

INVENTORY, JANUARY 1, 1900.

142 No. 1 fire hydrants, at $25.00	$3,550 00	
1 4-inch stop valve, at $11.00	11 00	
194 6-inch stop valves, at $12.00	2,328 00	
17 8-inch stop valves, at $20.00	340 00	
17 10-inch stop valves, at $30.00	510 00	
5 12-inch stop valves, at $35.00	175 00	
3 16-inch stop valves, at $60.00	180 00	
5 20-inch stop valves, at $95.00	475 00	
2 30-inch stop valves, at $190.00	380 00	
2 36-inch stop valves, flanged, at $300.00	600 00	
3 30-inch stop valves, extra heavy, at $225.00	675 00	
1 30-inch stop valve, extra heavy, unfinished.	215 00	
5 6-inch 4-way stop valves, at $30.00	150 00	
3 6-inch globe valves, at $30.00	90 00	
8 8-inch globe valves, at $40.00	320 00	
5 10-inch globe valves, at $55.00	275 00	
		10,274 00
3 20-inch rotary stop valves, at $265.00	$795 00	
1 48-inch rotary stop valve	665 00	
2 36-inch check valves, at $375.00	750 00	
2 30-inch check valves, at $325.00	650 00	
2 20-inch check valves, at $170.00	340 00	
2 20-inch check valves, flanged, extra heavy, at $200.00	400 00	

Digitized by Google

10 40-inch rotary quadrants, at $7.00	70 00		
6 30-inch rotary quadrants, at $5.00	30 00		
5 20-inch rotary quadrants, at $5.00	25 00		
4 bell cranks, at $15.00	60 00		
1 air pump barrel	15 00		
			3,800 00
Finished parts of fire hydrants	$1,423 88		
Finished parts of stop valves	2,187 65		
			3,611 53
61 old style stop screws	$458 25		
107 Viney stop screws, at $2.50	267 50		
87 Barton stop screws, at $4.00	348 00		
11 Barton bonnet and screw, at $8.00	88 00		
8 drilling machines, at $45.00	360 00		
			1,521 75
595 new style stop screws, 4-inch to 48-inch	$1,730 00		
102 socket screws, at $2.00	204 00		
85 spindles, at $2.25	191 25		
			2,125 25
614 iron bands, 4-inch to 48-inch	$1,579 50		
			1,579 50
86 4-inch fire hydrant valves, at 70c	$60 20		
79 6-inch fire hydrant valves, at $1.59	125 61		
			185 81
216 fire hoe heads, at $1.75	$378 00		
20 air pump rod straps, at $9.50	190 00		
66 air pump rod brasses, at $2.50	165 00		
52 sets gibs and keys, at $4.50	234 00		
15 pump rods, unfinished	200 68		
4 pump rods, finished	61 53		
			1,229 21
Articles and tools carried in stock issued to districts	$2,342 39		
			2,342 39
42,800 pounds wrought iron, at 2 cents	$856 00		
2,513 pounds iron forgings, at 8 cents	201 04		
10,642 pounds steel	1,101 29		
1,504 pounds expansion metal, at 24½ cents	368 48		
50,670 pounds lead, at $4\frac{975}{1000}$ cents	2,520 83		
360 pounds Babbitt metal, at 9 cents	32 40		
			5,080 04
23,890 pounds stop valve castings, at 1¼ cents	$286 13		
11,067 pounds fire hydrant castings, at 1.40 cts.	154 94		
4,440 pounds machinery castings, at 1½ cents	66 60		
9,665 pounds loam castings, at 3½ cents	338 28		

Digitized by Google

5,868 pounds brass castings, at 12 cents.....	$704 16	
5,262 pounds Ajax metal castings, at 23½ cts...	1,236 57	
654 pounds rolled brass castings, at 18 cts....	117 72	
		$2,904 40
Hardware.....	$229 78	
Bolts and nuts.....	573 69	
Oils and tallows.....	35 41	
Paints, brushes, oils, etc.....	28 18	
Chandlery.....	43 67	
Gum goods.....	93 10	
Lumber.....	406 74	
		1,410 57
		$36,064 45

Digitized by Google

Principal Articles Delivered to Purveyors' Districts, etc.

