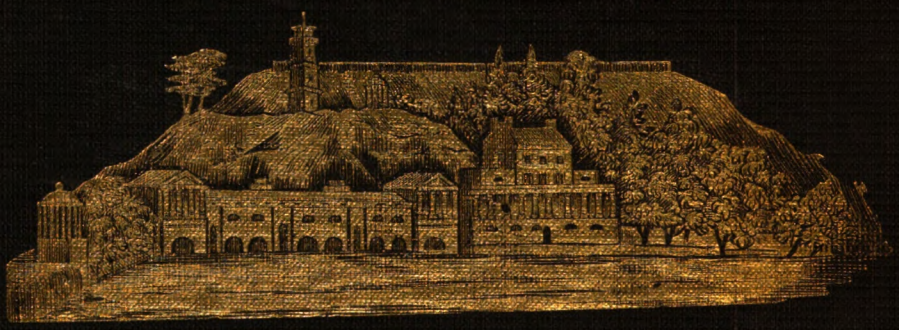
ANNUAL REPORT

OF THE



DEPARTMENT FOR SUPPLYING THE CITY WITH WATER.

1881.

DEPARTMENT

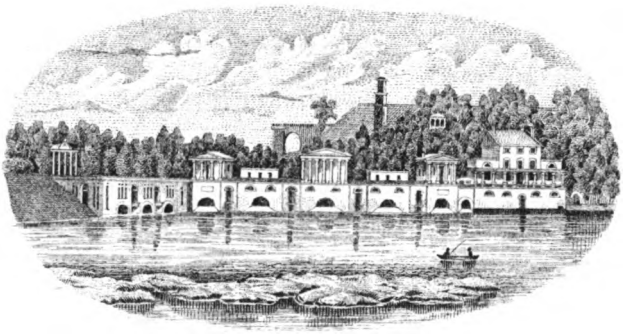
FOR

SUPPLYING THE CITY WITH WATER.

ANNUAL REPORT

OF THE

Chief Engineer of the Water Department,



OF THE

CITY OF PHILADELPHIA.

FOR THE YEAR 1881.

Presented to Councils March 2, 1882.

PHILADELPHIA:

J. SPENCER SMITH, PRINTER, 501 CHESTNUT STREET.

1882.

COMPLIMENTS OF

WILLIAM H. McFADDEN,

CHIEF ENGINEER.

Please acknowledge the receipt of this Report.

REPORT

—OF THE—

CHIEF ENGINEER.

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Committee on Water Works, 1881-82.

WILLIAM S. REYBURN, *Chairman.*

John McCullough, Daniel Blair, John K. Cumming,
Adam Albright, Thomas H. Green, Daniel W. Gilbert,
Fred. Halterman, George Roney, Oliver Parker,
Geo. R. Snowden, John C. Bickel, Wm. B. Irvine,
Henry Clay, Jerome Beaver, Chas. K. Smith,
John Flanagen, James McCormick, Wm. B. Bement,
J. Gordan Showaker, John T. Strickland, Wm. F. McCully
Sam'l F. Stringfellow, Andrew J. Maloney.

GEO. A. SMITH, *Ex-officio.* GEO. W. BUMM, *Ex-officio.*

WM. HENRY LEX, *Ex-officio.*

OFFICERS.

Chief Engineer—WILLIAM H. McFADDEN.

ASSISTANT ENGINEERS.

JOHN L. OGDEN. CHARLES G. DARRACH. JOHN E. CODMAN.

GENERAL SUPERINTENDENT OF WORKS.

ROBERT McFADDEN.

Chief Clerk- J. T. HICKMAN.

William M. McFadden, *Draughtsman.* William J. Innes, *Muster Clerk.*
George W. Eckert, *Assistant Clerk.* W. W. Widdifield, *Pipe Clerk.*
John A. Hayes, *Telegraph Operator.* Thos. J. Lister, *Messenger.*

PIPE RECORDING CLERKS.

William Whitby, Allen J. Fuller.

Superintendent of City Shop—JAMES F. NEALL.

PURVEYORS.

1st District—John H. Holmes, Wharton, above Eleventh.
2d " David A. Craig, 918 Cherry Street.
3d " Chas. I. Lowry, 1420 Frankford Ave.
4th District—William Ewing, 810 Corinthian Ave.
5th " Henry Dawson, Lyceum Build'g, Roxbo'h.
6th " David B. Morrell, Town Hall, Germant'n.

ENGINEERS AT WORKS.

Fairmount—Jos. Moyer, A. C. Bonsall. *Belmont*—Abram Stott, Jno. E. Smith.
Schuylkill—Josh. Bartley, David Pyke. *Roxborough*—W. H. Smith, Lew. Culp.
Delaware—John H. Penn, Jos. Thompson. *Frankford*—Charles Douglass.
Chestnut Hill—James M'Clenahan, *Asst. Engineer.*

REGISTRAR'S DEPARTMENT.

Registrar—A. N. KEITHLER.

John S. Warner, *Chief Clerk.* Wm. J. Halliday, *Receiving Clerk.*
John F. Scheidt, *Permit Clerk.* A. Bucheister, *Registering Clerk.*

ENTRY CLERKS.

George Macauly, Chas. D. Birney.

BILL CLERKS.

Joseph Fisher. John M. Stacker. Chas. L. Hayden. Thomas Orr.

INSPECTORS.

E. S. Higbee, E. D. Thomas, John H. Haines,
James H. Graham, W. H. Hergesheimer, Thomas Shaffer,
S. D. Woodington, James Carr, Henry Marshall,
Louis Obermiller, Wm. A. Agnew, William Erwin,
E. M. Rowe, James Cameron.

REPORT.

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

GENTLEMEN:—For the ninth time I have the honor to submit the Annual Report of the Water Department, wherein will be found the operations of the works for the year ending December 31, 1881, their condition and the extensions so much needed.

These demand your immediate attention and your earnest co-operation to avoid the calamity of a short supply, so fortunately averted last summer, though every other City on the Atlantic slope suffered either from impure water or an inadequate supply.

In my judgment, one million dollars would not compensate the loss sustained by one day's suspension of the City's industries for want of an adequate water supply, not to speak of the inconveniences of a domestic and sanitary character, and its importance for safety in case of fire.

Is it not, therefore, better to prevent by the proper use of the means at *your* command than to cure at such a fearful sacrifice?

Are not the people, who pay through this Department a surplus of one million dollars a year, entitled to an abundant supply of water and of an acceptable quality, which could be obtained by reservoir capacity for subsidence?

RECEIPTS.

The receipts of the Department for 1881 amount to $1,479,605.12, of this $1,474,056.11 was collected at the office of

the Registrar, and $5,549.01 at the office of the Chief Engineer.

The increase over 1880 is $33,263.59, of which $32,500.65 was received by the Registrar, and $762.94 by the Chief Engineer.

Revenue.

The revenue for 1881 amounts to $1,509,541.34, which includes the above receipts of $1.479,605.12 and $29,936.22 collected by the City Solicitor from liens for water-pipe, as per his weekly and monthly returns reported to this Department. The amount of water-pipe liens collected for 1881 was $8,079.31 less than in 1880.

Expenditures in 1881.

From annual appropriation of December 31, 1880	$434,486	50
" " " by transfer of December 2, 1881, from the special of $80,000, Item 24, in the annual appropriation	10,000	00
From special appropriation, refunds, December 31, 1880, and June 16, 1881	2,376	84
From special appropriation of $80,000.00, less transfer of $10,000 00	26,058.28	
From special appropriation of $100,000.00, less $739.26, which was expended in 1880	88,427	29
From consolidated balances of loans of the $56,000.00 appropriated, less expended in 1880, $1,170 35 = $54,829.65	15,536	33
From balance of consolidated loans, $15,037.17	2,502	50
Total expended in 1881	$583,387	74
Total receipts for 1881	$1,479,605	12
Total expenditures for 1881	583,387	74
Receipts in excess of expenditures	$896,217	38
Total Receipts for 1881	$1,479,605	12
Less expended from annual and special appropriations	565,348	91
Profits of the Department for 1881	$914,256	21

Profits for 1881		$914,256 21
Add water-pipe liens collected by the City Solicitor...		29,936 22
Revenue in excess of all expenditures		$944,192 43

Summary of Expenditures for 1881.

Salaries of the Engineering Department		$18,400 00
" " Registering Department		26,885 00
" at Pumping Stations		58,065 00
Salaries		$103,350 00
Supplies—Coal and wood	$84,972 32	
" " " deficiency	24,887 60	
" Tallow, oil and gas	8,978 50	
" Small stores	3,500 00	
		$122,338 42
Repairs to machinery at works, for materials	$14,986 06	
Repairs to distribution, pipes, plugs, etc., materials	199 05	
Repairs to buildings, grounds and reservoirs, materials	12,484 94	
Materials	$27,670 05	
		$27,670 05
Repairs to machinery at works, for wages	$11,013 06	
" distribution, pipes, plugs, etc., wages	24,732 11	
Repairs to buildings, grounds and reservoirs, wages	22,967 96	
Wages	$58,713 13	
		$58,713 13
Incidentals—Books, stationery, printing, etc	6,498 89	
" Fuel, ice, rents, etc., for offices,	4,493 35	
" Carriage hire for Chief, Assistant and Superintendent...	1,025 00	
		$12,017 24
For maintenance—from annual appropriation		$324,088 84
" " " special " and refunds		2,376 84
Total expended for maintenance		$326,465 68

Improvements to Distribution.

Drills	$9,449 50	
Pipes, fittings, castings, material, etc.	48,828 34	
Labor, laying pipes and shop rolls (wages)	49,999 82	
Pipe laying roll (salaries)	16,120 00	
		$124,397 66
		$450,863 34
Less expended from special appropriation for refunds,		$2,376 84
Expended from annual appropriation		$448,486 50
Amount merged		358 50
		$448,845 00
Item 24, of $80,000.00, a special appropriation for the extension of the works, less the transfer of $10,000.00		$70,000 00
Annual appropriation		$518,845 00

The expenditure for maintenance was $326,465.82, or nearly 22 per cent. of the receipts of the Department, and the expenditure for improvements and extensions was $256,922 06, or 17 per cent. of the receipts.

The expenditures are classified as follows:

For materials, purchased from lowest bidders, under contract	$333,966 30
For salaries, fixed by Councils	119,470 00
" wages, paid mechanics and laborers, as rated by Committee	127,574 60
For refunds, paid in warrants	2,376 84
Total	$583,387 74

The surplus of receipts over expenditures has more than liquidated all loans provided for the use of the Department. If the water furnished gratuitously for all public purposes, including fire protection; and to charitable institutions at fifteen per cent. of the legal rates, was paid for at legal rates, this sum would meet the interest on the cost of the plant.

The water rates in Philadelphia are as low as any City in the world, and a greater quantity of water is pumped than in any City, London and Paris alone excepted.

The low rates for water inure to the benefit of the citizens, in accordance with the theory on which the works were established. This theory was not to make the works a source of profit, but to be self-sustaining and the application of the surplus receipts over expenditures to extensions in order to secure and maintain an abundant supply of the best quality.

If this Department were made to operate within its own sphere there would be ample means from its own resources to obtain the end in view, so much needed, an abundant supply of wholesome water, subsided so as to be acceptable to the most fastidious.

Comparative Statements.

During the eighteen years, including 1855 and 1872, the receipts of the Department were $11,807,813.76, and the expenditures $9,129,779.85, an expenditure of 77 per cent. on the basis of receipts. During the nine years, including 1873 and 1881, the receipts were $12,018,533.68, and the expenditures $7,400,157.70, an expenditure of less than 62 per cent. on the basis of the receipts. In other words, the 38 per cent. of surplus of receipts amounting to $4,618,375.98 during the last nine years has been deposited with the City Treasurer, and has been used by Councils for the maintenance of the other departments or to lessen the tax rate.

During the first period of eighteen years the quantity of water pumped was about 170 billion gallons, and the work done, meaning a million gallons lifted 100 feet high, was 193 billion gallons.

During the second period, or the last nine years, the quantity of water pumped was about 162 billion gallons and the work done was 231 billion gallons.

This shows an increase of work done in the second period

of nine years, compared with the period of eighteen years, of over 20 per cent., involving an increase in the supplies and running expenses.

The expense of maintenance in 1881 was about double that of 1866, but the amount of work done in 1881 was about threefold that done in 1866.

In 1819, iron water-pipes came into general use and the use of wooden logs was abandoned.

Iron water-pipes were first used as an experiment in 1804 and again in 1817.

From 1819 to 1854 inclusive, a period of 36 years, 248 miles and 4,790 feet of iron pipes, weighing, as estimated, 58,195,359 pounds or 29,097 net tons, and 1,359 pounds were handled.

Of this amount there was taken out and twice handled 6,302 feet, weighing, as estimated 94,530 pounds or 47 net tons and 530 pounds, leaving 247 miles and 3,768 feet in the ground and added to the distribution of the City up to 1855. The estimated weight of this is 58,100,829 pounds or 29,050 net tons and 829 pounds.

From 1855 to 1872 inclusive, a period of eighteen years, 303 miles and 5,085 feet, weighing, as estimated, 83,534,413 pounds or 41,767 net tons and 413 pounds were handled. 116,792 feet, or 22 miles and 632 feet, weighing, as estimated, 2,511,271 pounds, were purchased from the Germantown Water Company. Of the amount laid by the City there were used for repairs, lowered and raised, taken out and twice handled 94,416 feet or 17 miles and 4,656 feet, weighing, as estimated, 3,608,436 pounds or 1,804 net tons and 436 pounds.

The cost during the eighteen years, from 1855 to 1872 inclusive, for lead, pipes, etc., and pipe laying, exclusive of the cost of the Germantown distribution, was $3,716,134.94, of which $1,581,828.02 was from loans and $2,134,306.92 from taxation.

The cost of pipes handled, on the basis of the estimated

weight, which was 83,534,413 pounds, was $4.45, nearly, per 100 pounds.

From 1873 to 1881 inclusive, a period of nine years, 219 miles and 3,599 feet, weighing, as estimated, 58,326,851 pounds or 29,163 net tons and 851 pounds were handled, and 29,350 feet, or 5 miles 2,950 feet, weighing, as estimated, 601,086 pounds, or 300 net tons and 1,086 pounds, were purchased from the Chestnut Hill Water Company. Of these amounts there were used for repairs, lowered and raised, taken out and twice handled, 140,259 feet, or 26 miles and 2,979 feet, weighing, as estimated, 3,816,485 pounds or 1,908 net tons and 485 pounds. The cost during this period of nine years for the lead, pipes, etc., and the pipe laying was $2,675,009.57, of which $645,996.37 was from loans, and $2,029,013.20 from taxation. The cost of the pipe handled during this period, on the basis of the estimated weight, was $4.58, nearly, per 100 pounds. The average cost since consolidation was $4.51, nearly, per 100 pounds. The cost of lead, pipes, etc., and pipe laying, previous to consolidation, has not been ascertained nor is it likely to be, as the records of the Districts entering into the consolidated City are not accessible at this late date.

The $16,529,937.55 expended since consolidation may be classified as follows:

The cost of maintenance	$5,401,564 06
" " pipes etc. (distribution)	6,391,144 51
" " machinery	1,463,359 04
" " buildings, grounds and reservoirs	2,815,066 70
" " works purchased, Germantown, Chestnut Hill, and payments made in 1855 and 1856 on the Twenty-fourth Ward works	236,539 81
" " drills, surveys and incidentals	222,263 43
Total expended since consolidation	$16,529,937 55

Add to this, when ascertained, the cost of the Fairmount,

the Spring Garden, the Delaware, the old Twenty-fourth Ward Works, together with the Centre Square Works and their distributions, and we have the entire expenditure since the inception of the Water Works.

In the last nine years more pounds of pipe were handled than in the thirty-six years preceding 1855, and nearly two-thirds as much as in the eighteen years between 1855 and 1872 inclusive. In these nine years 198 miles and 3,570 feet of pipe was added to the 308 miles and 1,061 feet laid in the previous eighteen years, to which add the 247 miles and 3,768 feet laid previous to consolidation, and we have a total of 754 miles and 3,119 feet of pipage in the distribution, weighing, as estimated, 97,814, or nearly 100,000 net tons of cast-iron pipe.

Cherry Street Shop.

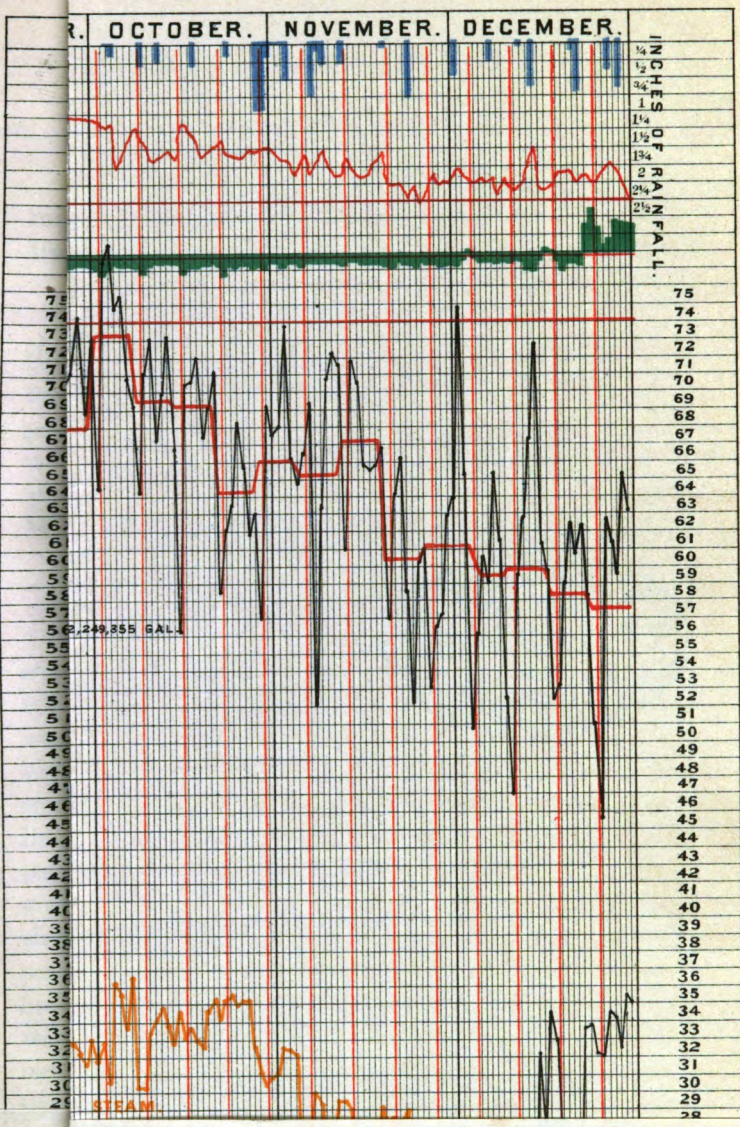
The Cherry street shop is a valuable adjunct to the department in that it gives such control of the employees as enables the repairs to the machinery and the pipes in the distribution to be done with promptness and dispatch.

This shop should be moved to the neighborhood of the Spring Garden Works, a location central to all the pumping stations, with railroad facilities to each of them. It should be enlarged and better tools and facilities provided for the constantly increasing demands made upon it to keep in repair and maintain in good order the machinery and pipes under the care of the Department. The present location of the shop in Cherry street would be very suitable for the Purveyor's office and yard for the Second District, being convenient to the centre of the City, where the largest and most valuable property is located.

Telegraph.

The number of messages sent from this office during the year 1881 was 2,436 and the number received was 2,217,

YEAR 1881.



making a total of 4,653. Of these 219 were in reference to leaks and breaks in the pipes in the distribution.

The Pumpage Diagram

Shows graphically the daily rainfall, the noonday temperature at Fairmount, the number of days in which no water passed to waste over the flash-boards, the number of days in which it did pass to waste. It shows also the daily pumpage at each of the Works, the total daily pumpage of all the Works, as well as the weekly average consumption of water.

Buildings, Grounds and Reservoirs.

These received the usual attention, so far as the means supplied would enable. When less than one per cent. on the estimated value is provided not much can be done in the way of keeping them in repair and good order. Less is provided for this purpose than in former years when loans and special appropriations were used to maintain and keep them in order. The standpipe at Spring Garden was scraped and painted, the one at the Delaware Works was changed into an air vessel as it was leaky and worn out, and the upper portion should be taken down and removed before it becomes dangerous. An overflow pipe with governing valves, stop-house and apron was provided at the southwest corner of the Delaware Basin by means of which the Belmont Works, and the new engine at the Spring Garden Works may be used to supply water to the Delaware Basin. At the Belmont Basin the thirty-six inch pumping main was carried over the top of the embankment in order to help subside the water furnished to West Philadelphia.

The brick lining of all the reservoirs which the frost disturbed was repaired, the railroad tracks at the various Works, both the sidings and those to the boiler houses were repaired and kept in good order under contract. At the Belmont and

Spring Garden Works 1,228 square yards of cobble paving were laid in the rear of the boiler houses. At the Spring Garden Works one of the coal bins was refloored. The excavation for the addition to the coal bin at Belmont was extended. At Belmont the building both inside and outside was painted, as well as the outside work at Spring Garden, Roxborough and Frankford. The tin roofs at Roxborough and Frankford were painted. All this painting was done under contract. At Fairmount the painting was done by the foreman and his helpers, and included the painting done to the machinery.

The roof over No. 1 Turbine and the water closets forming the piazza of the old Mansion House was so worn as to be leaky and dangerous. The old material was removed and replaced by a pavement upon brick arches supported upon I beams and Phœnix columns. The old floor in the basement at the Delaware Works was taken out and renewed under the engine-room and in the standpipe vault.

Recommendations.

Of the recommendations contained in the supplemental report presented to Councils October 1, 1880, the following have been provided for:

The 20 inch main on Market street, from Front to Broad.

The 20 inch main on Broad street, from Girard Avenue to Callowhill street.

The 20 inch main on Sixteenth street, from Spring Garden to Callowhill street.

Leaving the following to be provided for, and to which we would again urge your special attention.

The connecting of pipes at intersections.

Relay with larger pipes those of four inches and less.

Twenty inch main on South street, from Delaware avenue to and along Gray's Ferry road to Federal street.

Twenty inch main on Market street, from Broad to Twenty-second street.

Twenty inch main from Ninth and Jefferson to Marshall and Callowhill streets.

Thirty inch main on Twenty-first or Twenty-second street, from Callowhill to South street.

Twenty inch main on McCallum and Green streets, from Allen's lane to Manheim street.

Thirty inch main, from Belmont Reservoir down Fifty-second to Walnut street.

Twenty inch main on Lancaster avenue, from Fifty-second to Forty-fourth street.

Connect the ten inch pipe supplying the C. T. A. B. Fountain with the ten inch pipe on Elm avenue, to avoid a complete shut-off in the supply to West Philadelphia should a break occur in the present supply pipe.

Five million gallons per day pumpage is all that can be relied upon at Fairmount in the summer. Seventeen million gallons, the maximum average, was pumped at Belmont during 1881. A daily average of thirty-five million gallons for one month was pumped at Spring Garden, with one small engine in reserve. These three Works during the summer period of 1880 pumped a maximum average of fifty million gallons per day, while in 1881 they reached fifty-seven millions, an increase of fourteen per cent.