Districts.	Fire Hydrants.	Wedge Stop Valves.								Check Valves.		36-in. Rotary Valve.	6-inch 4-way Stop.	Plugs.		Stop Box Risers.	Fish Traps.				Iron Bands.	Globe Valves.		
		4-inch.	6-inch.	8-inch.	10-inch.	12-inch.	16-inch.	20-inch.	36-inch.	20-inch.	36-inch.			Wood.	Brass.		1¼-inch.	2-inch.	3-inch.	4-inch.		6-inch.	8-inch.	10-inch.
First	98	.....	64	.....	9	16	2	.....	.....	.....	.....	.....	1	78	366	102	.....	.....	.....	.....	1			
Second	185	7	217	30	30	15	5	3	.....	1	.....	.....	6	428	324	466								
Third	187	11	178	12	12	12	.....	.....	.....	.....	.....	.....	.....	294	504	197	.....	.....	.....	.....	8			
Fourth	99	6	101	26	14	4	.....	.....	.....	.....	.....	1	.....	204	474	108	.....	.....	.....	.....	36			
Fifth	12	.....	23	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	18	.....	.....	.....	.....	.....	.....	16			
Sixth	107	.....	84	4	6	2	.....	.....	.....	.....	.....	.....	.....	115	42	.....	.....	.....	.....	.....	115			
Distribution	.....	.....	.....	.....	.....	.....	.....	.....	2															
Meter Department	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	38	7	5	21				
Works	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	1	.....	.....	2	3	4	3
Total	688	24	667	72	71	49	7	3	2	1	.....	2	7	1,137	1,710	883	38	8	5	21	178	3	4	3

Digitized by Google

PRINCIPAL ARTICLES MANUFACTURED DURING 1899.

680	No 1 fire hydrants, at $25	$17,000 00
22	4-inch stop valves, at $11	242 00
736	6-inch stop valves, at $12	8,832 00
76	8-inch stop valves, at $20	1,520 00
55	10-inch stop valves, at $30	1,650 00
49	12-inch stop valves, at $35	1,715 00
3	16-inch stop valves, at $60	180 00
2	20-inch stop valves, at $95	190 00
3	30-inch stop valves, extra heavy, at $225	675 00
2	36-inch stop valves, flanged, at $300	600 00
1	36-inch check valve, at $375	375 00
2	30-inch check valves, at $325	650 00
2	20-inch check valves, at $170	340 00
2	20-inch check valves, extra heavy, at $200	400 00
6	6-inch 4-way stops, at $30	180 00
6	6-inch Globe valves, at $30	180 00
12	8-inch Globe valves, at $40	480 00
8	10-inch Globe valves, at $55	440 00
2	Gates and hoists, complete, for Roxborough, at $500	1,000 00
866	Wooden plugs, at 50c	433 00
777	Stop box risers, at 35c	271 95
404	Fire hoe heads, at $1.75	707 00
267	Iron bands, 6-inch to 48-inch	997 75
1,043	Stop screws, 6-inch to 36-inch	2,275 25
		$41,333 95

Digitized by Google

APPENDIX E

REPORT

OF THE

CHIEF DRAFTSMAN

FOR THE YEAR 1899

Philadelphia, January 18, 1900.

F. L. HAND, ESQ.,
Acting Chief, Bureau of Water.

DEAR SIR:—The following report of work under my charge in the drafting room for the year 1899 is respectfully submitted.

Two hundred and fifty-seven (257) drawings, as follows, relating to the construction of buildings, boilers, reservoirs, intakes, conduits, maps and profiles, have been made and recorded, besides a large quantity of material relating to statistics, of which diagrams were made but not recorded.

Miscellaneous castings	12
Plans of buildings, etc.	60
Plans and details of reservoirs	13
Special machinery	10
Details of engines and boilers	11
Surveys and maps	40
Details of intakes, conduits, etc.	11
Filter plans	25
Illustrating various reports	75
Total	257

Digitized by Google

Many of these drawings required much time and labor in perfecting them. Specifications were prepared for work which required to be advertised as follows: New pump chambers for Engines Nos. 2 and 3 at Spring Garden; Engines Nos. 2 and 3 at Roxborough, and Engines Nos. 1, 3 and 4 at Queen Lane Station; specifications and plans for new intake, engine house, boiler house and stack at Roxborough Station, Messrs. Macey, Henderson & Co., contractors; specifications and plans for engine house, boiler house and stack, Frankford High-Service Station, Harry Kuemmerle, contractor; one 150 feet 11-foot diameter stand pipe, Stacey B. Opdyke, contractor, for Frankford High-Service Station; one 3-million gallon pumping engine, Holly Manufacturing Co., contractor, for Frankford High-Service Station; two pumping engines, one for Roxborough and one for Belmont High-Service Station, H. R. Worthington, contractor; specifications and plans for three steel plate boilers, 160 pounds pressure, for Frankford High-Service Station, I. P. Morris Co., contractors; two steel plate boilers, 160 pounds pressure, for Roxborough Station, Robert Wetherill & Co., contractors, and specifications and plans for re-location of intake pipe at Queen Lane Station.

The steel plate for the three boilers now being built by the I. P. Morris Company was rolled by the Illinois Steel Company and inspected by the Pittsburg Testing Co.

The steel plate for the two boilers being built by Robert Wetherill & Co. was rolled by the Central Steel Co., of Harrisburg. I made an inspection and test of the material at Harrisburg on September 20, 21 and 22, and attach a copy of same to this report.

Specifications and plans are now being prepared for the proposed improvements at Belmont Pumping Station, in West Park.

Digitized by Google

During the year about 3,000 blue prints were made of various parts of machinery, detail plans, etc., which were used at the machine shop and by contractors on different kinds of work.

About 150 photographic prints were made. Views were taken of water meters, of banks of reservoirs at Roxborough, Queen Lane and East Park, of pipe on Midvale Avenue, of stack at Shawmont and buildings in course of erection at Belmont and Wentz Farm.

From data prepared by inspectors of the Bureau, 230 calculations for boiler horse power were made. From these calculations are determined the water rents to be paid by owners of steam boilers using city water.

The daily pumpage chart and the daily stream flow charts for hydrographic work have been prepared as in former years.

Yours respectfully,

JOHN E. CODMAN,
Chief Draftsman.

Digitized by Google

TESTS OF STEEL BOILER PLATES

Made by John E. Codman, Chief Draughtsman, Bureau of Water, Department of Public Works, at Central Iron and Steel Co., Harrisburg, Penna., Sept., 1899.

Marks.	Measurements.			Applied load.	Strain in pounds per sq. inch.	Elongation in eight inches.		Reduction of Area.				Remarks.
	Breadth	Width.	Area.			Elongation in inches.	Elongation in Percentage.	Breadth	Width.	Area.	Per-centage.	
A 1	1.137	.918	1.090	34,500	30,780	Elastic limit						Shell.
				54,800	50,270	.50						
9369				59,700	54,760	1.00						
				60,400	55,400	1.50						
				60,440	55,440	2.80	35.0	.840	.590	.496	54.5	Bend.
A 2	1.190	.877	1.044	34,300	32,850	Elastic limit						Shell.
				48,650	46,600	.50						
9369				53,800	51,500	1.00						
				54,400	52,100	1.50						
				54,600	52,300	2.70	33.7	.750	.500	.375	64.1	
A 3	1.190	.932	1.109	38,100	34,350	Elastic limit						Shell.
				58,000	52,300	.50						
9369				63,500	57,250	1.00						
				63,500	57,250	1.50						
				63,500	57,250	2.02	25.2	.855	.620	.530	52.2	Bend.
A 4	1.185	.950	1.126	36,400	32,330	Elastic limit						Shell.
				51,000	45,290	.50						
9369				62,200	55,240	1.00						
				62,200	55,240	1.50						
				62,200	55,240	2.62	32.7	.835	.640	.534	52.6	

Note.—Boilers 8 feet 6 inches diameter, ¾ shell. Built by Robert Wetherill, Chester, Pa., 1899.

Digitized by Google

Test of Steel Plates—Continued.