The increased distribution provided by the twenty inch main on Market and Broad streets and the twelve inch pipe on North Broad street will increase the consumption from these Works in 1882 to at least sixty-six million gallons, which is all that we can rely upon from them, without any reserve for the increased summer demand; so that additional engines and boilers are imperatively demanded and should be commenced immediately so that the supply for 1883 may be assured.

I would therefore advise that an engine and boiler house

be erected over the forebay in the rear of the present Works, and that engines and boilers capable of lifting from fifteen to twenty million gallons be purchased and erected. The old No. 4 overhead Cornish next to the Cramp engine can then be taken down and sold and in its place a large engine erected to be supplied with boilers erected in No. 4 boiler-house.

Duplicate engines should be provided for Frankford and Roxborough so as to avert any contingency in case of accident or injury to the present machinery.

Subsiding basins should be provided, such as the proposed Cambria, with its pumping and distributing mains, so as to assure a supply to the median levels.

The East Park Reservoir, as a subsiding basin, with its pumping and distributing mains, should be provided for the low levels.

An enlarged basin for subsidence at Mount Airy to supply Germantown.

Pumpage.

The total pumpage for 1881 amounted to 22,721,014,838 U. S. gallons, a daily average of 62,249,355, an increase over 1880 of 1,600,221,452 gallons, or more than 7½ per cent., a daily average increase of 4,384,171.

The pumpage at Fairmount by water power was 7,575,326,689, a daily average of 20,754,319, a decrease, compared with 1880, of 312,569,565 gallons, or almost 4 per cent., a daily average decrease of 856,355 gallons.

For the first six months in 1881 the daily average pumpage was 28,496,604 gallons. For the month of June it was 32,981,374 gallons, while for the last six months it was only 13,138,268 gallons.

From August 13th to November 1st, a period of eighty days, the daily average pumpage was only 5,883,104 gallons.

In the month of September the daily average was but 5,220,277 gallons, the least average monthly pumpage in the

history of the works, corresponding to the least minimum flow of the river, as measured by Mr. Edwin F. Smith, Chief Engineer of the Schuylkill Canals, and reported by him at 167,200,000 gallons, as compared with the minimum flow reported for 1874, which was 245,500,000 gallons.

From July 2d to December 3d no water ran to waste over the dam, and as none was wasted during this period, and as the pumpage into the City reservoirs and mains from the Schuylkill was 60,079,697 gallons per day, about 107,000,000 gallons must have been used in the lockage of boats, leakage through the canal, the dam, and through the head gates at Fairmount Works.

Estimating the lockage at 7½ millions, the remaining 99,-500,000 gallons would represent the total amount of water as power, including all leakage through the dam and gates, and represents 19,000,000 gallons to pump one million gallons into the reservoirs. An attempt was made to measure the water admitted to the turbines, by means of an electric current meter, but the flume is so short that conflicting currents and eddies prevented even a rough approximation, so that we are still forced to *estimate* the actual quantity of water used in pumping.

The amount heretofore adopted by competent engineers has been 15 millions to pump one, nor does it seem far from correct. Leakages through the dam, 1,112 feet long, and through six gates, would make up the 19 millions, as observed.

The pumpage at the Spring Garden or Schuylkill Works was 6,902,344,760 gallons, a daily average of 18,910,533 gallons, an increase over 1880 of 1,418,683,480 gallons, or nearly 26 per cent., a daily average increase of 3,886,804 gallons.

For the first six months of the year the daily average was 10,663,153 gallons, for the month of June it was 14,570,153 and for the last six months it was 27,077,794, while for the months of September and October it was 33,801,238 gallons.

A comparison with the Fairmount pumpage will show how

these steam works supplement the Fairmount water-power works when the flow of the Schuylkill is insufficient to drive the turbine wheels.

The pumpage at the Belmont Works was 4,245,905,582 gallons, a daily average of 11,632,618 gallons, an increase over 1880 of 702,448,143, nearly 20 per cent., or a daily average increase of 1,924,515 gallons.

For the first six months of the year the daily average was 8,119,313 gallons, for the last six months it was 15,088,639 gallons, while the daily average during 61 days of September and October reached 17,000,000 gallons, or 92 per cent. of the theoretical capacity of the works.

The increased pumpage at the Schuylkill and Belmont Works was made possible by the new boilers and engines erected during the winter of 1880 and spring of 1881. These enabled us to give a plentiful supply of water to the second system or median levels, as well as to supplement the supply to the first system, or low levels, which could not have been done without them. The flow of the Schuylkill was never less, and but for this increased machinery Philadelphia would have suffered with New York, Brooklyn, Boston and Richmond, Va.

The pumpage at Delaware Works was 1,815,583,861 gallons, a daily average of 4,974,202 gallons, a decrease, compared with 1880, of 180,390,215 gallons, or 9 per cent., a daily average decrease of 494,236 gallons.

The pumpage at the Delaware Works since 1879 has been reduced 17 per cent. by means of the additional mains from the Schuylkill River Works, and by means of the increased machinery and boilers. The sewage poured into the Delaware river makes the water pumped at these works objectionable, and has forced the Department to reduce the pumpage at these works to a minimum, and, as soon as the East Park reservoir with its distributing mains are finished, may enable us to abandon the supply of water from this pumping station, and

protecting the water supply, as has been outlined in the report of this Department for 1876.

The pumpage at the Frankford Works was 880,083,222 gallons, a daily average of 2,411,187, a decrease, compared with 1880, of 70,565,986, or about 7 per cent., a daily average decrease of 193,332 gallons.

The pumpage at the Roxborough Works was 1,210,095,644 gallons, a daily average of 3,315,330 gallons, an increase of 93,558,535 gallons, almost 9 per cent., or 256,324 gallons.

The pumpage at the auxiliary works to Manatawna was 3,833,880 gallons, an increase of 772,710 gallons, or 25 per cent.

The pumpage at the Chestnut Hill Works was 87,841,200 gallons, a daily average of 240,661 gallons, a decrease compared with 1880 of 714,650 gallons, or almost one per cent. These works supply a suburban district composed chiefly of country seats, the summer population being much greater than at other times of the year; the daily average during the months of July, August, September, and October is 300,000 gallons, while during the remainder of the year it is about 200,000 gallons.

The total amount of water pumped into the reservoirs and distribution during 1881 was 22,721,014,838 gallons. This equated into work done amounts to 34,238,528,111 gallons pumped 100 feet high, an increase over 1880 of 2,552,252,839 gallons, or nearly 9 per cent.

The amount of water pumped by steam-power equated into work done was 26,663,201,422, nearly 80 per cent. of all the work done, and an increase over 1880 of 2,864,822,404 gallons pumped 100 feet high, or over 12 per cent.

The amount of work done by water-power was 20 per cent. of the total, and 4 per cent. less than in 1880.

Expense of Pumpage.

The work was accomplished at a total expense of $235,-

611.64, or $6.88 per million gallons lifted 100 feet high by both steam- and water-power, divided and compared with 1880 as follows:

	1880.	1881.
Wages of engineers and fireman per one million gallons, 100 feet	$1 79	$1 84
Coal	2 46	3 60
Oils and gas for lubrication and lighting	0 22	0 21
Repairs and boiler cleaning, and small stores	1 04	1 23
	$5 51	$6 88

the increased expenses due principally to the increased price of coal, small stores and repairs.

The expense of work done by water-power was $2.21 per million, 100 feet high, against $1.98 in 1880, and of that by steam-power $8.20 per million, against $6.68 in 1880, the average price of coal in 1881 being $4.38, against $3.34 in 1880.

Rainfall and Flow of River.

The rainfall at Philadelphia for the year was 40·28 inches, at Reading 40·29 inches and at Lebanon 36·08 inches. The month of June was unusually wet, an average of 6·42 inches at the three points named, and compares with other years as follows: June, 1869, 5·07 inches; 1876, 3·22 inches; 1877, 5·62 inches; 1878, 3·70 inches; 1879, 5·12 inches; 1880, 2·97 inches; 1881, 6·42 inches. The remainder of the year was unusually dry, being for July, August, and September but 3·46 inches, and for the six months ending January 1, 1882, 14·08 inches. The corresponding rainfall during these six months in various years are as follows: 1869, 22·65; 1876, 25·39; 1877, 24·50; 1878, 21·12; 1879, 18·84; 1880, 19·66; 1881, 14·08.

During 173 consecutive days from July 1st to December 21st there were but two days in which any water flowed to waste over the dam, and during this time only 13 inches of rain fell. At Lebanon, from June 30th to September 26th,

a period of 89 days, or 3 months, but 1¼ inches of rain fell, being one of the dryest periods on record. The month of August was the dryest at Lebanon for 28 years.

The minimum daily flow of the Schuylkill is reported to have been but 167,000,000 gallons, or 21,600,000 cubic feet in 24 hours, or 250 cubic feet per second, or only ·00022 cubic foot per acre per second, and ·1389 cubic foot per second per square mile.

The Supply.

The supply during the year has been good. No complaints that were not due to local causes, and easily remedied, have been presented.

The old City had a fair supply, its only cause of complaint was for want of larger mains. The second system or median levels north of Spring Garden street had an abundance of water, the pressure not less than fifteen pounds at the plugs. The pressure in West Philadelphia is yearly becoming less, and should be augmented by a duplicate main from the Belmont Basin.

Frankford and Roxborough were abundantly supplied, although Germantown suffered during the dry summer by reason of the free use of water for irrigating lawns and gardens. The mains from the basin are not sufficient to carry enough water to keep up a pressure for household use and at the same time provide for irrigation.

Quality.

Those localities receiving the water directly from the Roxborough, Frankford, and Belmont Basins have had subsided water during the year, each basin having a present subsiding capacity of not less than one week. In the major part of the City, however, the water is supplied either directly from the river or through basins of small capacity; this defect should be remedied by the construction of the Cambria basin for the

second system or median levels and the finishing of the East Park Reservoir for the old City and low levels.

Brooklyn excepted, the organic impurities are not as bad as in other cities, as may be seen from the following report of Professor Leeds, of the Stevens Institute, Hoboken, N. J.

To improve the quality and prevent further contamination all the sewage of Philadelphia and inland towns on the Schuylkill should be excluded from the river.

The expense of preventing pollution would be far less than the cost of bringing water to the City from remote sources, which has been estimated at from ten to thirty million dollars.

HOBOKEN, N. J., June 29, 1881.

CERTIFICATE OF FINAL WATER ANALYSIS.*

From whom received.
W. H. McFadden, Chief Engineer. No. 16.
When received. June 24, 1 P. M.
Title of Label. Philadelphia Water.
Source of Sample. Spring Garden and Corinthian Basins—Schuylkill water.
Color, none. Taste, none. Smell, none.

DATA OBTAINED BY ANALYSIS.

		Parts in 100,000.	Grains per gallon.
I.	Free ammonia	0.001	0·0006
II.	Albuminoid ammonia	0·018	0·0105
III.	Oxygen required to oxidize organic matter	0·460	0·268
IV.	Nitrites	None.	None.
V.	Nitrates	0·6845	0·399
VI.	Chlorine	0·30	0·175
VII.	Total hardness	4·40	2·56
VIII.	Permanent hardness	.....	.....
IX.	Temporary hardness	.....	.....
X.	Total solids	14·30	7·75
XI.	Mineral matter	6·00	3·50
XII.	Organic and volatile matter	8·30	4·25
XIII.	Other data, when required for judgment.		

* A Preliminary Analysis is limited to data included under Sections I, II, VI, and VII, and is sufficient to determine whether the water is good enough to warrant further work. A Final Analysis includes all the data, and is essential to a sound judgment as to whether the water is to be finally endorsed as safe for drinking purposes, and fit for technical use.
The U. S. Gallon is taken at 58·318 grains.

The *Free Ammonia* is one-eighth of the amount permissible in safe drinking-water. The *Albuminoid Ammonia* approaches very closely to the maximum allowable amount and is twice that which is present in the Brooklyn (Ridgewood) water. The *Ratio* of the *Mineral* to the *Organic Matter* is 6 : 8.

INTERPRETATION OF RESULTS: By telegraphic despatch to the various cities, and by personal collection, samples were obtained from many of the principal cities of eastern United States, on the 23d—28th of June and analyzed with the the result of showing, that the order in regard to Purity was as follows: I. Brooklyn, the purest. II. Philadelphia. III. Baltimore. IV. Washington. V. Croton. VI. Hoboken. VII. Jersey City. VIII. Oswego. IX. Wilmington, Del. X. Boston (Cochituate).

The Philadelphia is safe drinking-water, but much inferior to the Brooklyn, in which the *Ratio* of the *Mineral* to the *Organic Matter* is 5 : 1.

Signed, ALBERT R. LEEDS, Ph.D.,
Professor of Chemistry, Stevens Institute of Technology.

MACHINERY AT THE WORKS.—REPAIRS, ETC.

FAIRMOUNT.

Turbines Nos. 1 and 9, the crossheads were lined up.

Turbine No. 3, the step was renewed.

Turbine No. 5, the plunger was repaired.

Turbines No. 7 and 8, the valves were renewed.

SPRING GARDEN.

Engine No. 4, Overhead Cornish, the follower was repaired in the steam-piston and new foot-valves put into the air-pumps. The steam-piston and water-valves may need renewal.

Engine No. 5, Side-lever Cornish. General repairs were made. The pump-valves were taken out and renewed. All balance steam valves were renewed, and the connections refitted. Copper steam connections made and U. S. metallic packing applied to the piston-rod.

Engine No. 6, Simpson Compound. The pump-valve of

bucket and plunger was repaired and bushed. Both steam piston-heads, broken May 11, were renewed complete with rings, springs and followers. The crank was bored out in place, a new crank-pin made and replaced and the engine lined up. U. S. metallic packing was applied to both high and low pressure piston-rods. The steam valves were repaired and ground in, the steam-pipe connections renewed and valves reset.

No. 7 Engine, Cramp. The pump-valves were reparied and the broken springs and guard plates renewed. The connecting-rods and links refitted.

Hot Well and Steam Pipe Connections and Boiler-room. All of the hot wells were connected to a 5 inch main, leading to the donkey pumps and injectors in the boiler-rooms, and independent connections made to boilers from donkey pumps. Independent steam connections were made to each of the engines, all the valves were refitted and repaired. All the boilers were cleaned, the furnaces relined, and the brickwork repaired. New mouth-pieces were put in No. 4 boilers, and the fire-fronts of No. 6 tubular boilers renewed. These boilers have been in use since 1870. The tubes are becoming leaky and should be renewed.

Belmont.

But little repairs were made to the engines and pumps. New valves, where required, were put in, the air-pump links and brasses were refitted. The steam-jacket of No. 2, broken August 27, 1881, was repaired. The low pressure piston-heads of the No. 3 Engine are cracked and must be renewed and No. 2 Engine overhauled.

In the boiler-room the cylinder boilers were cleaned, the furnaces relined, and the brickwork repaired. New mouth-pieces were set in boilers, the steam-pipe fittings and valves repaired.

DELAWARE.

Engine No. 1, High Pressure. The steam valves were refitted and the steam piston rings reset with blocks.

Engine No. 2, Low pressure. The links and brasses were renewed, the valve-rods repaired, lifting arms for rockers on valve-rods renewed. The pumps of these two engines require extensive repairs; the cylinders should be bored, the pistons renewed and the rods straightened.

Engine No. 3, Worthington. A new piston replaced the one broken July 10. The air-pump valves were renewed, and the steam cylinder of the right-hand low pressure engine patched. A new cylinder has been ordered and the engine must have extensive repairs made for next summer use.

Boiler-room. All the boilers were cleaned, the furnaces were relined and the tubular boilers patched.

The cylinder boilers have been condemned by the City Boiler Inspector, as per the following letter.

DEPARTMENT OF STEAM ENGINE AND BOILER INSPECTION.
PUBLIC BUILDING,
Entrance Market and Juniper streets.

Philadelphia, January 30, 1882.

DR. WM. H. MCFADDEN,
Chief Engineer.

DEAR SIR:—I respectfully call your attention to the critical and unsafe condition of the cylinder boilers at the Delaware Water Works. Having carefully examined these boilers, we find the lower shells worn out and unfit to be used.

The iron is very badly corroded and reduced by oxidation. In some of the sections the iron is wasted nearly through the sheets. There are already a number of patches on these sections. This is the condition of all of the lower shells, all of which will have to be renewed.

The upper shells of the two south end boilers are in a passably good condition, but the upper shells of the six north side boilers are in a bad condition; they are badly grooved in the seams and have already 28 or 30 patches on.

These boilers have been in use for 31 years, much of the time both day and night. The boilers were put in by Messrs. Morris & Co., in 1851, and it must be apparent to you that in this long use would be entirely worn out. I am impressed it would be injudicious and unwise to repair these boilers.

In view of the above facts and the present condition I am obliged to withhold my approval.

Very truly, etc.,

JOHN OVERN, *Inspector.*

Frankford.

No. 1 Engine, Cramp. The cut-off rockshaft was renewed and new steam joints made on the steam-chest, cylinder cap and steam pipes. The foot valves of the pump must be renewed, and the engine generally repaired.

Boiler-room. The boilers were cleaned, all steam pipe joints remade, the check-valves were refaced and ground in, and stop-valves repaired.

Roxborough.

Engine No 2, Worthington. The pump valves were renewed and the air-pumps repaired

Boiler-room. The boilers were cleaned, the furnaces relined and the brickwork repaired. Extensive repairs were made to the tubular boilers, 21 tubes renewed. The cylinder boilers patched, new mouth-pieces placed, steam joints, pipes, valves and fittings repaired.

The cylinder boilers at these Works should be taken out and replaced by new boilers.

The Roxborough auxilliary engine was repaired, the boiler cleaned, steam joints made, etc.

CHESTNUT HILL.

Engine No. 1, Geared. The pump connecting-rod, the spur-wheel and pinion were renewed, the steam valves on the engine repaired, and all joints made.

Engine No. 2, Knowles. The pump valves were repaired, and new gum rings put on pump plunger. All the drip and exhaust pipes were connected and carried outside of engine-room.

Boiler-room. The old cylinder boilers were cleaned and repaired, supplied with new grate-bars, safety valves, stop valves, check valves, water columns and gauge cocks.

EXTENSION OF WORKS.

The Worthington engine erected at Spring Garden Works under contract dated September 20, 1880, went into operation July, 1881, and has been in commission ever since. A shed was erected to protect it from the weather, the contractor for building the engine-house having failed after he had built the foundations, and the work has been relet. The contractor for building and setting the boilers at Spring Garden and Belmont finished his work in the spring; the boilers were examined and passed by the City Boiler Inspector before the payments for them were made. These boilers have been in service since their completion.

The contract was awarded to W. Bugbee Smith for the erection of a standpipe at the Spring Garden Water Works and the removal of the old West Philadelphia standpipe, using such parts of it as were suitable for the new standpipe. The contractor built the foundation for the new standpipe and furnished the base castings.

At Chestnut Hill a new boiler was furnished and set under a contract by Messrs. Hilles & Jones. The pools were all cleaned, the building painted and repaired.

DETAILED EXPENDITURES

—OF THE—

WATER DEPARTMENT

—FOR—

1881.

DETAILED EXPENDITURES OF THE DEPARTMENT FOR 1881.

General Appropriations.	Appropriated.	Expended	Balance Merging
An Ordinance making an appropriation to the Department for Supplying the City with Water for the year 1881. Approved December 31, 1880	$518,845 00		
ENGINEERING—SALARIES.			
Items 1, 20½ and part of 2	$18,400 00		
Salary of Chief Engineer		$4,500 00	
" Chief Clerk to Chief Engineer		1,800 00	
" Assistant " "		1,080 00	
" three Assistant Engineers		5,400 00	
" Draughtsman		1,350 00	
" General Superintendent of Works		1,800 00	
" Clerk to Gen. " "		850 00	
" Muster Clerk		810 00	
" Telegraph Operator		810 00	
		$18,400 00	
REGISTERING, COLLECTING WATER RENTS, ETC.—SALARIES.			
Items 3, 9, 10 and part of 2	26,885 00		
Salary of Registrar		2,500 00	
" Chief Clerk to Registrar		1,350 00	
" Receiving Clerk		1,300 00	
" Permit Clerk		1,080 00	
" Registering Clerk		1,080 00	
Amount carried forward		$7,310 00	

General Appropriations.	Appropriated.	Expended	Balance Merging
Amount brought forward		$7,310 00	
Salary of two Entry Clerks		1,800 00	
" four Bill Clerks		3,600 00	
" Pipe Clerk (registering)		810 00	
" fourteen Inspectors		12,600 00	
" Messenger		765 00	
		$26,885 00	
PUMPAGE—SALARIES.			
Items 4, 5, 6, 7, 7½, 8, 8½	$58,065 00		

Works.	Engineers.	Assistant Engineers.	Firemen, Oilers, Coal Passers, etc	Watchmen. Works.	Watchmen. Basins.	Watchmen. Grounds.	Police Grounds.			
Fairmount	2	9	.....	.....	.....	2	2	.....	10,575 00	.....
Delaware	2	.....	11	.....	2	.....	.....	.....	10,575 00	.....
Schuylkill	2	.....	12	.....	2	.....	.....	.....	12,420 00	.....
Belmont	2	.....	14	1	1	.....	.....	.....	12,600 00	.....
Chestnut Hill	.....	1	1	.....	.....	.....	.....	.....	1,275 00	.....
Roxborough	2	.....	6	.....	1	....	.....	}	7,020 00	.....
" aux.	.....	1	.....	.....	.....	.....	.....			
Frankford	1	.....	2	1	1	.....	.....	.....	3,600 00	.....
									$58,065 00	

SUPPLIES.

COAL AND WOOD.

Item 13	$85,000 00		
Belmont, 50 cords wood, at $6.45, contract	.....	322 50	.....
Schuylkill, 56 " " "	.....	361 20	.....
Delaware, 30 " " "	.....	193 50	.....
Roxborough, 20 " " "	.....	129 00	.....
Amount carried forward	.....	$1,006 20	.....