Marks.	Measurements.			Applied load.	Strain in pounds per sq. inch.	Elongation in eight inches.		Reduction of Area.				Remarks.
	Breadth	Width.	Area.			Elongation in inches.	Elongation in Percentage.	Breadth	Width.	Area.	Per-centage.	
B 1	1.190	.903	1.075	32,900	30,600	Elastic limit						Shell.
9369				48,300	44,930	.50						
				59,800	55,630	1.00						
				59,800	55,630	1.50						
				59,800	55,630	2.22	27.7	.850	.595	.506	52.9	
B 2	1.187	.887	1.053	36,500	34,660	Elastic limit						Shell.
6055				52,800	50,140	.50						
				60,400	57,360	1.00						
				61,150	58,070	1.50						
				61,150	58,070	2.14	26.7	.845	.590	.499	52.6	Bend.
B 3	1.160	.360	.980	32,000	32,650	Elastic limit						Shell.
		.845		46,800	47,750	.50						
6055				58,000	59,180	1.00						
				58,340	59,530	1.50						
				58,340	59,530	2.26	28.2	.880	.593	.519	47.0	
B 4	1.150	.885	1,018	30,300	31,350	Elastic limit						Shell.
				40,000	40,700	.50						
7069				51,200	52,110	1.00						Bend.
				52,400	53,340	1.50						
				52,400	53,340	2.38	29.7	.750	.540	.405	58.8	Second piece.

Digitized by Google

Test of Steel Plates—Continued.

Marks.	Measurements.			Applied Load.	Strain in pounds per sq. inch.	Elongation In Eight Inches.		Reduction of Area.				Remarks.
	Breadth	Width.	Area.			Elongation in eight inches.	Elongation in Percentage	Breadth	Width.	Area.	Per-centage.	
C 1 to 4	1,160	.580	.673	21,500	31,940	Elastic limit						Butt Straps.
				34,000	50,520	·50						
D 1 to 4				37,200	55,270	1.00						
				38,000	56,460	1.50						
9332				38,400	57,060	2.84	35.5	.790	.330	.261	61.2	
C 5 to 8	1,235	.578	.714	21,950	30,740	Elastic limit						Butt Straps.
				33,000	46,220	.50						
D 5 to 8				37,950	53,150	1.00						
				39,150	54,830	1.50						
7866				39,150	54,830	2.76	34.5	.825	.330	.272	61.9	
E 1 & 2	1,240	.420	.521	17,100	37,800	Elastic limit						Dome sheets and dome heads.
				26,400	50,600	.50						
J 1 & 2				28,300	54,300	1.00						
				28,700	55,080	1.50						
8139				29,200	56,040	2.46	30.7	.848	.225	.191	63.3	Bend.
F 1 & 2	1,240	.450	.558	19,300	34,580	Elastic limit						Reinforcing plates.
				29,000	51,960	.50						
G 1 & 2				32,500	58,240	1.00						
				32,500	58,240	1.50						
8,295				32,500	58,240	2.56	32.0	.875	.260	.228	59.1	

Digitized by Google

Test of Steel Plates—Continued.

Marks.	Measurements.			Applied load.	Strain in pounds per sq. inch.	Elongation in eight inches.		Reduction of Area.				Remarks.
	Breadth	Width.	Area.			Elongation in inches.	Elongation in percentage.	Breadth	Width.	Area.	Per-centage.	
H 1	1.190	.812	.966	30,900	31,990	Elastic limit	.....	.....	.....	.....	.....	Head.
				46,000	47,620	.50						
7866				55,100	57,040	1.00						
				55,100	57,040	1.50						
				55,100	57,040	7.50	31.2	.880	.560	.493	49.0	
H 2	1.160	.815	.945	30,500	32,270	Elastic limit	.....	.....	.....	.....	.....	Head.
				46,000	48,670	.50						
7866				57,300	60,630	1.00						
				57,300	60,630	1.50						
				57,300	60,630	2.12	26.5	.905	.605	.548	42.0	Bend.
I 1	1.160	.800	.928	27,400	29,520	Elastic limit	.....	.....	.....	.....	.....	Head.
				44,000	47,410	.50						
7866				50,700	54,610	1.00						
				51,850	55,870	1.50						
				51,850	55,870	7.12	26.5	.850	.540	.459	50.5	
I 2	1.155	.823	.951	32,100	33,750	Elastic limit	.....	.....	.....	.....	.....	Head.
				46,000	48,370	.50						
7609				55,450	58,300	1.00						
				55,450	58,300	1.50						
				53,450	58,300	2.18	27.2	.885	.620	.549	42.3	

Digitized by Google

Test of Steel Plates—Continued.

Marks.	Measurements.			Applied load.	Strain in pounds per sq. inch.	Elongation in eight inches.		Reduction of Area.				Remarks.
	Breadth	Width.	Area.			Elongation in inches.	Elongation in percentage.	Breadth	Width.	Area.	Per-centage.	
K 1 to 4	1.175	.625	.734	22,200	30,240	Elastic limit	.....	.....	.....	.....	.....	Combustion chamber sheets.
				35,000	47,680	.50						
7866				37,850	51,560	1.00						
				39,170	53,360	1.50						
				39,170	53,360	2.24	28.0	.780	.325	.254	65.4	
L 1 & 2	1.240	625	.775	23,400	30,190	Elastic limit	.....	.....	.....	.....	.....	Combustion chamber sheets.
				37,400	47,740	.50						
M 1 & 2				43,100	55,610	1.00						
				43,500	56,120	1.50						
2970				43,500	56,120	2.40	30.0	.875	.390	.342	55.9	Bend.

Digitized by Google

APPENDIX F

Report of Assistant in Charge of Hydrographic Work

Philadelphia, January 17, 1900.

F. L. HAND, ESQ.,
Acting Chief, Bureau of Water.

DEAR SIR:—The following report on hydrographic work and data collected during the year is respectfully submitted.

Rainfall observations at twenty stations, three of which are provided with automatic gauges, have been continued, completing seventeen years of continuous records of data relating to precipitation.

Stream flow observations by automatic gauges on the Perkiomen, Neshaminy and Tohickon streams have been continued, completing sixteen years of continuous records.

Owing to the building of a new dam and improvements to the roadway, by the Park Commission, observation on the Wissahickon, begun in 1897, were discontinued in June of the present year.

Observations on the Schuylkill, with the automatic gauge, put in operation in 1897, have been continued at Fairmount. Although the computations made therefrom are crude, and, to a certain extent, only approximate, they

Digitized by Google

give fairly good results, and show a favorable comparison with other streams, the data in regard to which is supposed to be more accurate.

A comparison of the rainfall on the watersheds of the Schuylkill river and the amount of water found flowing in the river, for the years 1898 and 1899, is as follows:

Date.	Rainfall, in inches.	Flowing in river, inches.	Percentage of total rainfall in river.
January 1 to December 31, 1898	49.53	24.39	48
January 1 to December 31, 1899	44.43	22.29	50
October 1, 1898 to October 1, 1899	52.80	25.13	48

Comparison and study of such tables shows that the amount of rainfall flowing in the river is controlled by other conditions than those of rainfall alone, and demonstrates the value of data obtained by systematic observations continuing for a number of years.

Observations on the Perkiomen, Neshaminy and Tohickon streams were continued during the year by the voluntary observers. Notices were sent to these observers that the hydrographic work of this Bureau would be discontinued after January 1, 1900.

The greatest monthly rainfall during the year, 7.46 inches, occurred in September. There was a deficiency in the months of April, May, June, October, November and December, and an excess in the months of February and March.

The automatic gauge in Philadelphia recorded 12 storms, that at the forks of the Neshaminy 26 storms, and that at Spring Mount, on the Perkiomen, 28 storms, in which the rate exceeded more than .25 of an inch per hour.

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

Digitized by Google

I. Monthly precipitation on sundry water sheds.

II. } Rain storms exceeding ¼ inch per hour. { Philadelphia
III. } { Forks of Neshaminy
IV. } { Frederick
{ Perkiomen Valley

V. Inches of rainfall flowing in the..... { Perkiomen
{ Neshaminy
{ Tohickon

VI. Average annual yield of streams.

VII. Comparative stream flow..... { Perkiomen
{ Neshaminy
{ Tohickon
{ Wissahickon
{ Schuylkill

VIII. } Monthly and daily yield of..... { Perkiomen
IX. } { Neshaminy
{ Tohickon
{ Wissahickon
{ Schuylkill

The following named persons have been engaged as observers and rodmen during the year:

John G. Hilsman, rodman and gauge observer, Rush Valley P. O.