General Appropriations.	Appropriated.	Expended	Balance Merging
Amount brought forward.....	.....	$1,006 20	
Frankford, 20 cords wood, at $6.45, contract.....	.....	129 00	.....
Chestnut Hill, 10 " " "	.....	64 50	.....
Delaware, 69·00 tons coal, at $5,55.....	.....	382 95	.....
" 1,995·00 " at 4.34, contract...	.....	8,660 47	.....
Sch'lkill, 6,701·02 " at 4.44, "	.....	29,753 02	.....
Roxboro', 4,417·12 " at 4.33, "	.....	19,133 32	.....
Belmont, 4,940·16 " at 4.32, "	.....	21,344 26	.....
Ches. Hill, 575·03 " at 4.75, "	.....	2,731 96	.....
Frankford, 408·00 " at 4.33, "	.....	1,766 64	.....
		$84,972 32	$27 68
TALLOW, OIL, AND GAS.			
Item 14 ....$3,500 00			
Trans., June 20th, from Item 20..... 1,000 00	$4,500 00		
55½ gals. castor oil, at .69, contract...	.....	38 30	.....
395 lbs. Dixon's mch. gr., at .10.....	.....	39 50	.....
252½ gals. engine oil, at .25, contract...	.....	63 12	.....
780 " " at .20, " ...	.....	156 00	.....
1,172 " " at .23, " ...	.....	269 68	.....
1,301¾ " " at .21, " ...	.....	273 39	.....
250½ " valvoline, at 1.25.....	.....	313 12	.....
590 " lard oil, at .65, contract...	.....	383 50	.....
2,147 " head light oil, at .17, " ...	.....	364 99	.....
31,380 lbs. tallow, at .6½, " ...	.....	2,039 70	.....
100 gross sponge cloths, at 5.50, " ...	.....	550 00	.....
		$4,491 30	8 70
GAS AT WORKS AND PURVEYOR'S OFFICES.			
Item 14½.....	4,500 00	4,487 20	12 80
SMALL STORES.			
Item 15.....	3,500 00		
Globes for lamps, contract.....	.....	3 44	.....
Torches, contract.....	.....	7 20	.....
Amount carried forward.....	.....	$10 64	

General Appropriations.	Appropriated.	Expended	Balance Merging
Amount brought forward		$10 64	
Hardware, contract		10 90	
Brooms, contract		34 02	
Red lead		44 60	
Sundries		33 86	
Cotton waste, contract		59 07	
Emery cloth, contract		55 50	
Copper oilers, contract		52 25	
Gum, contract		67 76	
Iron barrows, contract		85 87	
Painting material		163 75	
Gum goods (tools), contract		368 34	
Hardware (tools), contract		570 07	
Packing, contract		843 37	
Sponge cloths, contract		1,100 00	
		$3,500 00	

General Appropriations.	Appropriated.	Expended.	Bal. merg.
Repairs—Items 16, 19, 19½, 21			
Repairs to Machinery—Item 16	$22,500 00		
Transferred December 2, 1881, from Item 24	3,500 00		
	$26,000 00		

Material.	Roxborough.	Frankford	Chestnut H.	Fairmount.	Belmont.	Schuylkill.	Delaware.			
Boiler fluid, contract	$200 00	$50 00	$50 00		$450 00	200 00	$150 00		1,100 00	
Copper pipe						37 49			37 49	
Gum rings & valves, con	264 45	48 77	6 15	$90 48	53 08	203 33	118 72		784 98	
Brass steam fittings, "	341 88	266 30	138 98	94 70	404 49	1,418 88	222 26		2,887 49	
Wrought iron " "	256 45	11 20	17 70	3 93	236 77	1,488 41	96 69		2,111 15	
Repairs to boilers	495 98				8 96	2,306 33			2,811 27	
Machine castings, cont	265 83	51 77			127 23	939 24			1,384 07	
Felt duck						9 10			9 10	
Fire brick, contract	183 94				193 65	346 52	118 40		842 51	
Machine work	8 38	1 50	4 65	1 86	31 46	26 17	1 75		75 77	
Packing, contract				280 00		570 40	160 00		1,010 40	
Combination felt, cont					72 00	109 56			181 56	
Lumber, contract				17 40		29 41			46 81	
Feed water heater, cont							850 00		850 00	
Piston rod body							91 75		91 75	
Current meter, contract				195 00					195 00	
Cotton waste, contract				104 39					104 39	
Duplex pump, "	180 50								180 50	
Wren bars, "	139 88								139 88	
Repairs to brick arch					141 94				141 94	
Total	$2,337 29	$429 54	$217 48	$787 76	$1,719 58	$7,684 84	$1,809 57		$14,986 06	
WAGES.										
Cleaning boilers	$111 00				$1,175 69	$901 30	288 00		2,475 99	
Machinists and extra firemen	447 18	$243 30	$61 17	$664 87	580 87	1,311 12	357 68		3,666 19	
Bricklayers	353 75	74 25		52 25	1,055 38	2,369 75	480 75		4,386 13	
Coal passers					124 25	227 50			351 75	
Riggers					55 00				55 00	
Hauling				26 00	26 00	26 00			78 00	
Total	$911 93	$317 55	$61 17	$743 12	$3,017 19	$4,835 67	$1,126 43		$11,013 06	88c.

General Appropriations.	Appropriated.	Expended	Balance Merging.
REPAIRS TO DISTRIBUTION.			
Item 19	$15,000 00		
Plumbing		$26 17	
Filling break over pipe		30 00	
Paving around plugs, contract		142 88	
Wages—Shop, Pressure Inspector		858 75	
" Germantown District		884 50	
" Manayunk "		922 25	
" First "		2,099 75	
" Second "		3,116 98	
" Third "		3,587 25	
" Fourth "		3,330 50	
		$14,999 03	97
MAKING NEW CONNECTIONS.			
Item 19½	10,000 00		
Wages—First District		$1,455 75	
" Second "		1,955 25	
" Third "		2,872 76	
" Fourth "		3,125 37	
" Manayunk District		523 00	
		$9,932 13	$67 87
REPAIRS TO BUILDINGS, GROUNDS AND RESERVOIRS.			
Item 21 $30,000 00			
Trans. Dec. 2, 1881, from Item 24 5,500 00	35,500 00		
Material—Wire screen		$1 20	
" Repairs to tool-house		3 35	
" Tolls, Columbia bridge		3 87	
" Terra cotta pipe		8 40	
" Flag-stone		10 35	
" Repairs to coal buckets		24 78	
Amount carried forward		$51 95	

General Appropriations.	Appropriated.	Expended	Balance Merging.
Amount brought forward		$51 95	
Material—Services of diver		30 00	
" Gum hose, contract		49 50	
" Plumbing		69 40	
" Painting roofs, contract		139 65	
" Gasket and waste "		148 53	
" Castings for R.R. tracks, contract		166 84	
" Scales, contract		167 00	
" Repairs to wharf, Del., contract		232 11	
" Hardware, contract		714 37	
" Painting stand-pipe, sch. contract		300 00	
" Iron coal cars, contract		411 00	
" Paints, brushes, etc., contract		642 90	
" Repairs to tracks, contract		931 52	
" Earth excavation and cobble pav. contract		778 84	
" Repairs to stand-pipe, Del		673 46	
" Repairs to roofs and spouts		778 29	
" Cleaning res., C. Hill, contract		774 50	
" Bricks, lime and cement, "		1,273 84	
" Removing ashes, contract		1,578 00	
" Lumber, contract		1,343 43	
" Painting at works, contract		1,229 81	
		$12,484 94	
Wages—Coal passers		1,673 49	
" Watchmen, Schuylkill and Frankford reservoir		432 25	
Wages—Riggers		1,032 18	
" Gardeners		957 25	
" Bricklayers		2,266 88	
Amount carried forward		$18,846 99	

General Appropriations.	Appropriated.	Expended	Balance Merging.
Amount brought forward.....	.....	$18,846 99	.....
Wages—Janitor and Watchmen at office.....	.....	2,003 25	.....
" Painters.....	.....	1,727 00	.....
" Helpers.....	.....	2,141 13	.....
" Hauling material and supplies.....	.....	2,415 00	.....
" Laborers.....	.....	2,531 27	.....
" Stone cutters and masons.....	.....	2,895 26	.....
" Carpenters.....	.....	2,893 00	.....
		$35,452 90	$47 10
INCIDENTALS.			
Items 11, 12, 17, 23.....			
BOOKS, STATIONERY, ADVERTISING, ETC.			
Item 11.....$5,000 00			
Transferred June 20, 1881, from Item 20, 1,000 00			
Transferred Dec. 2, 1881, from Item 24, 500 00	$6,500 00		
Books and stationery, contract.....	.....	3,182 48	.....
Printing report, contract.....	.....	992 33	.....
Advertising for privilege of cutting ice.....	.....	62 40	.....
" for removal of stand-pipe.....	.....	1,007 63	.....
" annual supplies.....	.....	1,254 05	.....
		$6,498 89	$1.11
OFFICE EXPENSES, FUEL, ETC.			
Item 12.....$4,000 00			
Transferred Dec. 2, 1881, from Item 24, 500 00	$4,500 00		
Iron pipe, contract.....	.....	5 00	.....
Freight.....	.....	13 33	.....
Testing boiler plates.....	.....	15 00	.....
Meals for workmen.....	.....	22 05	.....
Books, Ordinances of Councils.....	.....	21 00	.....
American District service.....	.....	22 66	.....
New towels.....	.....	24 00	.....
Amount carried forward.....	.....	$123 04	.....

General Appropriations.	Appropriated.	Expended	Balance Merging.
Amount brought forward		$123 04	
Weighing old boilers		25 92	
Ground rent		26 66	
Rent of testing scales		55 00	
Morning papers		37 44	
Hardware, contract		57 35	
Washing towels		84 00	
Brooms, brushes, etc., contract		84 17	
Rent of offices		100 00	
Repairs to heater, lounge, telegraph instrument, tools, etc		139 69	
Ice, contract		192 14	
Aquarium		125 00	
Coal, contract		170 20	
Carriage hire, contract		142 00	
Meals for Registrar's Department		147 60	
Postage stamps		279 50	
Engineers' supplies, contract		203 71	
Sundry small items		345 37	
Carpet and matting		323 63	
Stationery, contract		487 03	
Transportation—Inspectors and workmen		1,343 90	
		$4,493 35	$6 65
CARRIAGE HIRE.			
Carriage hire and keep of horse of C. E. Item 23	$650 00	650 00	
Carriage hire and keep of horse of General Superintendent of works, Item 17	375 00	375 00	
DEFICIENCIES.			
To pay deficiency of bills for coal delivered in 1880, Item 25	$25,000 00		

General Appropriations.	Appropriated.	Expended	Balance Merging.
Belmont, 2,555·08 tons, at $3 35		$8,560 59	
Roxborough, 603·18 " " 4 37		2,639 04	
Schuylkill, 2,734·13 " " 4 47		12,223 89	
Fairmount, 298·11 " " 4 60		1,373 83	
Freight—Transfer of coal from Belmont to Schuylkill		90 75	
		$24,887 60	$112 40
	$324,375 00	$324,088 84	$286 16
Expended for maintenance from annual appriation		$324,088 84	
Expended for maintenance from special appropriation, refunds		2,376 84	
Total expended for maintenance		$326,465 68	
IMPROVEMENTS.			
Drilling and making new attachments, Item 18	$9,500 00		
Wages—First District		$1,716 75	
" Second "		1,715 50	
" Third "		1,662 00	
" Fourth "		1,619 00	
" Manayunk District		1,433 25	
" Germantown "		1,303 00	
		$9,449 50	$50 50
Pipes—Special castings, fire plugs, stop cocks, lead, brass, iron and other materials, Item 22	$50,000 00		
Packing, contract		2 34	
Leather, "		3 50	
Use of siding		7 00	
Amount carried forward		$12 84	

General Appropriations.	Appropriated.	Expended	Balance Merging.
Amount brought forward		$12 84	
Lanterns, contract		12 50	
Alcohol "		13 17	
Hardware "		17 25	
Linseed oil "		20 25	
Headlight oil "		27 88	
Repairs to boiler shop		28 24	
Varnish		30 72	
Tubeing, contract		39 38	
Machine work		39 99	
Repairs to tools		39 27	
Wharfage		41 85	
Repairs to water meters		42 69	
Sheer poles		45 00	
Blasting powder, contract		49 65	
Freight		54 36	
Lard oil, contract		55 77	
Red clay		56 93	
Coke		74 70	
Gum rings for plugs, contract		124 00	
Rent of shops—Second and Manayunk districts		125 00	
Malleable castings, contract		156 01	
Gum goods, contract		178 70	
Water meters "		294 00	
Gasket and waste, contract		388 84	
Sponge cloth, contract		576 20	
Coal and wood for shop, contract		738 75	
Brass steam fittings, contract		853 06	
Patent plug valves "		1,000 00	
Hauling, contract		1,216 66	
Amount carried forward		$6,353 66	

General Appropriations.		Appropriated.	Expended	Balance Merging.
Amount brought forward			$6,353 66	
Lumber, contract			1,568 81	
Brass castings, contract			1,692 44	
Special pipe castings, contract			2,331 57	
Iron and steel, contract			3,266 33	
Lead, contract			4,837 59	
Iron shop castings, contract			5,131 72	
Barton patent valves "			5,410 00	
Iron pipes and special pipe castings, contract			19,407 70	
			$49,999 82	$0 18
LABOR IN LAYING PIPES, SETTING AND FITTING PLUGS, STOPS, ETC.				
Item 20	$52,200 00			
Transferred June 20, 1881, to Item 11	$1,000 00			
Transferred June 20, 1881, to Item 14	1,000 00			
Transferred June 20, 1881, to new Item 26.	1,350 00			
	$3,350 00	$48,850 00		
Inspecting pipe			$246 37	
Measuring over pipe			536 60	
Wages—Assistant Engineers' roll			1,130 00	
" Manayunk District			1,486 11	
" Germantown "			2,346 37	
" First "			2,851 25	
" Second "			8,997 75	
" Third "			3,951 75	
" Fourth "			3,899 00	
" Shop roll			23,383 14	
			$48,828 34	$21 66

General Appropriations.	Appropriated.	Expended	Balance Merging.
PIPE LAYING—SALARY ROLL.			
Items 26, 21½, 20½, part of 2 and 3...	$16,120 00		
Salary of Superintendent of City Repair Shop		1,440 00	
" Clerk to " " "		850 00	
" Six Purveyors		8,880 00	
" Five Clerks to Purveyors		3,600 00	
" Two pipe recording Clerks		1,350 00	
Amount appropriated, less the $80,000 00, special Item 24	$438,845 00		
Amount appropriated by transfer from the $80,000 special	10,000 00	$448,845 00	$448,486 50	$358 50
Less expended for maintenance from annual appropriation	324,375 00	324,088 84	286 16
	$124,470 00	$124,397 66	72 34
Expended for improvements from annual appropriation		$124,397 66	
SPECIAL APPROPRIATIONS.			
REFUNDS.			Not merging.
Special appropriation to refund certain twice paid and overpaid water rent and pipe laying bills, December 31, 1880	738 99	492 79	246 20
Special appropriation to refund certain twice paid and overpaid water rent and pipe laying bills	2,764 35	1,884 05	880 30
Included in maintenance		$2,376 84	

EXTENSIONS.

APPROPRIATIONS.		Specific Items.	Amounts available for 1881.			Balance not merging.
			Special appropr'tions		Loans.	
Special appropriation of December 31, 1880	$80,000 00					
Less transfers to annual appropriation	10,000 00					
			$70,000 00			
Special appropriation, December 31, 1878	$100,000 00					
Less expended in 1880	739 26					
				$99,260 74		
Consolidated balances of loans, June 14 and 20, 1880	$56,000 00					
Less expended in 1880	1,170 35					
					$54,829 65	
The balance of consolidated loans, Nov. 22, 1881					15,037 17	
Amounts available for 1881			$70,000 00	$99,260 74	$69,866 82	
EXPENDITURES.						
Item 24 of the annual appropriation	$80,000 00					
Transferred, December 2, 1881, to Item 11 $500 00						
" " " " 12 500 00						
" " " " 16 3,500 00						
" " " " 21 5,500 00						
	10,000 00					
			$70,000 00			
Carried forward		$70,000 00				

EXTENSIONS (Continued).

EXPENDITURES.	Specific Items.	Amounts available for 1881.			Balance not merging.
		Special appropr'tions		Loans.	
Brought forward..	$70,000 00				
For the purchase of pipe, special castlings and fittings, inspecting and hauling the same, and for labor necessary to lay a water-main on Market street, from Broad to Delaware avenue; a main on the east side of Broad, from Girard avenue to Callowhill street, and also a main on Broad, from Cambria to Erie avenue, and to relay with larger pipe on west side of Broad street, from Girard avenue to Poplar street. August 17, 1881.					
Wharfage		$4 70			
Special pipe castings.....Contract		91 09			
Advertising for above supplies		105 00			
Inspecting pipe		161 28			
Iron and steel.....Contract		296 41			
Lumber..... "		306 52			
Hauling..... "		460 60			
Brass castings..... "		609 07			
Iron castings for shop..... "		2,472 02			
Lead..... "		6,013 54			
Pipes (mains)..... "		12,571 55			
Wages, Fourth District		2,966 50			$43,941 72
Items appropriated from the $100,000.00 special appropriation and the $56,000.00 of consolidated loans.					
Item 1. For the purchase of new boilers, setting and fitting the same, and the erection of a new boiler house at the Belmont Works	$25,000 00				
Duplex Pump			$451 25		
New boilers			23,556 69	$992 05	
Carried forward	$95,000 00	$26,058 28	$24,007 94	$992 05	$43,941 72

EXTENSIONS (Continued).

EXPENDITURES.	Specific Items.	Amounts available for 1881.			Balance not merging.
		Special appropr'tions		Loans.	
Brought forward	$95,000 00	$26,058 28	$24,007 94	$992 05	$43,941 72
Item 2. For the purchase of a new ten million gallon engine, fitting and setting the same; new boilers, setting and fitting the same; stand-pipe and connections; the erection of a new engine house—all to be located at the Schuylkill Works	124,082 54				
Testing iron plates for stand pipe				6 95	
Lumber.....Contract				21 99	
Duplex pump..... "			451 25		
Wages (new connections)				2,713 87	
Stand pipe.....Contract				6,350 02	
New engine..... "			28,000 00	2,000 00	
New boilers..... "			33,425 36	1,123 00	$49,990 10
Item 3. For the removal of two boilers from the Schuylkill Works, setting and fitting the same, and the repairs to machinery, house and tank, and the making of new connections at Chestnut Hill Works	5,000 00				
Steam cleaner and baskets				19 00	
Gum goods.....Contract				27 20	
Coping stone				87 30	
Tubing and hardware.....Contract				114 01	
Painting..... "			171 08		
Brass steam fittings..... "				171 12	
Bricks, lime, cement and gypsum				303 77	
Removing old boilers.....Contract			382 35		
Lumber..... "				485 81	
Wages (new connections)				1,068 00	
New boilers.....Contract			1,989 31	49 24	131 81
Carried forward	$224,082 54	$26,058 28	$88,457 29	$14,541 28	$94,063 63

EXTENSIONS (Continued).

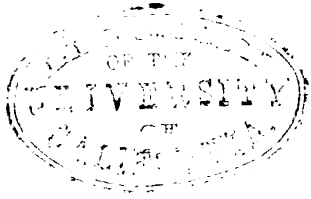
EXPENDITURES.	Specific Items.	Amounts available for 1881.			Balance not merging.
		Special appropr'tions		Loans.	
Brought forward	$224,082 54	$26,058 28	$88,457 29	$14,541 28	$94,063 63
Item 4. Advertising, printing, and stationery, and incidentals	3 00			3 00	
Test trial of the pumping engines at the Frankford Works, June 14, 1880	4 85				$4 85
For the purchase of pipes, special castings, and fittings, and hauling the same. Inspection and expenses incident thereto, and for the labor necessary to the laying of the water mains. November 22, 1881	15,037 17				
Wages, First District				196 50	
" Second "				537 50	
" Third "				842 50	
" Fourth "				718 00	
" Manayunk District				208 00	12,534 67
Available	$239,127 56				
Expended from $80,000 00		26,058 28			
" " 100,000 00			88,427 29		
" " 71,037.17 bal. of loan consolidated				$18,038 45	
Not merging		43,941 72	10,833 45	51,827 83	
Available for 1882					$106,603 16

EXTENSIONS.

Hallowell works.	Purchase of Mt. Airy reservoir.	Purchase of Chestnut Hill works.	Incidentals.	Total expended from Loans for Extensions.	Total.—Improvements, construction, and extensions.	Grand Total.
.....	.....	.....	.....	.....	$131,314 11	$248,226 09
.....	.....	.....	.....	.....	$71,037 24	$160,468 02
.....	.....	.....	.....	.....	77,446 17	200,653 00
.....	.....	.....	.....	.....	$148,483 41	$361,121 02

S COLLECTED BY CITY SOLICITOR.

Total.	Per cent. of Expenditures on Basis of Receipts.	Receipts in Excess of Expenditures	Expenditures in Excess of Receipts.	Revenue, less the Annual and Special Appropriations considered as Profits.
$248,226 09	66	$133,810 63	....	$133,810 63
$160,468 02	38	$254,857 89	.....	$254,857 89
200,653 00	47	225,125 31	.....	225,125 31
$361,121 02	43	$479,983 20	.....	$479,983 20
$187,978 09	41	$269,670 14	.....	$269,670 14
411,737 09	74	139,449 97	.....	326,100 03
252,532 54	45	305,998 99	.....	360,208 84
239,028 37	45	294,951 69	.....	371,293 80
$1,091,276 09	52	$1,010,070 79	....	$1,327,272 81
$217,966 18	40	$327,826 88	.....	$368,521 37
213,750 20	36	372,472 30	....	375,461 58
$431,716 38	38	$700,299 18	.....	$743,982 95



OPERATIONS

—OF THE—

REGISTRAR'S DEPARTMENT

—FOR—

1881.

Department for Supplying the City with Water.

Registrar's Office,
N. W. cor. Thirteenth and Spring Garden streets.

Philadelphia, January 2d, 1882.

Dr. Wm. H. McFadden,
Chief Engineer.

Dear Sir:—I herewith submit the report of receipts at this office for the year 1881.

The total amount derived from all sources was $1,474,056.11, which has been paid daily, as received, into the office of the City Treasurer. This is an increase over the previous year of $32,500.65.

The collections from water-rents for the year 1881 amounted to $1,256,662.00, an increase over the previous year of $37,736.34, and the receipts from delinquent rents amounted to $84,591.40, a decrease of $28,136.97.

The receipts from fractional rents, penalties and other sources amounted to $85,313.60; an increase over the previous year of $1,490.07.

The receipts from water-pipe amounted to $47.489.11, an increase of $21,411.21.

Pipe bills to the amount of $13,840.28 were returned to the City Solicitor for lien, and the amount collected by him was $29,936.22, as appears of record in that Department, as per his report to this Department.

Respectfully referring to the annexed itemized tables, I remain,

Yours, very respectfully,

A. N. Keithler,
Registrar.

Receipts at Chief Engineer's Office.

Old barrels and gum	$7 60
Conscience money returned through A. N. Keithler, Registrar	8 00
Overdrawn warrant (James McClenahan)	12 70
Stone	35 00
Brass scrap and turnings	640 23
Old iron	540 11
Rents	900 00
Old boilers	1,564 24
Bergner & Engel, fire attachment	227 71
Campbell Manuf. Co. " "	93 51
W. C. Allison " "	98 56
G. I. Littlewood " "	85 20
W. Arrott " "	82 39
Sharpless & Son " "	102 96
Baldwin Locomotive Works " "	103 02
James Stafford " "	83 75
Henzler & Flack " "	120 53
J. J. Glazier Bro. & Co. " "	87 22
J. B. Stetson " "	94 38
Knickerbocker Ice Company " "	83 64
Adams Express Co. " "	104 25
J. Wanamaker, repairs to pipe	12 04
Midville Steel Works " "	5 25
E. C. Knight " "	35 29
D. Hudson Shedaker " "	11 90
Hensel, Colloday & Co. " stop	17 20
W. B. Bement & Son " valve	34 05
Geo. B. Harris, removing plug	12 50
Aldine Hotel, changing connection for meter	72 25
St. James Church, motor attachment	99 26
Church of Epiphany " "	71 55
Reading Railroad Company, supply connection	102 72
	$5,549 01

Receipts at the Registrar's Office for the year 1881.