George W. Wood, rodman and gauge observer, Spring Mount, Pa.

A. F. Stover, rodman and observer, Point Pleasant, Pa.

Dr. George M. Grim, gauge observer, Ottsville.

George Louder, gauge observer, Smith's Corner, P. O. Point Pleasant.

Dr. J. A. Roth, gauge observer, Seisholtzville.

A. W. Walton, gauge observer, Doylestown.

H. L. Schull, gauge observer, Lansdale.

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

Mr. J. L. Heacock, Quakertown, Pa.

Digitized by Google

ervations at Philadelphia.

	Tohickon Series.				Neshaminy Series.		
	Ottsville.	Quakertown.	Smith's Corner.	Point Pleasant.	Lansdale.	Forks of Neshaminy.	Doylestown.
Elevations A	390	536	480	119	350	143	405
	Precipitation in Inches.	Precipitation in Inches.	Precipitation in Inches.	Precipitation in Inches.	Precipitation in Inches.	Precipitation in Inches.	Precipitation in Inches.
January	2.32	3.74	4.13	4.51	3.44	4.25	4.02
February	5.46	4.20	4.88	4.99	5.68	8.06	4.87
March	5.56	7.10	6.82	6.93	5.93	7.73	6.07
April	1.86	2.05	2.12	2.73	1.28	1.72	1.16
May	2.21	3.04	2.11	1.55	1.15	2.38	0.75
June	1.70	3.96	3.19	2.11	0.95	1.74	2.17
July	3.13	4.23	3.63	2.15	3.18	4.49	2.80
August	3.57	5.76	4.96	5.91	7.74	2.89	4.15
September	5.13	8.16	7.72	5.81	6.96	6.65	7.30
October	1,16	1.17	1.66	1.61	1.29	2.04	1.93
November	2.37	2.93	2.38	2.52	1.25	2.26	3.04
December	1.97	2.61	2.03	2.73	2.64	2.26	2.68
Total	36.44	48.95	45.07	43.55	41.49	46.47	40.94
Percentage	91	122	112	109	103	116	102
17 years yearly	48.55	49.58	54.07	49.95	46.18	48.56	47.27
	124	127	138	128	118	124	121
Average deficie	12.11	0.63	9.00	6,40	4 69	2.09	6.33
Percentage def	25	1.3	16	13	10	4	13

Digitized by Google

Digitized by Google

Sergeant L. M. Dey, U. S. Signal Service.

Mr. Benjamin Shoemaker, Pennsylvania Hospital, Philadelphia.

Mr. E. F. Smith, Engineer of Canals, Reading, Pa.

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

During 1899 all observations on rainfall were taken uniformly in accordance with the instructions given at the beginning of the year.

Yours respectfully,

JOHN E. CODMAN,
In Charge of Hydrographic Work.

Digitized by Google

TABLE II.

Rain Storms exceeding in rate 0.25 inches per hour, as recorded by the Automatic Rain Gauge at Philadelphia for the year 1899.

Date of Observation.	Automatic Rain Gauge.					Remarks.
	Total Fall.		Maximum Fall.			
	Amount in Inches.	Duration—Hrs. Min.	Amount in Inches.	Duration in Minutes.	Rate per Hour during Maximum Fall.	
January 7th, rain storm	1.35	16—15	.50	60	.50	
January 25th, rain storm	1.00	11—00	.55	20	1.65	
July 5th, rain storm	.70	2—10	.64	20	1.92	
July 26th, rain storm	2.26	34—15	1.85	30	3.70	
July 27th, shower	.82	1—30	.42	16	1.58	
August 3d, shower	.40	6—25	.36	12	1.80	
August 6th, rain storm	.85	5—30	.50	25	1.20	
August 11th, shower	1.86	3—30	1.66	52	1.91	
August 26th, rain storm	.65	2—55	.45	30	.90	
September 8th, shower	.45	3—40	.27	15	1.08	
September 26th, rain storm	1.24	8—15	.98	35	1.68	
October 18th, rain storm	.68	7—45	.43	40	.65	

Digitized by Google

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 1899.

Date of Observation.	AUTOMATIC RAIN GAUGE.					Remarks.
	TOTAL FALL.		MAXIMUM FALL.			
	Amount in Inches.	Duration Hrs. Min.	Amount in Inches.	Duration in Minutes.	Rate per Hour during Maximum Fall.	
January 24th, rain storm	1.69	15—45	.22	16	.83	
February 27th, rain storm	1.32	17—00	.25	60	.25	
March 5th, rain storm	1.24	16—30	.40	60	.40	
March 12th, shower	.54	9—45	.30	24	.75	
March 22d, rain storm	1.23	34—00	.25	60	.25	
March 29th, rain storm	1.68	27—00	.15	12	.75	
April 8th, rain storm	1.04	14—15	.25	60	.25	
May 11th, rain storm	.75	5—50	.25	60	.25	
May 22d, shower	.41	1—10	.35	16	1.31	
June 9th, shower	.36	5—00	.21	16	.79	
June 15th, shower	.34	1—25	.29	20	.87	
July 5th, shower	.33	1—00	.25	10	1.50	
July 8th, shower	.68	6—30	.25	20	.75	
July 16th, rain storm	.41	7—20	.22	20	.66	
July 26th, rain storm	1.05	34—45	.40	40	.60	
July 27th, shower	.54	3—15	.50	16	1.88	
July 30th, shower	.44	2—30	.41	40	.62	
August 3d, shower	.38	0—45	.35	20	1.05	
August 11th, shower	1.65	15—15	1.45	60	1.45	
September 3d, shower	.46	2—00	.26	20	.78	
September 8th, shower	.64	11—15	.36	20	1.08	
September 11th, rain storm	.99	10—00	.30	60	.30	
September 19th, rain storm	2.23	13—30	1.51	60	1.51	
September 26th, rain storm	1.43	7—30	.95	40	1.42	
October 18th, rain storm	.65	4—15	.40	20	1.20	
November 3d, rain storm	1.11	12—00	.21	20	.63	

Digitized by Google

TABLE IV.

Rain Storms exceeding in rate 0.25 inches per Hour, as recorded by the Automatic Rain Gauge at Frederick for the year 1899.

Date of Observation.	Automatic Rain Gauge.					Remarks.
	Total Fall.		Maximum Fall.			
	Amount in Inches.	Duration, Hrs. Min.	Amount in Inches.	Duration in Minutes.	Rate per Hour during Maximum Fall.	
January 24th, rain storm	1.19	14—25	.30	60	.30	
March 5th, rain storm	1.29	8—55	.25	15	1.00	
March 12th, rain storm	.33	4—55	.19	12	.95	
April 8th, rain storm	.77	20—30	,25	60	.25	
May 11th, rain storm	.86	5—20	.40	36	.67	
May 17th, rain storm	1.12	18—25	.20	16	.75	
May 23d, shower	.20	0—30	.10	8	.75	
June 2d, shower	.15	25—00	.09	8	.68	
June 5th, shower	.19	1—00	.15	10	.90	
June 9th, shower	.46	3—10	.20	12	1.00	
June 15th, shower	.20	2—00	.10	8	.75	
June 20th, shower	.46	1—40	.26	16	.98	
June 25th, shower	.73	6—15	.31	16	1.16	
June 29th, rain storm	.72	15—00	.15	8	1.12	
July 8th, shower	.26	2—05	,12	8	.90	
July 26th, rain storm	.79	32—20	.30	60	.30	
July 30, shower	1.54	0—35	1.40	25	3.36	
August 2d, shower	.25	6—10	.20	24	.50	
August 3d, shower	.39	0—50	.34	16	1.28	
August 6th, rain storm	.48	6—40	.33	60	.33	
August 10th, shower	1.45	5—00	1.40	30	2.80	
August 21st, shower	.18	0—40	.15	10	.90	
August 27th, rain storm	2.50	9—10	1.95	80	1.46	
September 3d, shower	.58	2—10	.45	40	.68	
September 8th, rain storm	.62	12—30	.37	12	1.85	
September 11th, rain storm	.73	5—15	.20	12	1.00	
September 26th, rain storm	1.27	16—35	.61	40	.92	
December 12th, rain storm	.45	4—00	.20	20	.60	

Digitized by Google

TABLE V.