MONTHS.	Delinquent rents.	Penalties.	Rents of 1881.	Penalties.	Fractional Rents.	Water pipe.	Totals.
January	$3,213 75	$481 42	$70,532 43	.....	$864 66	$852 54	$75,944 80
February	2,828 75	412 50	99,853 79	.....	1,961 47	849 46	105,905 97
March	5,129 25	758 63	223,869 72	.....	6,578 01	2,300 07	238,635 68
April	14,108 05	2,099 70	668,813 22	.....	5,580 20	1,438 72	692,039 89
May	15,507 55	2,324 29	40,654 00	2,029 95	5,025 22	2,888 34	68,429 35
June	23,442 80	3,507 93	56,767 00	2,837 02	5,727 73	1,329 98	93,612 46
July	5,954 55	892 49	12,516 55	1,872 42	4,157 87	3,428 01	28,821 89
August	4,015 75	597 61	18,696 00	2,790 38	5,165 45	6,930 35	38,195 54
September	3,253 55	488 19	25,929 65	3,872 51	4,242 40	6,079 89	43,866 19
October	3,585 40	533 63	25,400 19	3,791 49	4,378 13	7,531 89	45,220 73
November	1,972 00	295 27	7,232 20	1,083 14	4,912 99	7,596 04	23,091 64
December	1,580 00	236 00	6,397 25	957 47	4,857 43	6,263 82	20,291 97
Total	$84,591 40	$12,627 66	$1,256,662 00	$19,234 38	$53,451 56	$47,489 11	$1,474,056 11

Amount of claims for water pipe returned for lien in 1881..... $13,840 28

Amount of claims for water pipe collected by City Solicitor in 1881.. $29,936 22

Comparative statement of receipts for the years 1880 and 1881.

YEAR.	Delinquent rents.	Penalties.	Water rents.	Penalties.	Fractional Rents.	Water pipe.	Totals.
1881	$84,591 40	$12,627 66	$1,256,662 00	$19,234 38	$53,451 56	$47,489 11	$1,474,056 11
1880	112,728 37	16,783 11	1,218,925 66	19,002 35	48,038 07	26,077 90	1,441,555 46
Increase			$37,736 34	$232 03	$5,413 49	$21,411 21	$32,500 65
Decrease	$28,136 97	$4,155 45					

Items of receipts under head of "Fractional Rents."

	Rents.	Ferrules.	Repaving.	Repairs.	Totals.
1881	$38,684 56	$7,086 00	$5,322 00	$2,359 00	$53,451 56
1880	35,505 07	5,828 00	4,482 0	2,222 50	48,038 07
Increase	$3,179 49	$1,258 00	$839 50	$136 50	$5,413 49
Decrease					

Estimated receipts in statement to City Controller	$1,417,500 00
Actual receipts, as above	1,474,056 11
Increase over estimate	56,556 11

Permits issued during the year 1881.

	WARDS.																													Totals.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
Dwellings	65	8	5	3	7	2	13	26	15	1	2	.....	.....	5	52	6	18	81	137	116	185	156	121	414	211	169	70	239	141	49	90	2,407
" ½	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6
Baths	43	11	7	6	4	1	20	49	13	4	2	3	1	8	53	6	17	43	123	95	53	96	26	300	122	89	78	221	143	43	75	1,755
Wash paves	17	5	3	.....	7	1	3	24	18	1	3	4	7	6	20	1	8	19	35	70	33	46	13	162	43	19	55	156	114	16	54	963
Water closets, urinals, and biddets	4	9	2	1	106	71	16	100	133	27	8	18	21	23	87	7	6	29	75	101	10	89	4	247	36	19	113	169	210	20	91	1,852
Basins, sinks, and wash tubs	4	.....	.....	.....	102	51	23	153	108	34	7	.....	22	18	66	2	.....	8	29	84	11	66	17	133	9	11	143	147	136	7	25	1,416
Bars	2	2	.....	1	4	3	3	4	6	4	2	2	4	2	9	4	4	6	12	4	7	2	4	3	7	2	3	10	5	2	8	131
Watering horses	2	2	.....	.....	1	4	1	.....	1	3	1	1	.....	1	4	.....	7	5	11	3	3	1	4	4	7	2	1	3	.....	.....	3	75
Stables	7	1	.....	.....	1	.....	2	1	1	2	1	.....	.....	1	9	1	.....	3	18	4	1	4	.....	4	5	3	2	6	6	2	12	97
Slaughter houses	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	1	.....	.....	1	.....	.....	3	.....	.....	.....	7
Factories	4	1	.....	.....	.....	.....	.....	1	.....	1	1	1	.....	.....	.....	2	.....	3	4	1	2	1	.....	.....	4	7	3	2	.....	2	4	44
Boilers and engines	9	2	1	.....	8	13	2	1	14	4	6	1	3	1	5	7	3	10	24	6	2	8	5	2	14	5	5	3	2	2	12	180
Horse powers	136	34	15	.....	132	284	17	22	494	67	41	2	15	5	217	261	104	261	779	58	28	32	109	3	327	145	35	26	110	40	175	3,974
Stores, shops, and offices	1	1	.....	.....	.....	7	1	.....	11	.....	.....	.....	.....	1	.....	.....	2	.....	2	.....	.....	.....	2	.....	1	.....	1	2	1	.....	2	35
Fountains	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	1	.....	.....	2	.....	.....	.....	.....	2	1	2	.....	.....	1	.....	.....	2	.....	.....	.....	12
Breweries and bottling establish'ts.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	1	.....	.....	1	.....	.....	.....	.....	.....	1	.....	2	.....	1	8
Bakeries	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	1	.....	.....	1	.....	1	.....	1	2	.....	.....	7
Hot houses	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	9	4	1	4	5	32	1	1	.....	.....	60
Institn's & Chu'hes	1	.....	.....	.....	.....	.....	.....	.....	1	2	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	1	2	.....	2	.....	1	.....	1	1	.....	1	14
Building purposes	11	2	.....	.....	2	4	5	7	12	1	.....	.....	.....	.....	23	2	2	18	53	16	71	49	21	63	45	14	16	45	43	5	20	550
Water for ships	.....	89	3	3	3	.....	.....	.....	.....	.....	11	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	109
Sprinkling streets	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	39
Drug stores	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	1	.....	.....	1	.....	1	.....	.....	.....	.....	.....	1	1	.....	.....	7
Dye houses	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	1	1	5	.....	1	.....	2	.....	2	.....	.....	1	.....	.....	1	15
Photograph gall'es	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Barber shops	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	.....	.....	.....	.....	.....	1	1	2	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	7
Cut offs	87	36	16	16	18	22	29	16	16	30	9	14	21	35	93	9	12	27	86	42	13	11	8	46	32	87	8	25	41	51	50	1,006
Total	395	203	52	30	395	463	135	405	843	181	96	47	95	109	642	309	186	514	1397	607	430	576	340	1385	871	580	565	1065	959	239	624	14,777

List of Dwellings, Factories, Horse-power, etc., charged on Registers for 1881.

	WARDS.																													Totals.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
Baths	3137	1132	953	598	698	383	2506	2408	1752	2158	406	886	1416	2034	4519	659	556	1288	3822	5756	582	2002	475	4195	1452	2575	2009	4204	5845	2500	2067	64,973
Bakeries	55	34	36	37	32	19	9	29	21	37	31	29	25	43	32	36	33	39	21	72	10	13	8	29	12	43	7	23	51	49	49	964
Banks	.....	.....	.....	1	5	15	.....	3	1	.....	1	1	2	1	.....	.....	.....	1	1	1	.....	1	1	.....	.....	.....	2	.....	.....	.....	.....	37
Bars	165	159	186	197	395	236	80	140	348	160	186	129	122	142	225	145	144	162	272	200	81	53	58	127	166	133	69	114	158	113	179	5,044
Barber shops	35	32	17	19	37	41	22	25	38	15	20	12	27	29	34	25	23	25	41	38	15	9	3	27	15	13	12	23	26	24	26	748
Biddets	.....	.....	.....	.....	.....	2	4	94	.....	.....	.....	.....	.....	.....	16	.....	.....	.....	.....	12	.....	6	.....	4	.....	.....	2	.....	8	.....	.....	148
Billiard saloons	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	.....	1	.....	.....	.....	.....	.....	3	.....	7
Blacksmith shops	4	1	14	13	3	5	.....	12	8	5	8	7	4	15	11	14	.....	.....	26	26	.....	.....	6	18	15	13	3	.....	.....	.....	17	248
Bleaching establ'ts	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	3
Bottling	2	4	.....	2	3	3	.....	.....	.....	2	2	2	.....	1	4	.....	3	5	13	3	3	.....	.....	.....	2	.....	.....	4	4	1	1	64
Boarders	.....	.....	.....	.....	69	230	.....	425	600	333	100	103	32	.....	.....	.....	.....	.....	.....	45	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,937
Boilers	58	31	13	4	8	224	31	63	90	37	89	87	35	42	153	114	81	82	201	62	21	54	45	29	83	44	41	24	46	43	133	2,068
Breweries and dis's	.....	1	2	1	1	2	.....	.....	1	. ...	6	5	2	1	3	.....	12	2	13	10	1	1	1	1	4	1	.....	7	16	.....	1	95
Brickyards	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	9	1	1	2	.....	.....	2	.....	2	.....	12	1	1	.....	32
Carriages	59	62	55	73	43	33	48	194	187	343	28	214	289	237	380	50	70	130	112	313	24	304	114	113	42	37	165	176	131	72	62	4,160
Carpenter shops	2	1	.....	.....	2	2	6	9	6	.....	3	4	10	22	11	13	6	.....	6	17	.....	.....	1	1	.....	3	8	.....	.....	5	2	140
Car shops	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	3	5
Cars	17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	81	30	117	.....	.....	.....	66	.....	.....	.....	.....	191	.....	.....	53	.....	.....	55	111	721
Chemical works	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	...	.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	6
Churches	11	9	7	8	7	10	9	10	7	7	3	2	9	16	16	1	3	3	14	16	10	10	9	27	12	9	14	7	19	4	17	306
Children Homes	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	1	...	1	.....	.....	3	.....	.....	.....	.....	7
Coal yards	4	22	2	3	.....	.....	.....	.....	.....	.....	.....	.....	7	4	8	.....	.....	2	10	11	5	.....	2	1	3	.....	7	6	.....	5	.....	102
Cooper shops	3	.....	9	14	.....	6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	36
Coffee roasters	2	1	1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	4	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	12
Depots	1	1	.....	.....	.....	.....	.....	.....	1	.....	4	.....	1	1	4	.....	.....	.....	4	.....	.....	.....	1	4	2	.....	3	2	.....	2	2	33
Drove yards	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	4
Drug stores	21	15	15	9	10	8	19	18	9	21	5	13	17	16	18	7	9	13	33	32	9	10	7	28	9	17	9	26	29	16	16	484
Dwell'gs & hydra'ts	7734	4325	2418	2309	2080	2818	4604	2962	2372	3549	1754	1971	2926	3501	7174	2391	2411	4081	7104	7606	2595	3060	2801	7901	5310	6362	2612	5560	7719	5232	5978	131,220
¾	133	64	28	34	14	18	27	44	61	27	16	27	14	46	136	90	120	201	202	72	20	.....	1	19	48	7	17	40	53	2	366	1,947
½	224	1164	1111	1108	548	294	776	422	80	820	782	710	485	480	704	1075	1193	683	177	395	14	14	49	42	205	44	43	31	28	251	113	14,065

List of Dwellings, etc.—Continued.

	WARDS.																													Totals.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
Dye houses	.....	2	1	7	6	3	.....	3	.....	5	15	.....	4	1	5	5	11	4	17	4	5	5	3	1	15	.....	.....	4	.....	3	14	143
Dye vats	.....	.....	.....	.....	52	.....	.....	.....	.....	.....	.....	.....	.....	2	27	14	17	10	.....	.....	8	32	.....	.....	.....	.....	.....	3	.....	.....	3	168
Eating saloon and restaurants	.....	.....	1	.....	7	45	5	14	26	16	23	1	2	.....	2	15	.....	.....	1	5	.....	.....	7	6	.....	8	7	.....	.....	4	4	199
Engines	57	24	22	3	58	190	19	8	16	7	4	5	41	42	89	41	39	52	135	48	17	56	27	18	50	36	34	24	26	44	80	1,312
Engine houses	1	.....	.....	.....	1	1	1	1	1	1	.....	1	.....	1	2	.....	.....	.....	2	1	.....	.....	1	1	.....	1	1	.....	.....	.....	.....	18
Factories	6	5	3	2	2	9	3	5	1	54	54	.....	7	48	51	55	26	15	53	43	23	39	25	14	26	18	3	.....	20	14	26	650
Feed stores	3	3	2	.....	.....	.....	.....	2	.....	1	1	1	.....	1	.....	.....	.....	4	13	.....	.....	.....	.....	5	.....	.....	.....	12	.....	6	5	59
Fire Plugs	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Fish stands	.....	1	1	2	2	.....	1	5	.....	4	4	.....	.....	.....	6	.....	.....	.....	2	5	3	.....	.....	4	.....	.....	2	.....	.....	.....	1	43
Firebrick works	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Foot baths	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6	.....	.....	.....	.....	5	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	13
Foundries	5	1	.....	.....	7	3	.....	.....	.....	.....	.....	.....	.....	5	29	1	1	.....	8	11	.....	1	2	.....	1	.....	1	.....	.....	2	2	80
Fountains	8	2	3	.....	.....	10	8	29	22	.....	.....	8	2	17	14	5	.....	5	5	19	9	27	4	33	3	3	32	16	27	17	3	331
Forges	5	6	8	20	3	11	3	6	4	28	28	2	17	31	42	30	15	150	20	48	.....	.....	10	3	17	15	3	.....	.....	27	26	578
Furnaces	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4
Galvanizing works	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Gas works	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	1	2	.....	.....	.....	2	1	.....	.....	.....	.....	.....	8
Glass works	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	3	6
Green houses	16	.....	.....	.....	.....	.....	.....	12	4	.....	.....	.....	.....	2	6	.....	.....	7	5	8	16	61	19	24	49	16	78	80	15	12	1	431
Grind stones	.....	.....	.....	.....	.....	5	.....	.....	.....	.....	.....	.....	.....	.....	10	30	.....	.....	17	.....	.....	.....	1	.....	.....	.....	2	.....	.....	.....	.....	55
Hatter planks	.....	.....	.....	.....	12	17	.....	.....	2	.....	.....	.....	.....	3	.....	21	.....	.....	17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	72
Halls	3	.....	2	1	.....	2	1	4	2	.....	.....	.....	2	1	1	.....	.....	1	.....	1	.....	3	2	1	.....	.....	1	.....	.....	6	1	35
Hay markets	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	2
Horse troughs	32	13	13	8	16	6	6	5	8	13	11	13	3	8	30	7	19	35	49	31	15	13	12	56	36	16	14	31	14	11	33	577
Horse power boilers	779	1033	180	338	1448	2827	412	781	1697	957	931	273	606	1023	3098	2132	2071	1710	3857	1130	373	1879	965	302	1202	956	632	224	937	781	2231	37,705
Hotels	.....	.....	.....	.....	.....	.....	.....	7	2	2	2	1	1	.....	.....	.....	.....	.....	.....	3	.....	.....	.....	6	.....	.....	3	.....	.....	.....	.....	27
Hospitals	.....	.....	.....	.....	.....	.....	1	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	2	.....	5	.....	.....	1	.....	3	1	.....	16
Ice cream saloons	3	7	9	2	2	.....	22	15	14	10	10	.....	8	5	11	4	.....	.....	.....	8	.....	.....	.....	10	.....	1	3	2	5	1	1	153

List of Dwellings, etc.—Continued.

	WARDS.																													Totals.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
Kitchens	.....	.....	.....	.....	.....	.....	.....	.....	.....	5	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8	.....	.....	.....	18
Laboratories	.....	.....	.....	.....	.....	.....	.....	1	8	1	1	.....	1	.....	.....	.....	.....	.....	1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	1	.....	14
Laundries	.....	1	.....	.....	5	.....	3	12	13	.....	.....	.....	5	5	3	.....	.....	.....	.....	4	.....	4	.....	1	.....	.....	2	3	3	2	1	67
Lime vats	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	39	.....	.....	.....	66	60	.....	16	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	175
Lime yards	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	1	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	6
Lumber yards	2	1	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	1	1	2	.....	1	.....	3	.....	.....	.....	1	2	.....	1	.....	.....	.....	2	.....	18
Machine shops	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	1	5	.....	.....	4	3	.....	.....	.....	6	1	2	5	1	.....	.....	4	3	37
Marble yards	2	.....	.....	.....	.....	.....	4	2	5	.....	.....	.....	2	7	1	2	.....	.....	6	4	.....	.....	.....	5	.....	6	.....	5	.....	6	3	60
Market houses	.....	.....	2	2	2	2	.....	.....	3	.....	.....	3	1	1	4	.....	.....	.....	1	3	2	.....	2	4	.....	1	2	2	3	3	1	44
Market stalls	.....	.....	629	52	629	485	.....	.....	1263	.....	.....	602	19	148	495	.....	.....	.....	39	288	50	.....	326	326	.....	176	2	60	885	350	50	6,874
Malt houses	.....	.....	.....	.....	1	1	.....	.....	3	1	1	.....	1	.....	1	1	.....	1	4	3	.....	.....	.....	.....	.....	.....	.....	.....	3	.....	.....	21
Mills	2	2	1	1	1	3	1	.....	.....	2	2	.....	.....	.....	.....	.....	.....	2	1	.....	...	.....	9	4	1	2	6	.....	.....	1	1	22
Offices	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	15	.....	.....	.....	.....	5	.....	5	10	28	.....	6	7	24	8	5	21	22	16	.....	4	176
Oyster houses	7	1	.....	13	22	5	.....	.....	.....	.....	.....	4	.....	1	.....	.....	.....	1	17	.....	3	.....	.....	.....	1	.....	2	.....	4	.....	.....	81
Paint shops	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	4
Paper factories	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	1	1	2	.....	.....	.....	.....	.....	6
Photo. galleries	.....	1	1	2	6	4	5	8	16	5	7	3	3	3	2	1	1	1	3	4	4	2	1	.....	.....	.....	1	6	.....	.....	2	92
Polishing wheels	.....	.....	.....	.....	.....	3	1	.....	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	7
Pools	2	.....	.....	.....	1	.....	.....	1	1	3	.....	.....	2	1	6	1	.....	.....	2	.....	.....	1	1	.....	.....	.....	.....	.....	.....	.....	.....	22
Potteries	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	2
Printing offices	.....	.....	.....	.....	1	2	.....	2	9	2	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	2	20
Rectifying establishments	.....	.....	.....	.....	.....	.....	1	.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4
Schools	8	4	3	4	4	3	8	12	9	7	3	6	4	9	7	4	4	8	9	9	7	9	6	8	8	10	9	8	11	2	5	208
Scholars	1720	1061	1301	1115	400	315	3350	1904	1581	3552	1431	2023	154	2235	1700	2085	1620	4910	4530	1370	1662	2455	1975	2534	2377	3365	1534	2000	3746	1713	3900	65,618
Scouring establishments	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	2	.....	.....	.....	.....	30	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	37
Shower Baths	.....	.....	.....	.....	.....	.....	.....	26	.....	.....	.....	.....	11	4	414	.....	.....	.....	.....	.....	9	.....	1	2	.....	.....	40	19	124	1	.....	651
Shot towers	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Shoe factories	.....	.....	.....	.....	.....	.....	1	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2

List of Dwellings, etc.—Continued.

	WARDS.																													Totals.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
Sinks	.....	1	.....	4	29	176	123	701	121	83	26	10	20	22	137	.....	.....	.....	4	79	9	160	.....	120	.....	36	304	.....	71	26	.....	2,262
Skin Dressing Establishments	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	6	.....	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	13
Slaughter houses	47	1	.....	.....	.....	.....	1	.....	.....	1	.....	.....	4	14	14	8	56	18	71	15	.....	.....	4	47	23	4	.....	74	18	2	44	466
Soap factories	2	.....	2	.....	1	1	.....	.....	.....	1	.....	.....	1	.....	2	.....	.....	.....	2	2	.....	.....	.....	2	1	.....	.....	.....	.....	.....	.....	17
Stables	126	61	71	76	46	44	152	197	66	171	84	77	56	121	229	61	167	70	109	236	53	108	114	292	32	41	70	40	93	111	130	3,313
Stalls	1078	756	399	667	245	840	592	560	840	862	567	600	734	940	2115	684	698	1490	1317	1848	364	1091	562	2600	590	1100	1397	2056	1668	966	900	31,126
Steam heaters	.....	.....	.....	21	28	.....	.....	6	4	.....	.....	.....	5	4	7	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	77
Steam saws	.....	.....	.....	.....	.....	2	.....	5	.....	2	.....	.....	.....	4	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	14
Stills	.....	.....	.....	.....	.....	.....	.....	.....	1	2	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5
Stores and shops	25	24	3	15	6	38	.....	6	20	3	.....	11	.....	66	9	2	27	20	94	31	10	16	23	34	26	8	10	3	26	27	108	691
Storehouses	.....	.....	1	9	.....	9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	23
Sugar houses	2	2	.....	2	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7
Tanneries	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	16	.....	.....	.....	.....	4	5	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	26
Theatres and opera houses	.....	.....	.....	.....	.....	.....	.....	4	1	4	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10
Turbine wheels for organs	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	1	1	.....	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	1	.....	6
Tubs, vats, & tanks	15	22	23	3	215	93	300	.....	192	153	82	121	237	8	37	127	180	10	76	319	.....	.....	3	401	47	41	.....	.....	.....	62	128	2,895
Type foundries	.....	.....	.....	.....	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2
Urinals	13	16	4	21	276	333	33	308	225	133	90	83	90	43	56	10	10	6	43	34	9	13	.....	49	.....	20	35	20	30	38	12	2,053
Vinegar factories	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	2	1	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	1	6
Warehouses	.....	.....	.....	1	.....	.....	1	.....	3	.....	9	.....	5	4	.....	.....	.....	.....	3	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	1	.....	28
Wash paves	1172	585	516	80	558	427	1416	1198	1933	1528	329	610	1159	1430	3228	410	502	1035	2150	4180	421	1072	508	2413	576	1017	1487	3486	4600	1587	1216	43,826
Wash basins	91	57	94	73	1535	2765	1243	2792	2067	1539	300	521	870	775	3174	153	109	114	382	2083	214	849	118	1681	92	152	2063	2226	3680	192	126	32,130
Wash tubs	.....	.....	.....	.....	.....	13	146	1004	198	190	12	83	177	84	584	.....	.....	.....	15	50	14	367	12	.....	.....	13	234	105	568	.....	.....	3,869
Water closets	90	107	137	90	1595	2492	1608	3532	2108	1532	180	586	1233	1038	2112	160	124	99	385	2287	218	1392	67	2426	95	197	2336	2585	3384	646	245	34,886
Wool washers	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	3

OPERATIONS

— OF —

CHERRY STREET SHOP

— FOR —

1881.

STOCK ACCOUNT.

Statement of the operations of Cherry street shop, from January 1, 1881, to December 31, 1881.

Dr.	
To stock on hand January 1, 1881	$14,734 27
346,640 lbs. iron castings	7,986 36
11,330½ " brass castings	1,982 94
938¼ " gun metal	197 19
1,642 " malleable castings	156 01
2,990¼ " steel (assorted)	330 39
42,959 " wrought iron	1,791 74
137¾ tons coal	749 05
10,014 feet lumber	356 43
6 cords wood	42 00
116,045½ lbs. lead	6,069 28
942 stop boxes	2,823 25
Bolts and nuts	987 41
Gum, rings, valves (assorted gum)	1,312 92
Wrought pipe and fittings	47 79
Hardware	689 59
Sponge cloths	550 00
Rope and gasket	396 66
Paints and oil	297 71
Water meters (assorted)	336 69
Railroad tickets	483 50
Machine work	128 23
Wages paid hands	26,320 95
Brooms and brushes	9 18
Leather belting	17 14
Brass fittings	893 87
Gauges and repairs to same	11 80
Galvanizing	121 38
Old metals	101 00
Wire work	1 25
	$69,925 98
Balance	11,947 10
	$81,873 08

Cr.