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

Watersheds.	Area in Miles.	Percentage of Total Area.				Average for 16 Yeaes 1883–1899.												
		Woodland.	Cultivated.	Flats.	Roads.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
Perkiomen at Frederick, 16 years	152	25	71	2	2	2.99	3.66	3.77	2.14	1.47	0.86	1.35	0.98	1.04	0.86	1.75	2.05	
Neshaminy, below Forks, 16 years	139.3	6	92	½	2	3.39	4.12	3.70	2.02	1.70	0.75	1.06	0.93	0.83	0.65	1.57	2.23	
Tohickon, 16 years	102.2	24	72	2	2	4.02	4.78	4.68	2.47	2.11	0.85	1.29	1.25	1.21	0.83	2.18	2.62	
Perkiomen at Frederick — Maximum 16 years						5.40	9.73	5.58	3.48	6.66	2.65	4.89	2.48	3.68	2.36	6.67	3.77	
Perkiomen at Frederick — Minimum 16 years						0.59	1.25	1.56	0.97	0.46	0.28	0.17	0.28	0.16	0.20	0.34	0.91	
Neshaminy, below Forks — Maximum 16 years						6.77	10.44	7.41	3.57	7.41	2.46	5.47	3.37	3.51	2.55	6.31	4.56	
Neshaminy, below Forks — Minimum 16 years						1.60	0.90	1.51	1.03	0.35	0.08	0.04	0.14	0.03	0.06	0.11	0.41	
Tohickon — Maximum 16 years						7.34	10.41	9.00	4.76	8.56	3.43	6.41	3.75	5.49	3.54	7.97	4.28	
Tohickon — Minimum 16 years						0.54	1.19	1.83	0.73	0.25	0.08	0.08	0.10	0.04	0.05	0.14	0.67	

Digitized by Google

No longer the property of the St. Louis Public Library

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

Watersheds.	Period covered, years.	Area in miles.	Average rainfall in inches.	Average rainfall flowing off in inches.	Per cent. flowing off.	Average annual yield in gallons.	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	16	152	45.166	23.565	48.92	62,245,108,000	170,500,000	1.735	0.0360
Neshaminy below Forks	16	139.3	47.930	22.823	47.62	55,248,665,600	151,340,000	1.681	0.0351
Tohickon	16	102.2	49.912	28.584	57.30	50,765,146,264	138,938,400	2.103	0.0421
Wissahickon	2	64.6	Discontinued June, 1899.						
Schuylkill	2	1,916.0	52.795	25.125	47.55	See Table VIII.			
Sudbury, Mass.	24	75.2	46.19	22.567	48.86	29,479,152,000	80,764,800	1.662	0.0 59
Croton, N. Y.	19	338.0	45.97	22.760	49.50	135,400,000,000	371,600,000	1.680	0.0365

TABLE VII—*Comparative Daily Stream Flow 1898 and 1899.*

Watersheds.	Area of watershed.	Maximum Gallons.		Date.	Minimum Gallons.		Date.
		Per day.	Per square mile.		Per day.	Per square mile.	
Perkiomen	152	2,610,725,000	17,180,000	February 27th	14,961,000	101,000	July 23d.
Neshaminy	139.3	2,551,000,000	18,300,000	February 27th	3,555,000	25,600	July 25th.
Tohickon	102.2	2,080,000,000	20,390,000	February 27th	1,548,000	15,100	June 21st.
Wissahickon	61.6	830,350,000	12,855,000	February 27th			
Schuylkill	1,915	11,661,500,000	6,090,000	February 28th			

Digitized by Google

No longer the property of
the St. Louis Public Library

Digitized by Google

Digitized by Google

Digitized by Google

Digitized by Google

Digitized by Google

Digitized by Google

o longer the property of
the St. Louis Public Library

Digitized by Google

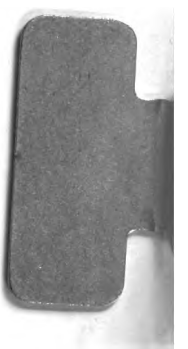
Digitized by Google

Digitized by Google

Digitized by Google

Digitized by Google

Digitized by Google



Digitized by Google

UNIVERSITY OF ILLINOIS-URBANA
3 0112 112103392

Digitized by Google