By repairs and supplies, First District.....	$4,783 21	
" " " Second "	10,754 67	
" " " Third "	9,942 20	
" " " Fourth "	14,727 00	
" " " Germantown.....	1,728 18	
" " " Manayunk.....	1,459 64	
		$43,394 94
BUILDING, GROUNDS AND RESERVOIRS.	$80 01	80 01

FAIRMOUNT WORKS.

By repairs to machinery.....	$858 64	
" " boilers.....	320 00	
" " building, grounds and reservoirs.....	804 02	
		1,665 86

SCHUYLKILL WORKS.

By repairs to machinery.....	$4,887 59	
" " boilers.....	782 41	
" " building, grounds and reservoirs.....	156 52	
" new work (improvements)	1,420 90	
" pumping water.....	844 05	
		8,091 47

ROXBOROUGH WORKS.

By repairs to machinery.....	$1,665 90	
" " boilers.....	428 52	
" " building, grounds and reservoirs.....	118 69	
		2,213 11

BELMONT WORKS.

By repairs to machinery.....	$1,647 55	
" " boilers.....	304 38	
" " building, grounds and reservoirs.....	12 36	
" new work (improvements).....	167 64	
		2,131 93
Amount carried forward.....		$57,577 32

Amount brought forward		$57,577 32
DELAWARE WORKS.		
By repairs to machinery	$2,498 10	
" " boilers	67 11	
" " building, grounds and reservoirs	19 18	
" pumping water	49 50	
		2,633 89
FRANKFORD WORKS.		
By repairs to machinery	$810 96	
" " boilers	159 82	
" " building, grounds and reservoirs	113 08	
" pumping water	166 50	
		1,250 36
CHESTNUT HILL WORKS.		
By repairs to machinery	$507 63	
" " boilers	90 07	
" pumping water	18 00	
		615 70
By water meters	$1,479 94	
" main office (B., G. & R.)	25 31	
" empty oil barrels	2 00	
" old metals	640 23	
3,625 ferrules	1,812 50	
Stock on hand, as per inventory, January 1 1882	15,835 83	
		19,795 81
		$81,873 08

INVENTORY OF STOCK ON HAND JANUARY 1, 1882.

17	4-inch	square-top	screws,	O. S.,	at $5.00	$85 00
17	6 "	"	"	"	5.00	85 00
6	10 "	"	"	"	8.00	48 00
5	12 "	"	"	"	10.00	50 00
16	16 "	"	"	"	12.00	192 00
8	20 "	"	"	"	14.00	112 00
						$572 00
Amount carried forward						$572 00

	Amount brought forward			$572 00
19	4-inch square-top screws, N. S., at	5.00	95 00	
49	6 " " " "	5.00	245 00	
10	8 " " " "	7.00	70 00	
2	16 " " " "	12.00	24 00	
3	20 " " " "	16.00	48 00	
6	30 " " " "	20.00	120 00	
3	36 " " " "	25.00	75 00	
				677 00
94	4-inch socket screws, at	5.00	470 00	
58	6 " "	5.00	290 00	
19	8 " "	6.00	114 00	
12	10 " "	6.50	78 00	
12	12 " "	8.00	96 00	
				1,048 00
44	4-inch spindles, at	5.00	220 00	
48	6 " "	5.00	240 00	
12	8 " "	5.00	60 00	
10	10 " "	5.00	50 00	
7	12 " "	5.00	35 00	
				605 00
27	6-inch bands, at	5.00	135 00	
10	8 " "	6.00	60 00	
25	12 " "	8.50	212 50	
5	16 " "	9.50	47 50	
6	20 " "	10.50	63 00	
1	30 " "	25.00	25 00	
				543 00
2	6-inch stopcocks, at	25.00	50 00	
3	8 " "	55.00	165 00	
2	10 " "	67.00	134 00	
8	20 " "	147.90	1,183 20	
				1,532 20
55	frames and covers, at	6 00	330 00	
16	stop boxes at	3.00	48 00	
2	sets gearing for derrick, at	50.00	100 00	
				478 00
23,911	lbs. cast iron, at	2⅕	526 04	
5,056	" unfinished brass, at	17½	884 80	
2,518	" finished brass, at	37½	944 25	
9,512	" wrought iron, at	4	380 48	
1,260	" steel (assorted), at	12	151 20	
2,203	" forgings, at	12	264 36	
101	" malleable casting, at	9½	9 60	
				3,160 73
	Amount carried forward			$7,615 93

Amount brought forward				$7,615 93
7½ doz. chisels (assorted), at	8.40	63 00		
3 " chisels (with handles), at	12.00	36 00		
2 " hammers (assorted), at	12.00	24 00		
16 drills (assorted), at	1.00	16 00		
26 caulking and gasket irons, at	75	19 50		
4 sledges, at	4.00	16 00		
34,522 lbs. lead, at	5.95	2,054 06		
			2,228 56	
1 1-inch water meter, at	26.00	26 00		
1 1½ " "	45.00	45 00		
2 2 " "	75.00	150 00		
1 3 " "	280.00	280 00		
Finished sides and vaives (ass'd), at		132 72		
			633 72	
42½ lbs. brass wire, at	32	13 60		
4 brass springs for pumps, at	50	2 00		
40 plug waste valves, at	75	30 00		
			45 60	
1,280 ft. lumber (assorted), at		64 26		
458 wood plugs, at	50	229 00		
10 doz. pick handles, at	1.75	17 50		
5 " hammer handles (ass'd), at		12 39		
2 car jacks, at	12.00	24 00		
552 lbs. gasket, at	9	49 68		
			396 83	
97 lbs. munce metal, at	50	48 50		
4 6-inch globe valves, at	75.00	300 00		
3 8 " "	90.00	270 00		
			618 50	
50 plug monkeys (complete), at	6.00	300 00		
94 " " frames, at	65	61 10		
19 " " screws, at	3.28	62 32		
495 ferrules (assorted), at	50	247 50		
140 brass plugs (assorted), at	50	70 00		
			740 92	
Hardware		174 13		
Bolts and nuts		276 73		
250 doz. sponge cloths, at	50	125 00		
722 pure gum valves and rings		1,706 40		
5 lbs. sheet gum, at	19½	98		
Paints and oils		56 99		
			2,340 23	
2 turn tables, at	92.77	185 54		
30 cross heads, at	1.00	30 00		
			215 54	
				$15,835 83

Stop cocks, stop cock boxes, frames and covers, fire plugs, cases, lead and gasket delivered from shop, No. 918 and 920 Cherry street, during 1881.

DISTRICTS.	3-inch stop cocks.	4-inch stop.	6-inch stop.	8-inch stop.	10-inch stop.	12-inch stop.	16-inch stop.	20-inch stop.	23-inch stop.	30-inch stop.	36-inch stop.	Total.	Frames & covers.	Fire plugs.	Plug cases.	Stop boxes.	Lead.	Gasket Bales.
First District	.....	4	8	.....	.....	.....	.....	.....	.....	.....	.....	12	40	65	60	96	5,240	4
Second District	.....	12	13	1	2	15	.....	.....	.....	.....	.....	43	47	95	92	274	38,294½	9
Third District	.....	9	28	5	.....	.....	.....	.....	.....	.....	.....	42	84	108	79	454	17,562	10
Fourth District	.....	6	71	4	2	10	.....	.....	.....	6	.....	93	29	154	107	172	13,046	12
Germantown	.....	.....	14	.....	.....	.....	.....	.....	.....	.....	.....	14	3	15	12	66	4,480	5
Manayunk	.....	9	5	.....	.....	.....	.....	.....	.....	.....	.....	14	13	14	10	63	1,581	1
		40	139	10	4	25	.....	.....	.....	6	.....	224	216	451	360	1,125	80,167	41

Stop cocks, fire plugs and casings, stop boxes, frames, covers and ferrules, made and fitted up at City shop from January 1, 1881, to December 31, 1881.

1881.	3-inch stop cocks.	4-inch stop.	6-inch stop.	8-inch stop.	10-inch stop.	12-inch stop.	16-inch stop.	20-inch stop.	23-inch stop.	30-inch stop.	36-inch stop.	Total stop cocks.	New fire plugs.	Fire plug cases.	Stop boxes.	Frames and covers.	½ inch ferrules.	⅝ inch ferrules.	¾ inch ferrules.	1-inch ferrules.	Total ferrules.
	.....	42	139	7	4	37	.....	8	.....	.....	.....	237	435	407	942	372	2,710	175	75	125	3,085

Inventory of Articles Manufactured during the year 1881.

42	4-inch stops,	at	$22 00	$924 00
139	6 " "	at	25 00	3,475 00
7	8 " "	at	55 00	385 00
4	10 " "	at	67 00	268 00
37	12 " "	at	75 00	2,775 00
8	20 " "	at	147 90	1,183 20
435	fire-plugs,	at	28 00	12,180 00
407	plug-cases,	at	7 50	3,052 50
3,085	ferrules (assorted),	at	50	1,542 50
4	6-inch globe-valves (ext. heavy),	at	75 00	300 00
	Patterns			149 60
				$26,234 80

RECAPITULATION.

Estimated cost of material for 1881	$28,870 76
Wages for finishing articles and setting the same	26,320 95
Actual cost	55,191 71
Stock on hand, January 1, 1881	14,734 27
Profits	11,947 10
	$81,873 08
Valuation of material and finished articles used in 1881	$66,037 25
Stock on hand, January 1, 1882	15,835 83
	$81,873 08

	Wages.	Material and finished articles.	Total.
New work material and fittings to pipes	$9,140 13	$24,623 40	$33,763 53
New work, ferrules	514 53	1,297 97	1,812 50
New work, improvements at works	1,796 81	1,271 67	3,068 48
	$11,451 47	$27,193 04	$38,644 51

Repairs to pipes, plug, &c.	$1,539 58	$8,091 83	$9,631 41	
Repairs to Machinery at works	11,737 58	2,974 30	14,711 88	
Repairs to building, grounds and reservoirs	514 27	814 90	1,329 17	
	$13,791 43	$11,881 03	$25,672 46	$25,672 46

Pumping water, wages of men detailed	$1,078 05
Cash returned to main office for old materials sold	642 23
	$66,037 25

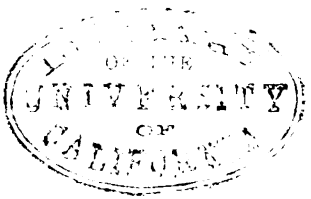
OPERATIONS

— OF —

THE WORKS

— FOR —

1881.



Actual and comparative amount of coal used by the different pumping engines for the year 1881.

Engines.	Description	Total gall's of water pumped.	Total tons of coal consumed.	Actual lift in feet, friction included.	Tons of coal required to lift one million gallons into reservoir.	Tons of coal required to lift one million gallons to the height of 100 feet.	Cost of coal to pump one million gallons to the height of 100 feet, coal taken at the price at each of the works for the year.	Hours run.	Remarks.
Schuylkill No. 4.....	Cornish.....	692,356,250	1,514·46	120	2·18	1·82	8·08	3,224	Fires in continuous operation during the time run.
" " 5.....	"	388,963,740	634·22	120	1·63	1·36	6·03	1,476	Fires in continuous operation during the time run.
" " 6.....	Simpson compound..	1,452,842,000	2,289·96	170—120	1·57	1·07	4·75	4,553½	Fires in continuous operation during the time run.
" " 7.....	Rotative "	3,297,874,690	3,088·64	170—120	·93	·69	3·06	5,526½	Fires in continuous operation during the time run.
" " 8.....	Worthington "	1,070,408,080	1,840·74	202	1·72	·85	3·76	3,455	Fires in continuous operation during the time run.
Belmont No. 1.....	" "	1,193,163,600	2,696·54	216	2·26	1·04	4·49	5,504¾	Fires in conti's operation.
" " 2.....	" "	842,353,512	1,829·81	207—216	2·17	1·01	4·36	3,764½	" " "
" " 3.....	" "	2,210,388,470	4,600·43	207—216	2·08	1·25	5·40	6,339¼	" " "
Delaware No. 1.....	Horiz'tal High Pres.	322,805,380	767·69	133	2·37	1·79	7·76	3,381½	" " "
" " 2.....	Beam Condensing.....	295,595,760	605·24		2·04	1·54	6·68	2,453½	" " "
" " 3.....	Worthington comp'd	1,197,182,721	1,784·42		1·49	1·12	4·86	4,827	" " "
Roxborough No. 1..	Cornish.....	16,386,699	67·78	346	4·13	1·20	5·19	172	Fires banked every day.
" " 2..	Worthington comp'd	1,193,708,945	4,517·69	346	3·79	1·09	4·71	5,765	" " " "
" auxiliary	Knowles direct act'g	3,833,880	44·46	80	11·70	14·82	64·17	788	" " " "
Frankford No. 1.....	Rotative compound...	880,083,222	1,456·71	203	1·65	·81	3·50	2,486¼	Fires in continuous operation during the time run.
" " 2.....	Worthington "	.....	.....	.....	.....	.....	.....	.....	.....
Chestnut Hill.....	Horiz'tal High Pres.	87,841,200	434·63	125	4·95	3·95	18·76	4,123	Fires banked every day.

Comparison of the running expenses of steam and water, 1881.

	Water power.	Per cent.	Steam power.	Per cent.	Total steam and water.	Per cent.
Salaries	$10,575 00	·63	$51,246 54	·23	$61,821 54	·22
Coal	805 00	·05	123,218 11	·56	124,033 11	·52
Lubricating oil, lights, etc	3,167 48	·19	8,856 18	·05	12,023 66	·09
All repairs	2,197 72	·13	35,535 61	·16	37,733 33	·17
Totals	$16,745 20	100	$218,866 44	100	$235,611 64	100
Gallons of water pumped into basin	7,575,326,689	·34	15,145,688,149	·66	22,721,014,838	100
Cost per million	$2 21		$14 45			
Gallons of water pumped 100 feet high	7,575,326,689	·22	26,663,201,422	·78	34,238,528,111	100
Cost per million	$2 21		$8 208			

Percentage of water pumped at each station in the years 1878, 1879, 1880, and 1881.

WORKS.	1878.		1879.		1880.		1881.	
	U. S. Gallons.	Percentage.	U. S. Gallons.	Percentage.	U. S. Gallons.	Percentage.	U. S. Gallons.	Percentage.
Fairmount water power	8,322,288,784	43·569	7,278,357,488	36·58	7,887,897,254	37·35	7,575,326,689	33·34
Schuylkill steam power	2,902,600,680	15·196	4,468,480,020	22·46	5,483,661,280	25·96	6,902,344,760	30·37
Belmont steam power	4,076,537,188	21·343	3,954,962,917	19·88	3,543,457,439	16·78	4,245,905,582	18·68
Delaware steam power	2,133,094,379	11·167	2,194,470,977	11·03	1,995,974,076	9·45	1,815,583,861	8·00
Roxborough steam power	1,052,782,483	5·511	1,141,356,720	5·74	1,166,537,109	5·52	1,210,095,644	5·33
Roxborough Auxiliary	3,303,060	0·017	3,389,250	0·02	3,061,170	0·02	3,833,880	0·02
Chestnut Hill steam power	78,267,900	0·409	87,532,350	0·44	89,555,850	0·42	87,841,200	0·38
Frankford steam power	532,789,858	2·789	765,551 793	3·85	950,649,208	4·50	880,083,222	3·88
Total pumpage	19,101,664,332	100·00	19,894,101,515	100·00	21,120,792,386	100·00	22,721,014,838	100·00

Operations of the Fairmount Water Works for the year 1881.

MONTHS.	Running time	Number of revolutions during the month.	Total number of gall's of water pumped durl'g the month.	Average gallons per day.	Coal.	Tallow.	Lubricating & cylinder oil.	From Penn'a Hospital Reports.	
								Rainfall during month.	Mean tem perature.
	Days.				Pounds.	Pounds.	Quarts.	Inches.	Degrees.
January	31	2,060,829	757,335,102	24,430,164	Heating Mill House.	13	98	4·836	26·48
February	27	1,697,636	653,630,567	23,343,948		10	21	5·370	31·02
March	31	2,532,385	907,261,616	29,266,503		31	105	5·871	39·43
April	30	2,697,030	946,333,530	31,544,451		.....	145	·715	49·71
May	31	2,506,840	903,883,380	29,157,528		20	132	3·283	65·48
June	30	2,838,630	989,441,227	32,981,374		.....	216	5·066	68·67
July	31	1,494,207	591,817,066	19,090,873		.....	142	1·139	77·87
August	31	713,507	291,741,743	9,411,024		.....	81	2·176	77·14
September	25	359,429	156,606,801	5,220,226		1	32	1·241	76·30
October	26	423,163	186,470,839	6,015,188		....	30	3·720	60·28
November	30	917,569	379,759,061	12,658,635		.....	91	3·143	46·20
December	31	2,073,617	811,045,757	26,162,766		.....	131	3·722	41·08
	Total.	Total.	Total.	Average.	Total.	Total.	Total.	Total.	
	3 54	20,303,842	7,575,326,689	20,754,319	390,000	75	1,224	40·282	

Operations of the Schuylkill Water Works for the year 1881.

MONTHS.	Running time	Number of revolutions during the month.	Total number of gall's of water pumped durl'g the month.	Average gallons per day.	Coal.	Tallow.	Lubricating & cylinder oil.
	Days.				Pounds.	Pounds.	Quarts.
January	31	579,948	321,184,410	10,360,787	1,307,712	1,186	202
February	28	530,626	309,351,830	11,048,279	992,644	1,109	217
March	26	365,692	238,309,760	7,687,411	667,966	595	137
April	30	427,617	249,036,990	8,301,233	837,649	925	157
May	30	635,344	375,043,100	12,098,164	1,117,961	857	183
June	30	581,641	437,104,590	14,570,153	1,156,415	736	207
July	31	1,153,632	710,303,840	22,913,027	1,994,526	1,060	380
August	31	1,759,160	1,011,992,860	32,644,931	2,996,031	1,376	677
September	30	1,770,779	1,014,658,450	33,821,948	2,760,284	1,469	643
October	31	1,816,998	1,047,217,060	33,781,195	3,136,482	1,570	721
November	30	1,215,093	786,104,970	26,203,499	2,259,996	816	504
December	31	684,764	402,036,900	12,968,932	1,754,751	339	285
	Total.	Total.	Total.	Average.	Total.	Total.	Total.
	359	11,521,294	6,902,344,760	18,910,533	20,984,417	12,038	4,312

Operations of the Delaware Water Works for the year 1881.

Months.	Running time.	Number of revolutions during the month.	Total number of gallons of water pumped during the month.	Average gallons per day.	Coal.	Tallow.	Lubricating and cylinder oil.
	Days.				Pounds.	Pounds.	Quarts.
January	26	283,090	101,063,130	3,260,101	418,586	.....	88
February	28	482,764	147,944,804	5,283,743	523,149	16	140
March	31	696,478	110,758,747	3,572,862	579,609	96	117
April	30	614,616	97,551,825	3,251,727	509,163	48	98
May	25	540,571	99,280,732	3,202,604	487,765	29	118
June	27	565,990	113,563,900	3,785,463	473,752	46	133
July	31	795,532	227,604,824	7,342,091	748,822	30	168
August	31	974,892	249,925,005	8,062,097	825,449	38	180
September	30	936,564	245,370,120	8,179,004	843,601	64	163
October	31	668,224	184,851,728	5,962,959	699,933	11	161
November	27	366,501	111,686,447	3,722,831	467,047	12	114
December	28	373,055	125,982,599	4,063,954	495,617	.....	110
	Total.	Total.	Total.	Average.	Total.	Total.	Total.
	345	7,298,277	1,815,583,861	4,974,202	7,072,494	390	1,590

Operations of the Belmont Water Works for the year 1881.

Months.	Running time.	Number of revolutions during the month.	Total number of gallons of water pumpee during the month.	Average gallons per day.	Coal.	Tallow.	Lubricating and cylinder oil.
	Days.				Pounds.	Pounds.	Quarts.
January	31	505,287	194,917,630	6,287,665	976,683	106	121
February	28	451,967	208,705,317	7,453,761	1,060,383	208	90
March	31	522,544	214,807,864	6,929,285	1,122,547	250	204
April	30	593,055	253,855,913	8,461,864	1,284,943	354	51
May	31	961,542	359,868,154	11,608,650	1,659,297	459	324
June	30	680,449	237,441,863	7,914,728	1,098,089	207	385
July	31	1,290,271	466,948,365	15,062,850	2,038,338	629	339
August	31	1,247,336	477,018,774	15,387,702	2,220,339	326	586
September	30	1,416,349	523,510,286	17,450,342	2,441,535	598	340
October	31	1,374,108	512,396,655	16,528,924	2,522,364	575	316
November	30	1,207,284	457,182,328	15,239,410	2,297,971	551	322
December	31	984,373	339,252,433	10,943,627	1,721,534	521	301
	Total.	Total.	Total.	Average.	Total.	Total.	Total.
	365	11,234,565	4,245,905,582	11,632,618	20,444,023	4,784	3,379

Operations of the Roxborough Water Works for the year 1881.

MONTHS.	Running time.	Number of revolutions during the month.	Total number of gallons of water pumped during the month.	Average gallons per day.	Coal.	Tallow.	Lubricating and cylindrical oil
	Days.				Pounds.	Pounds.	Quarts.
January	31	310,296	91,537,320	2,952,816	841,816	62	93
February	28	294,651	86,922,045	3,104,358	765,204	56	82
March	31	332,235	86 008,821	2,774,478	733,248	69	93
April	30	284,680	83,980,600	2,799,353	741,046	66	93
May	30	329,462	97,191,290	3,135,203	831,873	71	90
June	30	335,406	98,944,770	3,298,160	828,880	61	87
July	31	401,817	118,536,015	3,823,742	913,083	64	93
August	31	415,672	122,623,240	3,955,588	976,370	70	104
September	30	398,691	117,613,845	3,920,461	925,551	87	118
October	31	382,211	112,752,245	3,637,169	910,896	68	105
November	30	328,387	94,858,373	3,161,946	932,868	98	141
December	31	336,024	99,127,080	3,197,647	870,654	94	97
	Total, 364	Total, 4,149,582	Total, 1,210,095,644	Average, 3,315,330	Total, 10,271,489	Total, 866	Total, 1,190

Operations of the Roxborough Auxiliary Works for the year 1881.

MONTHS.	Running time.	Number of revolutions during the month.	Total number of gallons of water pumped during the month.	Average gallons per day.	Coal.	Tallow.	Lubricating and cylindrical oil
	Days.				Pounds.	Pounds.	Quarts.
January	4	13,292	199,380	6,432	12,200	4	5
February	4	13,359	200,385	7,157	10,600	2½	3
March	5	18,126	271,890	8,770	11,100	3	4
April	4	14,996	224,940	7,498	8,200	2½	2
May	5	19,069	286,035	9,227	6,200	3	2½
June	6	24,613	369,195	12,306	7,700	3½	3½
July	8	40,245	603,675	19,473	11,900	6	5
August	7	30,859	462,885	14,932	9,200	4½	4
September	7	30,682	460,230	15,341	8,500	4	4
October	6	20,883	313,245	10,105	5,800	3	3½
November	5	16,533	247,995	8,266	5,100	3	2½
December	4	12,935	194,025	6,259	9,300	3½	3
	Total,	Total,	Total,	Average,	Total,	Total,	Total,
	65	255,592	3,833,880	10,504	99,600	42½	42

Practical Operations of the Chestnut Hill Works for the year 1881.

MONTHS.	Running time.	Number of strokes during the month.	Total number of gallons pumped during month.	Average gallons per day.	Coal.	Tallow.	Lubricating and cylinder oil.
	Days.				Pounds.	Pounds.	Quarts.
January	31	406,200	7,210,050	232,582	84,000	54	7¾
February	28	331,200	5,878,800	209,957	68,600	49	7
March	31	325,800	5,782,950	186,547	69,440	54	7¾
April	30	301,800	5,356,950	178,565	67,200	52½	7½
May	31	338,400	6,006,600	193,761	72,800	54	7¾
June	30	378,600	6,720,150	224,005	81,760	52½	7½
July	31	471,600	8,370,900	270,029	93,520	54	7¾
August	31	535,200	9,499,800	306,445	101,920	54	7¾
September	30	510,600	9,063,150	302,105	96,880	52½	7½
October	31	483,600	8,583,900	276,900	85,400	54	7¾
November	30	442,200	7,849,050	261,635	75,040	52½	7½
December	31	423,600	7,518,900	242,545	77,000	54	7¾
	Total, 365	Total, 4,948,800	Total, 87,841,200	Average, 240,688	Total, 973,560	Total, 637	Total, 91¼

Operations of the Frankford Water Works for the year 1881.

MONTHS.	Running time	Number of revolutions during the month.	Total number of gall's of water pumped durl'g the month.	Average gallons per day.	Coal.	Tallow.	Lubricating & cylinder oil.
	Days.				Pounds.	Pounds.	Quarts.
January	22	221,529	72,439,983	2,336,773	275,596	44	11
February	23	201,208	65,795,016	2,349,822	287,233	23	11½
March	16	135,152	44,194,704	1,425,635	179,542	20	8
April	22	218,085	71,318,795	2,377,126	267,904	27	13½
May	25	238,220	77,897,940	2,512,837	291,410	27	13½
June	23	219,138	71,658,126	2,388,605	278,057	24	12
July	27	268,792	87,894,984	2,835,322	312,624	27	13½
August	26	261,722	85,583,094	2,760,745	298,275	26	13
September	22	233,660	76,406,820	2,546,894	261,052	22	11
October	21	198,410	64,880,070	2,092,905	223,614	21	10½
November	27	270,630	88,496,010	2,949,867	314,840	27	13½
December	22	224,840	73,522,680	2,371,695	272,889	22	11
	Total.	Total.	Total.	Average.	Total.	Total.	Total.
	276	2,691,386	880,083,222	2,411,187	3,263,036	310	142

Total gallons of water pumped during the year 1881.

MONTHS.	Fairmount works.	Delaware works.	Schuylkill works.	Belmont works.	Frankford works.	Roxborough works.	Roxborough Auxiliary works.	Chestnut Hill works.	Total for all the works.	Percentage of consumption.	Average per day.	Highest number of gall's in one day.	Lowest No. of gallons in one day.
January...	757,335,102	101,063,130	321,184,410	194,917,630	72,439,983	91,537,320	199,380	7,210,050	1,545,887,005	80	49,867,323	58,820,156	35,691,771
February..	653,630,567	147,944,804	309,351,830	208,705,317	65,795,016	86,922,045	200,385	5,878,800	1,478,428,764	85	52,801,027	67,599,665	31,099,185
March.....	907,261,616	110,758,747	238,309,760	214,807,864	44,194,704	86,008,821	271,890	5,782,950	1,607,396,352	81	51,851,495	61,768,013	44,022,295
April.....	946,333,530	97,551,825	249,036,990	253,855,913	71,313,795	83,980,600	224,940	5,356,950	1,707,654,543	91	56,921,818	70,945,563	47,836,857
May.....	903,883,380	99,280,732	375,043,100	359,868,154	77,897,940	97,191,290	286,035	6,006,600	1,919,457,231	100	61,917,975	78,142,979	50,787,372
June.....	989,441,227	113,563,900	437,104,590	237,441,863	71,658,126	98,944,770	369,195	6,720,150	1,955,243,821	105	65,174,794	79,700,656	54,744,737
July.....	591,817,066	227,604,824	710,303,840	466,948,365	87,894,984	118,536,015	603,675	8,370,900	2,212,079,669	115	71,357,409	80,475,624	58,754,039
August.....	291,741,743	249,925,005	1,011,992,860	477,018,774	85,583,094	122,623,240	462,885	9,499,800	2,248,847,401	117	72,543,464	82,315,932	61,435,757
Septemb'r	156,606,801	245,370,120	1,014,658,450	523,510,286	76,406,820	117,613,845	460,230	9,063,150	2,143,689,702	115	71,456,323	78,695,416	57,036,446
October.....	186,470,839	184,851,728	1,047,217,060	512,396,655	64,880,070	112,752,245	313,245	8,583,900	2,117,465,742	110	68,305,346	78,416,155	56,386,257
November	379,759,061	111,686,447	786,104,970	457,182,328	88,496,010	94,858,373	247,995	7,849,050	1,926,184,234	104	64,206,141	73,747,639	52,229,603
December.	811,045,757	125,982,599	402,036,900	339,252,433	73,522,680	99,127,080	194,025	7,518,900	1,858,680,374	97	59,957,431	74,655,034	45,788,950
Total.....	7,575,326,689	1,815,583,861	6,902,344,760	4,245,905,582	880,083,222	1,210,095,644	3,833,880	87,841,200	22,721,014,838	Av. 100	Average 62,249,355	Average 73,773,569	Average 49,651,105
Increase over 1880.	.....	.....	1,418,683,480	702,448,143	.....	43,558,535	772,710	.....	1,600,222,452	.....	4,542,273	6,302,327	2,424,800
Decrease from 1880.	312,569,565	180,390,215	.....	.....	70,565,986	.....	.....	714,650	.....	.....	.....	.....	.....

Amount of water pumped by all the Works from 1854 to 1881, inclusive, in U. S. gallons.

YEAR.	FAIRMOUNT.		DELAWARE.		SCHUYLKILL.		TWENTY-FOURTH WARD & BELMONT.		ROXBOROUGH & GERMANTOWN.		CHESTNUT HILL.		FRANKFORD.		TOTALS.	
	Total water pumped.	Daily average	Total water pumped.	Daily average	Total water pumped.	Daily average	Total water pumped.	Daily average	Total water pumped.	Daily average	Total water pumped.	Daily average	Total water pumped.	Daily average	Total for all the works.	Total daily average.
1854	2,286,402,222	6,264,116	618,173,121	1,693,625	1,366,011,559	3,742,497	.....	.....	.....	.....	.....	.....	.....	.....	4,279,586,902	11,700,238
1855	2,787,736,850	7,637,635	567,804,060	1,555,628	1,525,987,725	4,180,788	9,538,170	26,132	.....	.....	.....	.....	.....	.....	4,891,066,805	13,400,183
1856	2,867,188,965	7,833,850	769,566,040	2,102,639	1,980,637,500	5,411,578	52,577,642	143,655	.....	.....	.....	.....	.....	.....	5,669,970,147	15,491,722
1857	3,059,797,730	8,383,007	811,462,085	2,223,184	2,315,832,461	6,344,746	121,948,840	334,106	.....	.....	.....	.....	.....	.....	6,309,041,116	17,285,044
1858	3,058,418,667	8,379,229	757,187,690	2,074,487	2,819,641,992	7,725,047	204,177,624	559,391	.....	.....	.....	.....	.....	.....	6,839,425,973	18,738,153
1859	3,390,271,757	9,288,416	868,567,100	2,379,636	2,643,736,620	7,243,114	265,456,170	727,277	.....	.....	.....	.....	.....	.....	7,168,031,647	19,638,443
1860	3,612,989,017	9,871,555	872,144,980	2,382,910	2,696,960,210	7,368,744	283,646,070	774,989	.....	.....	.....	.....	.....	.....	7,465,740,277	20,398,197
1861	3,731,785,628	10,224,070	983,805,740	2,695,358	2,527,182,710	6,923,788	353,313,900	967,983	.....	.....	.....	.....	.....	.....	7,596,087,978	20,811,200
1862	3,564,724,753	9,766,369	909,126,440	2,490,757	3,038,527,420	8,324,733	420,507,810	1,152,076	.....	.....	.....	.....	.....	.....	7,932,886,423	21,733,933
1863	5,586,712,091	15,306,060	1,182,539,680	3,239,835	2,203,769,280	6,037,724	525,754,090	1,440,422	.....	.....	.....	.....	.....	.....	9,498,775,141	26,024,041
1864	5,970,801,329	16,313,665	1,090,884,060	2,980,558	1,725,444,660	4,714,330	519,877,800	1,420,431	.....	.....	.....	.....	.....	.....	9,307,007,849	25,428,983
1865	7,082,015,640	19,402,783	1,429,591,700	3,916,690	2,005,038,484	5,493,256	535,923,360	1,468,283	.....	.....	.....	.....	.....	.....	11,052,569,184	30,281,011
1866	7,721,817,582	21,155,665	1,271,841,020	3,484,496	947,652,428	2,596,308	606,665,380	1,662,097	106,369,060	291,422	.....	.....	.....	.....	10,654,345,470	29,189,987
1867	7,990,416,594	21,891,552	427,935,060	1,172,425	1,590,248,454	4,356,845	677,717,190	1,856,759	177,104,200	485,217	.....	.....	.....	.....	10,863,421,498	29,762,798
1868	8,024,530,911	21,924,948	705,442,350	1,927,438	2,337,365,642	6,386,245	727,824,780	1,988,592	190,015,200	519,167	.....	.....	.....	.....	11,985,178,883	32,746,390
1869	7,489,611,069	20,519,482	1,042,780,453	2,856,934	2,735,569,020	7,494,709	928,561,494	2,544,004	218,229,800	597,890	.....	.....	.....	.....	12,414,752,336	34,013,020
1870	8,134,985,170	22,287,631	1,186,131,144	3,249,674	3,003,737,166	8,229,417	*850,011,192	2,328,798	227,946,600	624,511	.....	.....	.....	.....	13,402,811,272	36,720,030
1871	8,821,728,593	24,169,065	1,007,378,521	2,759,941	2,201,294,172	6,030,943	1,054,210,990	2,888,249	‡413,787,205	1,133,664	.....	.....	.....	.....	13,498,399,481	36,981,916
1872	†7,366,632,573	20,127,411	1,474,531,040	4,028,773	2,223,287,070	6,074,555	1,456,756,728	3,980,210	§518,811,050	1,417,517	.....	.....	.....	.....	13,040,018,461	35,628,465
1873	†8,717,538,594	23,883,667	1,364,109,884	3,737,287	1,508,295,800	4,132,317	1,959,966,670	5,369,772	373,287,495	1,844,623	.....	.....	.....	.....	14,223,198,443	38,967,667
1874	†7,749,007,798	21,230,158	1,558,518,765	4,269,914	1,536,505,220	4,209,603	2,969,227,504	8,134,870	720,165,810	1,973,057	.....	.....	.....	.....	14,553,425,097	39,817,603
1875	†7,994,234,254	21,902,012	1,839,190,470	5,038,878	1,356,295,950	3,715,879	3,055,507,870	8,371,254	818,339,525	2,242,026	33,592,000	92,033	.....	.....	15,097,160,069	41,363,082
1876	†8,547,163,024	23,352,906	2,011,301,489	5,495,359	2,179,733,340	5,955,556	3,748,651,929	10,242,218	935,702,907	2,556,565	50,754,850	138,674	.....	.....	17,473,308,039	47,741,279
1877	9,492,419,433	26,015,985	2,149,106,828	5,865,390	1,729,810,384	6,297,697	3,486,809,917	9,594,170	960,670,580	2,648,008	58,427,850	158,912	.....	.....	17,817,144,792	48,983,958
1878	8,322,288,784	22,800,791	2,133,094,379	5,844,000	2,902,600,680	7,955,070	4,076,537,188	11,170,000	1,056,085,543	2,893,386	78,267,900	214,433	‖532,789,858	2,090,000	19,101,664,332	52,333,326
1879	7,278,357,488	19,950,213	2,194,470,977	6,012,222	4,468,480,020	12,258,850	3,954,962,917	10,835,515	1,144,745,970	3,136,564	87,532,350	239,815	765,551,793	2,097,402	19,894,101,515	54,507,518
1880	7,887,896,254	21,551,630	1,995,974,076	5,453,481	5,483,661,280	14,982,681	3,543,457,439	9,681,577	1,169,598,279	3,195,624	89,555,850	244,688	950,649,208	2,597,402	21,120,792,386	57,707,082
1881	7,575,326,689	20,754,319	1,815,583,861	4,974,202	6,902,344,760	18,910,533	4,245,905,582	11,632,618	1,214,029,524	3,326,000	87,841,200	240,660	880,083,222	2,411,187	22,721,014,838	62,249,355

*The works at Belmont were started October, 1870, at which date Twenty-fourth Ward Works were abandoned.

†Included in the Fairmount pumpage is that of the Worthington Engine, which, in 1872, was 146,540,888; in 1873, 9,711,208; in 1874, 166,984,376; in 1875, 324,225,056; in 1876, 172,505,781 gallons.

‖The record of pumping of the Frankford Works was commenced April, 1878.

‡The Roxborough Works commenced pumping December 21 1870.

§The Germantown Works were abandoned September 30, 1872.

DISTRIBUTION

— OF THE —

WATER DEPARTMENT

— FOR THE —

YEAR 1881.

DISTRIBUTION.

The following tables show, in detail, the work on the distribution for the year 1881. The total number of feet handled, which includes pipes raised, relaid, taken up, repairs, etc., amounts to 60,448 feet, or 11 miles and 2,368 feet, and in pounds 3,032,272, or 1,353·7 gross tons. The number of feet added to that laid in previous years amounts to 56,361 feet, or 10 miles 3,561 feet, weighing 2,843,918 pounds, or 1,270 gross tons.

A large number of intersections have been connected, improving the quality of the water by its circulation, and increasing the quantity and pressure in localities having cause for complaint.

During the heat of summer pressures were taken throughout the upper part of the city, which led to the detection of a number of important valves that had dropped; these were repaired and the circulation improved.

Owing to City Councils not making a specific appropriation of Item 24, of the annual appropriation, it was impossible to begin the work of laying the large mains as provided for. The pipes have been ordered and most of them delivered, so that they can be laid early next year.

The table of Iron Pipes published in the last Annual Report was as perfect as possible with the data of record at that time, but new discoveries have been made since, which renders necessary the new table.

Ordinances for the laying of 36,968 feet of pipes were passed by Councils, which added to the balance of last year made 237,092 feet; of these 54,706 have been laid, leaving still on our books 182,386 feet, or over 34 miles, which will be laid as required.

The twelve-inch main on Broad street, from Lehigh avenue to Germantown road, is connected at Lehigh avenue with the thirty-inch Belmont main, and has enabled the Department to throw the water from Mt. Airy Reservoir farther

back on the higher ground, and thus increase the pressure in the more elevated parts of Germantown, which are short during the summer months.

DISTRIBUTION.

IRON SERVICE AND SUPPLY MAINS LAID IN 1881.

FIRST DISTRICT.

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

Frontage chargeable after deducting the intersections.

Street.	Location.	Size. Inches.	Distance. Feet.
Albemarle, from	Twenty-eighth to Twenty-ninth	6	334
Mifflin, from	west of house line of Broad to Fifteenth	8	408
Reed, from	Thirtieth to Thirty-first	6	419
Rule, from	Fourth west	4	177
Tiernan, from	217 feet north of house line of Wharton to Federal	6	340
Twentieth, from	Dickinson to Wilder	6	160
Twenty-first, from	20-inch main on Washington avenue to Kimball	6	311
Twenty-fourth, from	Montrose to Christian street	6	140
Twenty-eighth, from	Albemarle to Ellsworth	6	79
Twenty-ninth, from	Albemarle to Ellsworth	6	79
Thirty-first, from	84 feet south of Wharton to Reed	6	336
Washington avenue, from	Clement to Nineteenth	6	1,053
Wilder, from	Twentieth to Twenty-first	6	523
Total			4,359

Dead ends, etc., connected. No frontage chargeable.

Street.	Location.	Size. Inches.	Distance. Feet.
Clement, with	Washington avenue	4	12
Dorrance, with	Washington avenue	4	12
Lingo, with	Washington avenue	4	12
Stocker, with	Washington avenue	4	12
Ward, with	Washington avenue	4	12
Mifflin, from	Centre to Otsego west	6	32
Montrose, from	Sixteenth west to dead end	4	26
Montrose, from	Twenty-fourth east to dead end	4	29
Otsego, from	centre of Mifflin north to dead end	6	17
Reed, across	Moyamensing avenue	6	87
Twenty-second, across	Washington avenue	6	54
Twenty-third, across	Washington avenue	6	54
Twenty-fourth, across	Washington avenue	6	64
Thirty-first, from	Wharton south to dead end	6	28
Total			451

Fire purpose connections (private).

Street.	Location.	Size. Inches.	Distance. Feet.
Reed,	155 feet west of Thirtieth, Campbell's Mill..	4	24

	Size. Inches.	Distance. Feet.
Fire-plug connections	4	186
Fire-plug connections	6	130
Total		316

	Size. Inches.	Distance. Feet.
Repairs	3	3
Repairs	4	87
Repairs	6	31
Total		121

Repairs, intersections connected.

	Size. Inches.	Distance. Feet.
Reed with Fourth	6	27
Twelfth with Ellsworth	6	12
Total		39

Recapitulation.

	Purposes for which used.		Size. 3	4	6	8	Total.
New pipe or feet added.	Frontage chargeable		.....	177	3,774	408	4,359
	Dead ends, etc., connected		.....	115	336	.....	451
	Fire connections (private)		.....	24	.....	.....	24
	Plug connections		.....	186	130	.....	316
	Total	Feet	.....	502	240	408	5,150
		Pounds	.....	9,538	131,440	17,136	158,114
Pipe used, but adding nothing to the total feet in ground.	Repairs, general		3	87	31	.....	121
	Repairs, intersections connec'd		.....	.....	39	.....	39
	Total	Feet	3	87	70	.....	160
		Pounds	45	1,653	2,170	.....	3,868
	Total handled	Feet	3	589	4,310	408	5,310
		Pounds	45	11,191	133,610	17,136	161,982

Second District.

Comprising the Fifth, Sixth, Seventh, Eighth, Ninth, Tenth, Twenty-fourth and Twenty-seventh Wards.

Frontage chargeable after deducting the intersections.

Street.	Location.	Size. Inches.	Distance. Feet.
Aspen,	from Forty-first to Holly	6	245
Boyer place,	from Chant north	6	54
Downing,	from Fifty-fourth west	6	36
Downing,	from Fifty-fourth west	4	273
Fifty-fourth,	from Haverford to Downing	6	116
Franklin,	from Pear to Fifty-second	6	574
Kershaw,	from Fifty-first to Fifty-second	6	638
Myrtle,	from Thirty-ninth to Union	6	417
Myrtle,	from Forty-second west	6	300
Silverton,	from Thirty-fourth to Orion	8	202
Smedley,	from Thirty-seventh east	6	153
Sycamore,	from DeKalb to Thirty-eighth	8	194
Thirty-eighth,	from Grape to Sycamore	6	206
Union,	from Oregon to Myrtle	6	390
Vanilla,	from Thirty-ninth to Union	6	418
Woodland avenue,	from 104 feet west of Fiftieth to 290 feet west of Seventy-third	12	12,283
Total			16,499

Dead ends, etc., connected. No frontage chargeable.

Street.	Location.	Size. Inches.	Distance. Feet.
Sixteenth,	across Market	6	48
Seventeenth,	across Market	6	48
Thirty-fourth,	with Silverton	6	28
Orion,	with Silverton	6	30
Total			152

Fire purpose connections (private).

Street. Location.	Size. Inches.	Distance. Feet.
Thirtieth, 981 feet north of Market, for Pennsylvania Railroad	6	30
Sixteenth, opposite Jones, for Pennsylvania Railroad	6	2
Sixteenth, opposite Jones, for Pennsylvania Railroad	4	24
Delaware avenue, 129 feet south of Walnut, for Pennsylvania Railroad	4	40
Merrick, 45 feet south of Filbert, for Pennsylvania Railroad	4	20
Twenty-second, south of Sansom, Adams Express Company	4	22
Eighth, 84 feet north of Chestnut, Sharpless & Sons	4	15
Chestnut, 267 feet east of Thirty-second, W. C. Allison & Co	4	22
Eighth, 135 feet south of Vine, Eighth Street Theatre	4	16
Total		191

Connections for church organ motors.

Street. Location.	Size. Inches.	Distance. Feet.
Locust, 90 feet west of Sixteenth, St. Marks	4	17
Twenty-second, 30 feet north of Walnut	4	26
Fifteenth, 150 feet north of Chestnut, The Epiphany	4	12
Total		55

Supply connections (private).

Street. Location.	Size. Inches.	Distance. Feet.
Johnson, 186 feet west of Twentieth, Electric Light Company	4	12
Filbert, 183 feet west of Seventeenth	6	24
Sansom, 112 feet west of Nineteenth	4	12
Total		48

	Size. Inches.	Distance. Feet.
Fire-plug connections	4	131
Fire-plug connections	6	574
Total		705

	Size. Inches.	Distance. Feet.
Repairs	4	117
Repairs	6	72
Repairs	8	9
Repairs	10	6
Repairs	12	12
Total		216

Repairs at intersections.

Street.	Location.	Size. Inches.	Distance. Feet.
Grape,	at intersection with Thirty-eighth [B. S.]	6	3
Seventeenth,	at intersection with Market [B. S.]	6	12
Thirty-fourth,	at inters'n with Hamilton [B. S.]	6	7
Thirty-fifth,	at intersection with Elm	12	3
Thirty-fifth,	at intersection with Elm	6	9
Thirty-ninth,	at intersection with Story [B. S.]	6	4
Total			38

Supply main.

Street.	Location.	Size. Inches.	Distance. Feet.
Thirty-fifth,	from 174 feet north of Sycamore, north	16	44

Taken up.

Street.	Location.	Size. Inches.	Distance. Feet.
Fire connection,	Wanamaker's, Thirteenth below Market	3	7
St. Mary,	from 3 feet east of west curb of Sixth, west	4	68
Boyer,	from Tenth, east, to Boyer place	3	135
Boyer place,	from Boyer south to 48 feet north of Chant	3	54
Thirty-seventh,	from 258 feet north of Aspen	6	12
Total			276

Relaid.

Street.	Location.	Size. Inches.	Distance. Feet.
St. Mary	from 3 feet east of west curb of Sixth, west	4	68
Boyer	from Tenth east to Boyer place	6	135
Boyer place	from Boyer south to 48 feet north of Chant	6	54
	Total		257

Recapitulation.

	Purposes for which used.	Sizes. 3	4	6	8	10	12	16	Total.
New pipe or feet added.	Frontage chargeable	.....	278	3,547	396	.....	12,283	.....	16,499
	Dead ends, etc., connected	.....	.....	152	.....	.....	.....	.....	152
	Fire connection (private)	.....	159	32	.....	.....	.....	.....	191
	Motor connection (private)	.....	55	.....	.....	.....	.....	.....	55
	Supply connection (private)	.....	24	24	.....	.....	.....	.....	48
	Plug connections	.....	181	574	.....	.....	.....	.....	705
	Supply main	.....	.....	.....	.....	.....	.....	44	44
	Total { Feet	.....	642	4,329	396	.....	12,283	44	17,694
	Total { Pounds	.....	12,198	134,199	16,632	.....	884,876	4,840	1,052,245
Pipe used, but adding nothing to the feet in ground.	Repairs, general	.....	117	72	9	6	12	.....	216
	Repairs, intersections connected	.....	.....	35	.....	.....	3	.....	38
	Taken up	196	68	12	.....	.....	.....	.....	276
	Relaid	.....	68	189	.....	.....	.....	.....	257
	Total { Feet	196	253	308	9	6	15	.....	787
	Total { Pounds	2,940	4,807	9,548	378	330	1,080	.....	19,083
	Total handled { Feet	196	895	4,637	405	6	12,298	44	18,481
	Total handled { Pounds	2,940	17,005	143,747	17,010	330	885,456	4,840	1,071,328

THIRD DISTRICT.

Comprising the Eleventh, Twelfth, Sixteenth, Seventeenth, Eighteenth, Nineteenth, Twenty-third, Thirty-first, and part of the Twenty-fifth Wards.

Frontage chargeable after deducting the intersections.

Street.	Location.	Size. Inches.	Distance. Feet.
Birch,	from 96 feet northwest of Edgemont to Belgrade	6	800
Bridge,	from east house line of Garden to Washington	8	1,495
Butler,	from Fifteenth to Turner	6	263
Clearfield,	from Lambert to Torpin	6	185
Clementine,	from Amber northwest	6	246
Collins,	from Huntingdon to Lehigh. avenue	6	858
Culvert,	from Fourth east	4	56
Geiss,	from Dauphin to Gordon	6	210
Hancock,	from 340 feet north of Lehigh to Somerset	6	183
Hedge,	from Oxford to Unity	6	414
Hope,	from Thompson to Master	6	566
Meadow,	from Mulberry to Cherry	6	230
Potter,	from Leamy northeast	6	194
Tulip,	from Palmer to Deal	6	321
Wildey,	from Ash south	6	166
Worth,	from Margaretta north	6	434
Total			6,621

Dead ends, etc., connected. No frontage chargeable.

Street.	Location.		Size. Inches.	Distance. Feet.
Hancock,	with N. S. Lehigh avenue	[DE]	6	27
Gordon,	from Geiss east	[DE]	4	18
Girard avenue,	across Lawrence	N. S.	6	26
Girard avenue,	across Lawrence	S. S.	10	30
Leopold,	with Richmond	[DE]	6	33
York	with 36-inch main on American		6	12
Lehigh,	with 36-inch main on American		6	12
Amount carried forward				158

Street.	Location.		Size. Inches.	Distance. Feet.
Amount brought forward				158
Kensington avenue, across Lehigh avenue		E. S.	8	59
Kensington avenue, across Lehigh avenue			6	6
Kensington avenue, across Lehigh avenue		W. S.	8	59
Kensington avenue, across Lehigh avenue			6	6
Fifth, over Connecting Railroad bridge		[DE]	8	95
Fifth, over Connecting Railroad bridge			6	24
Birch with Edgemont		[DE]	6	25
Melvale, from S. S. Clearfield to Centre		[DE]	6	26
Total				458

Fire purpose connections (private).

Street.	Location.	Size. Inches	Distance. Feet.
Adams, W. S., 187 feet N. of Coral, Arrott's Mill.		4	24
Putnam, S. S., 84 feet W. of Mascher, Dolan's		4	8
Adams, N. S., 188 feet W. of Jasper		4	28
Third, W. S. of Green, Germania Hall		4	16
Adams, N. S., 54 feet W. of Emerald		4	17
Fourth, 105 feet S. of Montgomery, J. B. Stetson & Co		6	12
York, N. S., 150 feet E. of Kensington		4	18
Richmond, E. S., 323 feet N. of Franklin, Bridesburg Manufacturing Co		4	14
Total			137

	Size. Inches	Distance. Feet.
Fire plug connections	4	154
Fire plug connections	6	215
Total		369

	Size. Inches.	Distance. Feet.
Repairs	4	119
Repairs	6	392
Repairs	8	4
Repairs	10	44
Total		559

Repairs, intersections connected.

Street.	Location.		Size. Inches.	Distance. Feet.
Fairhill with Huntingdon		[B. S.]	6	7
Third with Wood			6	9
Crown with Wood			6	3
Crown with Wood			4	10
Julianna with Wood			4	12
St. John and Buttonwood		[B. S.]	6	9
Fairmount with New Market		[B. S.]	6	12
Fourth and Buttonwood		[B. S.]	6	12
St. John and Canal			6	8
Fifth with Thompson			6	11
Susquehanna with Philip			6	13
Cedar with Gordon			6	12
York and Palethorpe		[B. S.]	6	12
York and Palethorpe			4	4
Tulip and Fox			6	11
Sepviva with Tucker			6	7
Sepviva with Tucker			4	2
Jasper with Hazzard		[B. S.]	6	13
Tulip with Pepper			6	10
Memphis with Hewson			6	10
Thompson with Ann			6	12
Wellington with Clifton			6	11
Coral with Letterly		[B. S.]	6	10
Somerset with Reese			6	11
St. John with George			6	7
St. John with George			4	4
Cedar with Huntingdon			6	16
Tulip with the S. S. of York			6	13
Tulip with N. S. of York			6	10
Tulip with Hewson			6	10
Cumberland with Orianna			6	5
Cumberland with Orianna			4	8
Mascher with Davis			6	10
Mascher with Davis			4	3
Otis with Holman			6	11
Fourth with Thompson			6	10
Fourth with Thompson			6	10
Edgemont with S. S. Allegheny			6	12
Edgemont with N. S. Allegheny			6	12
Amount carried forward				372

Street.	Location.		Size. Inches.	Distance. Feet.
Amount brought forward.....				372
Jasper with Adams.....		[B. S.]	6	11
Second with Norris.....			6	11
Second with Norris.....			10	3
Germantown with Oxford.....			6	17
Germantown with Oxford.....			10	3
Third with Callowhill.....		[B. S.]	12	15
Total.....				424

Repairs. New stops put in.

Street.	Location.	Size. Inches.	Distance. Feet.
Tulip, at S. H. L. of Huntingdon.....			
Hope, at N. H. L. of Dauphin.....		4	3
Howard, at S. H. L. of Dauphin.....		6	3
Montgomery, at W. H. L. of Front.....		6	18
Memphis, at S. H. L. of York.....		6	22
Frankford road, at centre of Erie avenue.		12	4
Frankford road, at N. H. L. of Ontario.....		12	4
Fifth, at N. H. L. of Brown.....		6	3
York, at W. H. L. of Edgemont.....		6	3
Germantown, at W. H. L. of Susquehanna.....		6	3
Diamond, at E. H. L. of Orianna.....		6	3
Lehigh, S. S., at W. H. L. of Kensington		6	3
Otis, at W. H. L. of Trenton avenue.....		6	2
George, at E. S. of Fifth		6	3
Brown, W. of W. H. L. of Fourth		6	9
Lehigh, W. H. L. of Kensington.....		6	3
Total.....			86

Relaid.

Street	Location.	Size. Inches.	Distance. Feet.
*Fairmount avenue, W. of Front.....		8	210
*Front, across Fairmount avenue.....		10	45
Total.....			255

* Old pipe remains in the ground, but is not used, as it is cut adrift.

Recapitulation.

	Purposes for which used.	Size. 4	6	8	10	12	Total.
New pipe or feet added.	Frontage chargeable	56	5,070	1,495	.....	.....	6,621
	Dead ends, etc., connected	18	197	213	30	.....	458
	Fire connections (private)	125	12	.....	.....	.....	137
	Plug connections	154	215	.....	.....	.....	369
	Total Feet	353	5,494	1,708	30	.....	7,585
	Total Pounds	6,707	170,314	71,736	1,650	.....	250,407
Pipe used but not adding anything to feet laid in ground.	Repairs, general	119	392	4	44	.....	559
	Repairs, intersections connected	45	358	.....	6	15	424
	Repairs, new stops put in	3	75	.....	.....	8	86
	Relaid	.....	.....	210	45	.....	255
	Total Feet	167	825	214	95	23	1,324
	Total Pounds	3,173	25,575	8,988	5,225	1656	44,617
	Total Feet	520	6,319	1,922	125	23	8,909
	Total Pounds	9,880	195,889	80,724	6,875	1656	295,024

Fourth District.

Comprising the Thirteenth, Fourteenth, Fifteenth, Twentieth, parts of the Twenty-eighth, and Twenty-ninth Wards.

Frontage chargeable after deducting the intersections.

Street.	Location.	Size. Inches.	Distance. Feet.
Alder,	from Norris to Diamond	6	552
Broad, E. S.	from Lehigh to Indiana	12	1,735
Broad, W. S.	from Indiana to Westmoreland	12	1,720
Brown,	from Corinthian avenue to Twenty-second	8	797
Carleton,	from Seventeenth to Eighteenth	6	447
Carlisle,	from Dauphin to 340 feet north of York	6	892
Carlisle,	from Cumberland north	6	316
Diamond,	from Ninth west	6	160
Erie,	from Broad to Sixteenth	6	987
Montgomery,	from Broad to west of Fifteenth	8	589
Montgomery,	from Sydenham to Sixteenth	8	253
Amount carried forward			8,448

Street.	Location.	Size. Inches.	Distance. Feet.
Amount brought forward			8,448
North, from Broad to Fifteenth		6	483
N. College avenue, from Twenty-third to Twenty-fourth		6	475
Percy, from Diamond to Susquehanna		6	588
Somerset, from Thirteenth to Broad		6	586
Taylor, from Wilcox to Brandywine		6	115
Turner, from Twenty-fourth to Twenty-fifth		6	450
Twentieth, from Ontario to Tioga		6	553
Twenty-second, from Huntingdon to Lehigh		6	561
Wilcox, from Chatham to Taylor		6	103
Total			12,362

Dead ends, etc., connected. No frontage chargeable.

Street.	Location.		Size. Inches.	Distance. Feet.
Girard, with Sixth		[D. E.]	4	10
Twenty-third, with N. College avenue		[D. E.]	6	22
Fifteenth, from Montgomery south		[D. E.]	6	24
Sixteenth, from Montgomery south		[D. E.]	6	24
Warnock, from Diamond south		[D. E.]	6	10
Melon, west from Ninth		[D. E.]	6	60
Total				150

Fire purpose connections (private).

Street.	Location.	Size. Inches.	Distance. Feet.
Wylie, above Nineteenth, for Hagstoz & Thorp		6	149
Master, 30 feet west of Thirty-first		6	28
Shamokin, east of Twenty-second		4	8
Total			185

Supply connections (private).

Street.	Location.	Size. Inches.	Distance. Feet.
Twenty-second, 381 feet north of Huntingdon,	Municipal Hospital	4	201
Diamond, 73 feet east of Tenth,	P. G. & N. Railroad Company	6	19
Hamilton, 173 feet east of Fifteenth,	Baldwin Locomotive Works	6	14
Total			234

	Size. Inches.	Distance. Feet.
Fire-plug connections	4	44
Fire-plug connections	6	284
Total		328

	Size. Inches.	Distance. Feet.
Repairs	4	42
Repairs	6	69
Repairs	30	16
Repairs	36	12
Total		139

Repairs, intersections connected.

		Size. Inches.	Distance. Feet.
Twenty-seventh, with Mt. Pleasant	[B. S.]	6	10
Melon, with Tenth	[B. S.]	6	15
Fifteenth, with Hamilton	[B. S.]	6	17
Total			52

Repairs, pipes disconnected.

Street.	Location.	Size. Inches.	Distance. Feet.
Twenty-second, from Fairmount avenue		10	14
Twenty-second, from Wallace		6	16
Twenty-second, from Mt. Vernon		6	10
Total			40

Pumping mains.

	Size. Inches.	Distance. Feet.
Spring Garden Works, for No. 8 engine	30	694
Spring Garden Works, connecting No. 5 and No. 7 mains	36	6
Belmont Works, extension of main for No. 3 engine	36	42
Belmont Works, extension of main for No. 3 engine	30	20
Belmont Works, extension of main for No. 3 engine	4	
Lehigh Reservoir, overflow	30	11
Lehigh Reservoir, overflow	16	135
Lehigh Reservoir, overflow	8	17
Total		935

Supply mains.

Street.	Location.	Size. Inches.	Distance. Feet.
Sixteenth, from Spring Garden to 10 feet south of Hamilton		20	525
Twenty-second, from Green to Spring Garden		10	492
Broad, from Westmoreland to Germantown road		12	2,492
Broad, to connect with Germantown avenue		6	15
Total			3,524

Pipes and connections at works.

	Size. Inches.	Distance. Feet.
Belmont engine house, blow-off pipe	6	341
Belmont engine house, blow-off pipe	4	38
Belmont engine house, blow-off pipe	12	3
Belmont engine house, pipe from spring	4	264
Total		646

	Size. Inches.	Distance. Feet.
Pipe raised.—Belmont pumping main	36	150
Taken up.—Pipe from spring, Belmont	3	100
Relaid.—Pipe from spring, Belmont	3	100

Recapitulation.

	Purposes for which used.	Size. 3	4	6	8	10	12	16	20	30	36	Total.
Pipe added to that already laid.	Frontage chargeable	.....	.....	7,268	1,639	.....	3,455	.....	.....	.....	.....	12,362
	Dead ends, etc., connected	.....	10	140	.....	.....	.....	.....	.....	.....	.....	150
	Fire connections (private)	.....	8	177	.....	.....	.....	.....	.....	.....	.....	185
	Supply connections (private)	.....	201	33	.....	.....	.....	.....	.....	.....	.....	234
	Plug connections	.....	44	284	.....	.....	.....	.....	.....	.....	.....	328
	Pumping mains and connections	.....	10	.....	17	.....	.....	135	.....	725	48	935
	Supply mains and connections	.....	.....	15	.....	492	2,492	.....	525	.....	.....	3,524
	Drains and connections at Works	.....	302	341	.....	.....	3	.....	.....	.....	.....	646
	Total — Feet	.....	575	8,258	1,656	492	5,950	135	525	725	48	18,364
	Total — Pounds	.....	10,925	255,998	69,552	27,060	428,400	14,850	83,475	240,700	20,256	1,151,216
Pipe used for repairs, etc., which does not increase that already laid.	Repairs, general	.....	42	69	.....	.....	.....	.....	.....	16	12	139
	Repairs, intersections connected	.....	.....	52	.....	.....	.....	.....	.....	.....	.....	52
	Repairs, pipes disconnected	.....	.....	26	.....	14	.....	.....	.....	.....	.....	40
	Pipe raised	.....	.....	.....	.....	.....	.....	.....	.....	.....	150	150
	Pipe taken up	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	100
	Pipe relaid	100	.....	.....	.....	.....	.....	.....	.....	.....	.....	100
	Total — Feet	200	42	147	.....	14	.....	.....	.....	16	162	581
	Total — Pounds	3,000	798	4,557	.....	770	.....	.....	.....	5,312	68,364	82,801
	Total handled — Feet	200	617	8,405	1,656	506	5,950	135	525	741	210	18,945
	Total handled — Pounds	3,000	11,728	260,555	69,552	27,830	428,400	14,850	83,475	246,012	88,620	1,234,017

GERMANTOWN DISTRICT.

Comprising the Twenty-second and parts of the Twenty-fifth and Twenty-eighth Wards.

Frontage chargeable after deducting the intersections.

Street.	Location.		Size. Inches.	Distance. Feet.
Adams, from Washington lane to Johnson			6	912
Ashmead, from Wakefield to 362 feet northeast of Mercer			6	1,392
Coulter, from Wayne to Alfred			6	878
Mt. Airy, from 773 feet N. E. of Germantown avenue to C. H. RR.			6	793
Venango, from Eighteenth street west		[DE]	6	287
W. Washington lane, from 321 feet N. E. of Adams		N. E.	6	72
Total				4,334

Dead ends, etc., connected. No frontage chargeable.

Street.	Location.		Size. Inches.	Distance. Feet.
Duval, with Adams		[DE]	6	29
Washington lane, with Adams		[DE]	6	7
Eighteenth, from Venango south		[DE]	6	14
Broad, E. S., N. from centre of Westmoreland		[DE]	6	22
Broad, W.S., N. from centre of Westmoreland		[DE]	6	22
Westmoreland, from E. to W. side of Broad			6	41
Total				135

	Size. Inches.	Distance. Feet.
Fire plug connections	4	116
Fire plug connections	6	45
Total		161

	Size. Inches.	Distance. Feet.
Repairs	3	2
Repairs	4	5
Total		7

Taken up.

Street.	Location.	Size. Inches.	Distance. Feet.
Erie avenue,	in centre, from Broad to Fifteenth ..	6	538

Relaid.

Street.	Location.	Size. Inches.	Distance. Feet.
Erie avenue,	on S. S., from Broad to Fifteenth ...	6	525

Recapitulation.

	Purposes for which used.	Size. 3	Size. 4	Size. 6	Total.
New pipe or feet added.	Frontage chargeable	.....	.....	4,334	4,334
	Dead ends, etc., connected	.....	.....	135	135
	Plug connections	.....	116	45	161
	Total Feet	.....	116	4,514	4,630
	Total Pounds	.....	2,204	139,934	142,138
Pipe used, but adding nothing to feet in ground.	Repairs	2	5	.....	7
	Taken up	.....	.....	538	538
	Relaid	.....	.....	525	525
	Total Feet	2	5	1,063	1,070
	Total Pounds	30	95	32,953	33,078
	Total handled Feet	2	121	5,577	5,700
	Total handled Pounds	30	2,299	172,887	175,216

MANAYUNK DISTRICT.

Comprising the Twenty-first and part of the Twenty-eight Ward.

Frontage chargeable after deducting the intersections.

Street.	Location.	Size. Inches.	Distance. Feet.
Cresson,	from Seville to Adams	6	653
Cresson,	from Green lane to Jackson	6	341
Fountain,	from Ridge avenue S. W	6	488
Green lane,	from Spring to Magnet	6	188
Jefferson,	from Linden N. E	6	121
Krams,	from 351 feet N. E. of Mitchell N. E	6	72
Levering,	from W. to E. Fleming	6	61
Robinson,	from Main to Cresson	6	244
Sunnyside,	from Norristown Railroad N. E	6	180
Vassar,	from 6 feet W. of H. L. at Cresson to Ridge	6	432
Total			2,780

Dead ends, etc., connected. No frontage chargeable.

Street.	Location.	Size. Inches	Distance. Feet.
Seville with Cresson		6	19
Fleming with Levering		6	30
Total			49

Fire purpose connections (private).

Street.	Location.	Size. Inches.	Distance. Feet.
Main, E. S., 235 feet S. of Shur's lane, Littlewood & Co		4	17
Church, E. S., 361 feet N. E. of Hamilton, Jas. Stafford		4	14
Church, E. S., 361 feet N. E. of Hamilton, Jas. Stafford		6	9
Total			40

	Size. Inches.	Distauce. Feet.
Fire plug connections	4	69

	Size. Inches.	Distance. Feet.
Repairs	4	16
Repairs	10	12
Total		28

Repairs. Intersections connected.

Street.	Location.	Size. Inches.	Distance. Feet.
Spring, across Green lane		6	9

Taken up.

Street	Location.	Size. Inches.	Distance. Feet.
Main, 600 feet N. W. of Fountain		6	48

Relaid.

Street.	Location.	Size. Inches.	Distance. Feet.
Main, 600 feet N. W. of Fountain		6	48

Drain.

	Size. Inches.	Distance. Feet.
Roxborough Works	4	32

Recapitulation.

	Purposes for which used.		Size. 4	Size. 6	Size. 10	Total.
New pipe or feet added.	Frontage chargeable		.....	2,780	.....	2,780
	Dead ends, etc., connected		.....	49	.....	49
	Fire connections (private)		31	9	.....	40
	Plug connections		69	.....	.....	69
	Drain at Works		32	.....	.....	32
	Total	Feet	132	2,838	.....	2,970
		Pounds	2,508	87,978	.....	90,486
Pipe used, but not adding anything to feet in ground.	Repairs, general		16	.....	12	28
	Repairs, intersections connected		.....	9	.....	9
	Taken up		.....	48	.....	48
	Relaid		.....	48	.....	48
	Total	Feet	16	105	12	133
		Pounds	304	3,255	660	4,219
	Total handled	Feet	148	2,943	12	3,103
		Pounds	2,812	91,233	660	94,705

Statement of the number of fire-plugs in the City by Districts and by Wards during 1881.

	First District.						Second District.							Third District.							Fourth District.							German-town.		Manayunk		Total
	Wards.					Total	Wards.						Total	Wards.						Total	Wards.					Total		Wards.	Total	Wards.	Total	
	1	2	4	26	30		6	8	9	10	24	27		17	18	19	23	25	31		14	15	20	28	29			22		21		
Prior to 1881	...	...	...	...	...	1024	...	...	...	...	...	...	1527	...	...	...	...	...	...	1662	...	...	...	...	...	1037		386		247	5,883
During 1881	3	2	1	9	10	25	1	3	3	1	10	26	44	2	3	4	5	11	5	30	1	4	2	15	3	25	13	13	7	7	144
Totals	...	...	...	...	...	1049	...	...	...	...	...	...	1571	...	...	...	...	...	...	1692	...	...	...	...	...	1062		399		254	6,027
Taken out 1881	...	...	...	...	...	3	...	...	...	...	...	...	9	...	...	...	...	...	...	1	...	...	...	...	...						13
Totals in City	...	...	...	...	...	1046	...	...	...	...	...	...	1562	...	...	...	...	...	...	1691	...	...	...	...	...	1062		399		254	6,014

Number of attachments for fire purposes previously reported.....200
Made during 1881—First District..... 1
Made during 1881—Second District..... 9
Made during 1881—Third District..... 8
Made during 1881—Fourth District..... 3
Made during 1881—Manayunk District..... 2
— 23

Total..... 223

Number of holes drilled for making new attachments to public mains during the year 1881.

MONTHS.	½-in. diameter.	⅝-in. diameter.	¾-in. diameter.	1-in. diameter.	Totals.	Shut-offs.
January	3	3	.....	2	8	7
February	10	1	1	1	13	32
March	237	9	3	6	255	57
April	239	11	5	11	266	57
May	317	12	3	4	336	52
June	336	15	9	9	369	59
July	300	8	5	10	323	48
August	322	10	4	14	350	63
September	354	18	4	12	388	72
October	387	14	8	18	427	94
November	487	29	11	26	553	88
December	174	7	6	8	195	37
Totals	3,166	137	59	121	3,483	666

Table of attachments in Wards and Districts.

WARDS.	½-in. diameter.	⅝-in. diameter.	¾-in. diameter.	1-in. diameter.	Totals.	Shut-offs.
First District, 1, 2, 3, 4, 26, and 30.	594	2	2	15	613	131
Second District, 5, 6, 7, 8, 9, 10, 24, and 27	596	56	23	36	711	132
Third District, 11, 12, 16, 17, 18, 19, 23, 31, and part of 25	882	13	8	46	949	180
Fourth District, 13, 14, 15, 20, 29, and part of 28	702	60	14	16	792	184
Germantown, 22 and part of 25 and 28	196	5	10	5	216	19
Manayunk, 21 and part of 28	196	1	2	3	202	20
Totals	3,166	137	59	121	3,483	666

Repairs to plugs, stops and mains, and plugs and stops taken out during 1881.

DISTRICTS.	Plugs.		Stops.		Repairs to mains.
	Repairs.	Taken out.	Repairs.	Taken out.	
First	747	3	199	.....	72
Second	390	9	581	12	34
Third	668	1	482	.....	158
Fourth	630	.....	398	.....	92
Germantown	30	.....	2	.....	18
Manayunk	169	.....	135	.....	29
Totals	2,634	13	1,797	12	403

Account of new stops and fire plugs for 1881.

DISTRICTS.	Stops.			Plugs.
	Two way.	Barton Four way.	Total.	
First	15	8	23	25
Second	47	9	56	44
Third	68	10	78	30
Fourth	49	15	64	25
Germantown	15	.....	15	13
Manayunk	13	.....	13	7
Totals	207	42	249	144

Number of valves raised in the different districts during the year 1881.

DISTRICTS.	3-inch.	4-inch.	6-inch.	8-inch.	10-inch.	12-inch.	16-inch.	20-inch.	30-inch.	36-inch.	Total.
First	5	3	9	.....	1	1	...	...	...	...	19
Second	10	7	15	.....	2	4	...	...	...	...	38
Third	.....	20	31	.....	1	1	...	..	...	...	53
Fourth	.....	14	35	.....	1	1	...	...	...	...	51
Totals for 1881	15	44	90	.....	5	7	...	...	...	...	161
" " 1880	7	23	47	.....	8	1	...	...	1	...	87
" " 1879	9	16	60	1	3	2	...	...	1	1	93
" " 1878	27	22	100	.....	3	1	...	1	1	...	155
" " 1877	12	6	50	.....	1	.....	...	1	...	...	70
" " 1876	3	17	49	.....	3	.....	...	1	...	...	73
" " 1875	17	55	120	4	12	2	4	1	2	...	217
" " 1874	13	32	111	6	6	3	3	...	...	...	174
Total for eight years	103	215	627	11	41	16	7	4	5	1	1030

RECAPITULATION.

Work on the Water Pipes classified in sizes and by Districts and arranged according to the use made of them.

PIPE HANDLED DURING 1881.

DISTRICTS.	SIZES.										TOTALS.	
	3	4	6	8	10	12	16	20	30	36	Feet.	Pounds
First	3	589	4,310	408	.....	.....	.....	.....	.....	.....	5,310	161,982
Second	196	895	4,637	405	6	12,298	44	.....	.....	.....	18,481	1,071,328
Third	.....	520	6,319	1,922	125	23	.....	.....	.....	.....	8,909	295,024
Fourth	200	617	8,405	1,656	506	5,950	135	525	741	210	18,945	1,234,017
Germa'town	2	121	5,577	.....	.....	.....	.....	.....	.....	.....	5,700	175,216
Manayunk	.....	148	2,943	.....	12	.....	.....	.....	.....	.....	3,103	94,705
Total	401	2,890	32,191	4,391	649	18,271	179	525	741	210	60,448	3,032,272

Purposes for which the pipes were used.

DEDUCTIONS TO OBTAIN THE TOTAL FEET ADDED TO MILEAGE.

DISTRICTS.	REPAIRS.				Lowered or raised.	Taken out.	Deductions.	Balance.	Taken up.	Total feet added.	Total pounds added.
	General.	Intersections connected.	Intersections disconnected.	New stops put in.							
First	121	39	.....	.....	.....	.....	160	5,150	.....	5,150	158,114
Second	216	38	.....	.....	.....	276	530	17,951	276	17,675	1,051,960
Third	559	424	.....	86	.....	.....	1,069	7,840	.....	7,840	239,112
Fourth	139	52	40	.....	150	100	481	18,464	100	18,364	1,151,216
Germantown	7	.....	.....	.....	.....	538	545	5,155	538	4,617	141,735
Manayunk	28	9	.....	.....	.....	48	85	3,018	48	2,970	90,486
Total	1,070	562	40	86	150	962	2,870	56,616	962	56,616	2,832,623

FURTHER DEDUCTIONS TO OBTAIN FRONTAGE CHARGEABLE.

DISTRICTS.	Intersections included in frontage.	Intersections not included in frontage.	Private connections.			Fire plugs.	Relaid.	Drains at works.	Pumping mains.	Supply mains.	Total deductions.	Total frontage in feet.
			Fire.	Motor.	Supply.							
First	.....	451	24	...	.....	316	.....	.....	.....	.....	.....	.....
Second	.....	152	191	55	48	705	257	.....	.....	44	.....	.....
Third	.....	458	137	...	.....	369	255	.....	.....	.....	.....	.....
Fourth	.....	150	185	...	234	328	100	646	935	3,524	.....	.....
Germ'nt'n	.....	135	.....	...	.....	161	525	.....	.....	.....	.....	.....
Manay'nk	.....	49	40	...	.....	69	48	32	.....	.....	.....	.....
Total	6,503¼	1,395	577	55	282	1,948	1,185	678	935	3,568	17,126·3	40,451¾

Account of Service Pipes laid during 1881, and the receipts therefor.

	Pipe laid in feet.	FRONTAGE.		Amount accounted for	Collected by Registrar in 1881.
		Feet.	Dollars.		
Balance of frontage remaining on books December 31, 1880			$7,026 47		
Amount paid in 1875				$8 46	
Received by Registrar during 1881				4,162 41	$4,162 41
Returned for lien during 1881				2,855 60	
				$7,026 47	
Total feet of pipe laid during 1881	57,578·0				
Intersections, connections, etc., not chargeable with frontage	17,126·3				
Balance	40,451·9				
Single fronts, charged at $1.00 per foot		4,393·5⅝	4,393 45		
Double fronts, charged at $2.00 per foot		36,058·3⅝	72,116 60		
Amount of frontage		40,451·9	$76,510 05		
Corner allowances deducted			3,970 27		
Net amount of frontage to be collected			$72,539 78		
Amount received by Registrar during 1870				16 00	
" " " 1871				60 00	
" " " 1873				3 00	
" " " 1875				35 54	
" " " 1876				56 00	
" " " 1877				192 00	
" " " 1878				219 00	
" " " 1879				185 64	
" " " 1880				58 20	
" " " 1881				37,344 77	37,344 77
Amount returned for lien during 1881				10,976 78	
" in front of City property				993 97	
" remaining on books December 31, 1881				22,398 88	
				$72,539 78	
Amount received by Registrar, on deposit, pipe not laid					5,227 23
" " " " on expired claims, pipe laid					754 70
Total collected by Registrar during 1881					$47,489 11

Statement of material on hand in the several Purveyors Districts, January 1, 1882.

	DIAMETER IN INCHES.													
	3	4	6	8	10	12	16	18	20	23	24	30	36	48
Bands	...	19	10	13	6	26	5	1	15	...	9	5	19	70
Bevel Hubs	...	19	97	19	33	22	...	.....	.....	...	.....	.....	.....	.....
Bonnets	...	23	33	1	6	20	7	2	4	...	.....	6	2	1
Pipes	...	160	302	111	200	320	18	2	604	...	4	35	36	214
Pipes curved	1	5	11	.....	1	12	7	2	16	...	.....	18	8	1
Pipes, O. G	...	.....	6	.....	.....	.....	.....	.....	.....	...	.....	.....	.....	.....
Saddles	...	43	67	.....	9	4	.....	.....	.....	...	.....	.....	.....	.....
Sleeves, whole	7	56	48	158	51	104	18	18	16	...	.....	18	4	.....
Sleeves, half	...	.....	38	47	52	48	2	.....	2	...	.....	2	2	3
Stops	4	6	46	4	18	9	8	1	6	1	.....	9	11	.....
Quarter Turns	...	39	1	20	30	20	1	.....	.....	...	.....	.....	.....	.....
Plugs for Bells	...	.....	.....	2	1	.....	.....	.....	.....	...	.....	.....	.....	.....

FIRE PLUGS.		Goosenecks.			Meter.	Lead.	Clay.	Gasket.
		Old.	4-in.	6-in.	6-in.			
Steam	29	23	53	16	1	71,922	9 tons.	2 bales.
Hills	91							
Matthews	1							
Old style	7							

	3×3	4×3	4×4	6×3	6×4	6×6	8×4	8×6	8×8
Branches, Single	7	.....	25	.....	98	15	56	16	22
Branches, Double	.....	.....	36	.....	90	175	12	58	68
Breeches Pipes	.....	.....	.....	.....	.....	.....	.....	.....	.....
Reducers	.....	33	.....	5	38	.....	.....	.....	.....

	10×4	10×6	10×8	10×10	12×4	12×6	12×8	12×10	12×12
Branches, Single	30	39	13	4	100	51	10	11	8
Branches, Double	14	66	21	35	13	55	21	45	2
Breeches Pipes	.....	.....	.....	.....	.....	.....	.....	.....	.....
Reducers	7	43	31	.....	.....	20	10	10	.....

	16×4	16×16	18×6	18×18	20×4	20×6	20×8	20×12	20×16
Branches, Single	6	4	.....	1	2	5	.....	1	.....
Branches, Double	.....	1	2	.....	.....	14	1	2	.....
Breeches Pipes	.....	1	.....	.....	.....	.....	.....	.....	.....
Reducers	.....	.....	.....	.....	.....	.....	.....	.....	2

	20×18	20×20	30×6	30×12	30×16	30×20	30×30	36×30	36×36	48×36
Branches, Single	.....	1	.....	.....	1	.....	4	.....	.....	.....
Branches, Double	.....	.....	4	3	.....	1	3	.....	.....	.....
Breeches Pipes	.....	.....	.....	.....	.....	.....	.....	.....	3	1
Reducers	1	.....	.....	.....	.....	2	.....	2	.....	.....

Table.

Total feet.	FRONTAGE IN DOLLARS. Double.	Single.	Total frontage to be collected.	Collected by Registrar.	Returned for lien.	Collected by City Solicitor.	Collected more than charged.	Collected less than charged.
90,979¼	$38,730 00	$2,240 25	$179,718 25	$115,034 27	$81,151 48	$52,259 95	.....	$12,424 08
53,834⅜	49,339 90	4,494 70	103,174 50	73,253 88	38,581 54	56,233 57	$26,312 95	.....
41,805½	41,484 80	321 00	83,290 60	55,631 89	32,223 75	40,113 80	12,455 09	.....
21,099⅝	19,673 91	1,425 70	40,773 52	31,235 92	26,895 71	46,445 94	36,908 34	.....
17,136¹⁵⁄₁₆	16,914 94	222 00	34,051 88	26,077 90	11,854 89	38,015 53	30,041 55	.....
40,451¾	36,058 25	4,393 50	76,510 00	47,489 11	13,832 38	29,936 22	915 33	.....

d.

.....	29,350	.....	29,350
88	217,923	4,741	213,182
12	228,355	4,749	221,606
09	187,049	13,375	173,674
27	151,077	8,057	143,020
38	96,206	11,951	84,255
64	65,348	3,297	62,051
74	45,742	3,854	41,888
03	26,656	3,288	23,368
70	57,578	962	56,616
85	1,103,284	54,274	1,049,010
80	56,364,857	1,253,405	55,111,452

				TOTAL.	
				MILES.	FEET.
55	1,311,079	3,151	1,307,928	247	3,768
96	1,668,821	41,520	1,627,301	308	1,061
85	1,103,284	54,274	1,049,010	198	3,570
32	4,083,184	98,945	3,984,239	754	3,119

				NET TONS.
65	58,148,094	47,265	58,100,829	29,050$\frac{\text{AAA}}{\text{BBB}}$
25	84,081,759	1,644,511	82,437,248	41,218$\frac{\text{AAA}}{\text{BBB}}$
80	56,364,857	1,253,405	55,111,452	27,555$\frac{\text{AAA}}{\text{BBB}}$
70	198,594,710	2,945,181	195,649,529	97,824$\frac{\text{AAA}}{\text{BBB}}$

Rain-fall at Philadelphia, from Pennsylvania Hospital Reports.

Year.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Totals.	Read'g Pa.	Leban'n, Pa.
1810	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	32·66	.....	.....
1811	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	34·97	.....	.....
1812	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	39·30	.....	.....
1813	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	35·63	.....	.....
1814	.....	.....	.....	.....	.....	.....	.....	.....	.....	.. ..	.....	.....	43·14	.....	.....
1815	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	34·67	.....	.....
1816	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	27·95	.....	.....
1817	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	36·01	.....	.....
1818	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	30·13	.....	.....
1819	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	23·35	.....	.....
1820	.....	.....	.....	.....	.....	.....	.....	.....	.....	.. ..	.....	.....	39·61	.....	.....
1821	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	32·18	.....	.....
1822	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	29·86	.....	.....
1823	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	41·85	.....	.....
1824	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	38·74	.....	.....
1825	0·84	3·26	4·63	·83	1·72	3·59	2·06	3·70	2·61	1·25	1·36	3·72	29·57	.....	.....
1826	1·11	2·13	5·80	3·87	·19	4·655	3·68	2·75	2·00	5·83	1·85	1·28	36·145	.....	.....
1827	2·86	3·55	1·23	2·83	2·50	2·09	2·97	5·75	·79	5·91	4·76	3·26	38·50	.....	.....
1828	2·05	2·75	3·35	3·82	3·49	2·69	5·33	1·51	4·62	1·39	6·71	·26	37·97	.....	.....
1829	5·37	3·75	2·87	4·99	2·68	3·44	4·35	4·61	2·01	2·30	3·97	1·51	41·85	.....	44·22
1830	1·63	2·06	4·115	1·815	3·75	5·99	4·07	3·87	2·93	4·31	5·35	5·18	45·07	.....	43·33
1831	6·22	2·44	3·97	5·20	1·07	3·56	4·17	5·39	5·33	4·51	1·88	1·20	44·94	.....	41·47
1832	4·58	2·66	1·90	2·98	5·40	1·55	2·62	5·69	1·40	3·41	2·59	5·09	39·87	.....	37·31
1833	3·97	1·24	2·22	·70	5·88	5·28	4·15	3·39	3·82	10·05	2·18	5·67	48·55	.....	44·78
1834	2·49	2·22	2·02	2·83	3·52	3·99	4·35	·62	3·57	3·29	3·01	2·33	34·24	.....	34·49
1835	2·75	1·81	3·83	4·33	1·99	6·27	6·55	2·05	2·63	1·22	3·19	2·68	39·30	.....	37·62
1836	7·62	2·99	1·75	3·47	2·28	7·31	2·91	1·97	1·82	3·59	3·34	3·61	42·66	.....	39·82
1837	2·50	3·58	3·76	2·83	4·86	2·83	5·89	4·06	2·28	·66	3·23	2·56	39·04	.....	36·97
1838	2·20	2·19	3·171	3·586	3·577	6·600	2·376	2·780	9·519	4·896	3·350	1·044	45·238	.....	35·65
1839	5·037	3·424	1·504	1·507	6·073	3·922	2·516	4·644	2·919	2·831	3·100	6·262	43·73	.....	37·73
1840	1·841	3·009	2·626	6·827	2·688	5·948	4·538	5·554	2·502	5·734	2·486	3·647	47·400	.....	30·86
1841	7·837	1·387	5·821	6·456	3·269	3·114	3·280	9·102	1·895	3·198	4·224	5·917	55·500	.....	38·87
1842	1·358	4·265	2·835	5·307	5·865	3·192	11·805	3·786	1·269	1·712	3·487	3·657	48·538	.....	39·84
1843	1·440	2·540	4·415	4·723	2·045	1·686	4·543	9·255	4·856	2·220	4·148	4·041	46·912	.....	44·12
1844	4·052	1·449	4·430	1·354	3·091	3·351	5·284	2·399	4·034	5·025	2·951	2·753	40·173	.....	32·19
1845	3·760	4·738	2·415	2·580	1·599	3·725	2·763	7·298	2·155	2·529	2·500	3·959	40·021	.....	33·28
1846	4·680	3·330	4·598	2·112	3·444	3·300	4·604	4·272	·249	2·444	7·970	3·347	44·390	.....	46·61
1847	4·730	4·569	4·700	·585	1·567	3·305	2·765	3·182	8·070	3·000	2·836	5·785	45·094	.....	50·60
1848	2·030	1·443	2·756	1·541	4·902	4·433	3·281	1·714	1·805	3·747	2·343	5·007	35·002	.....	33·42
1849	·730	2·610	5·470	1·752	3·995	2·195	2·933	6·975	1·404	5·595	2·600	5·836	42·095	.....	35·16
1850	4·770	2·870	4·750	2·665	6·500	2·030	5·970	8·329	7·732	1·092	3·320	4·515	54·543	.....	64·17
1851	1·230	3·110	3·475	4·565	4·817	3·438	2·524	2·555	1·130	3·025	3·356	2·275	35·500	.....	35·50
1852	2·011	2·710	4·270	6·445	3·034	4·030	4·060	4·400	1·293	2·267	6·055	5·174	45·749	.....	43·90
1853	1·845	4·440	2·462	3·835	5·173	1·100	6·296	3·088	4·463	3·470	2·320	2·165	40·657	.....	43·11
1854	2·331	4·203	1·615	7·750	6·935	2·390	3·024	1·842	3·798	1·545	2·834	2·910	40·180	.....	37·58
1855	2·337	2·352	1·684	2·050	2·965	7·949	6·400	2·786	4·000	4·111	2·037	5·425	44·096	.....	53·63
1856	4·537	1·237	2·232	3·515	2·595	1·986	1·508	6·000	4·014	1·296	2·070	2·937	33·927	.....	32·55
1857	3·532	·790	1·831	6·786	5·547	7·500	3·915	7·590	1·105	2·690	1·450	5·550	48·286	.....	52·61
1858	2·595	2·285	1·087	4·640	5·015	4·495	1·345	4·941	1·492	1·842	5·615	4·500	39·852	.....	43·28
1859	6·675	3·660	6·985	5·610	2·250	6·013	4·071	4·736	7·681	3·132	3·820	3·490	58·123	.....	53·70
1860	3·225	2·755	1·415	3·800	3·817	2·885	·985	8·401	2·850	4·520	6·130	3·310	44·093	.....	51·60
1861	5·245	2·065	3·925	3·705	6·640	3·880	2·560	3·137	4·402	3·797	4·875	2·092	46·440	.....	45·02
1862	4·795	4·640	3·553	4·160	2·308	6·975	2·465	·925	3·980	4·770	4·790	1·650	45·011	.....	38·64
1863	4·720	4·680	5·885	7·015	4·510	4·250	6·009	1·447	·875	2·465	2·700	4·633	49·189	.....	56·74
1864	1·705	·551	5·170	3·795	8·685	2·345	3·770	1·920	7·165	1·820	3·930	5·145	46·001	.....	38·43
1865	3·610	5·825	4·710	2·830	7·210	4·750	2·970	3·770	7·960	3·050	3·960	5·610	56·255	.....	46·52
1866	3·145	6·615	2·150	2·930	4·680	2·960	2·520	2·181	8·705	4·145	1·760	3·465	45·256	.....	39·46
1867	1·762	3·892	5·465	1·810	7·320	11·025	2·387	15·816	1·720	4·320	2·940	2·730	61·187	.....	48·47
1868	3·620	2·520	3·360	5·440	7·005	4·370	3·514	2·056	8·908	1·737	5·280	3·595	51·405	.....	37·30
1869	4·280	4·760	5·305	2·120	4·235	5·585	2·885	1·280	3·250	6·320	3·725	5·115	48·860	.....	43·40
1870	4·075	2·532	4·060	5·605	6·280	2·895	3·947	5·115	1·710	3·895	2·102	1·889	44·105	50·45	40·98
1871	3·466	3·086	5·814	1·829	3·383	3·773	6·811	5·971	1·772	4·863	4·293	2·259	47·320	46·27	41·49
1872	1·267	1·185	3·377	2·497	2·808	4·223	11·215	8·319	3·820	5·363	3·381	3·662	51·117	41·24	37·00
1873	6·048	5·607	2·242	4·191	4·783	·887	5·553	12·289	4·045	5·889	4·995	1·757	58·286	58·49	54·57
1874	4·218	2·823	1·595	7·509	2·697	2·664	2·759	6·531	3·987	1·650	2·229	2·249	40·911	36·71	35·06
1875	2·360	3·284	3·925	1·360	1·575	5·258	4·174	6·584	3·035	1·827	5·544	2·918	41·844	.....	42·15
1876	2·023	3·680	5·605	1·909	5·189	2·209	6·223	1·215	7·776	1·210	9·025	3·169	49·323	.....	41·82
1877	2·893	1·550	5·097	2·962	1·215	5·512	6·196	1·007	5·882	6·963	6·507	1·363	45·147	.....	43·25
1878	4·566	2·172	3·641	2·541	4·329	4·750	5·313	4·803	1·418	2·391	2·891	4·873	43·778	37·23	36·46
1879	2·814	1·750	2·505	5·687	1·315	7·858	4·575	8·435	1·297	·447	1·615	6·351	44·649	32·22	34·54
1880	2·171	2·875	4·799	2·935	0·578	1·991	9·461	5·494	1·683	1·242	1·957	4·492	39·678	31·46	37·24
1881	4·836	5·370	5·871	·715	3·283	5·066	1·139	2·176	1·241	3·720	3·143	3·722	40·282	40·29	36·08

Height of gauge at Hospital, 50 feet above the level of the sea.
The observations from 1810 to 1824, inclusive, were taken at Spring Mills, Pa.

Monthly rain-fall at Lebanon, Pennsylvania, observed by S. B. Lehman, from 1829 to 1881, inclusive. Elevation, 495 feet above tide-water.

Year.	January.	Feb'y.	March.	April.	May.	June.	July.	August.	Septe'r.	October.	Novem'r.	Decemb'r	Totals.
1829	5·09	2·60	2·24	3·40	4·34	3·79	6·78	3·87	2·62	3·62	3·31	2·56	44·22
1830	2·80	·65	5·57	2·63	5·49	5·13	1·42	2·23	3·03	3·74	5·99	4·65	43·33
1831	4·64	2·75	2·07	3·60	1·17	4·86	6·26	3·40	5·84	3·38	2·18	1·32	41·47
1832	4·42	4·96	1·80	1·54	4·76	1·85	1·36	4·18	2·68	3·22	2·30	4·24	37·31
1833	2·74	·56	1·66	·57	4·58	9·00	5·97	1·07	4·14	6·97	2·34	5·18	44·78
1834	3·37	2·04	1·86	2·19	3·98	5·78	3·98	·98	2·39	2·89	2·18	2·85	34·49
1835	2·26	1·50	3·80	5·45	2·03	4·17	3·78	3·79	3·98	1·85	3·71	1·30	37·62
1836	4·40	3·05	1·45	2·80	3·32	6·32	2·00	3·47	1·18	4·10	3·37	4·36	39·82
1837	1·90	1·78	4·94	2·25	4·32	4·33	4·41	3·52	3·88	2·16	1·31	2·17	36·97
1838	3·89	1·41	3·18	2·38	5·64	3·89	·40	2·71	3·20	3·62	4·20	1·13	35·65
1839	4·22	2·70	·59	3·76	4·40	3·71	5·67	2·98	3·99	1·14	2·27	3·30	37·73
1840	1·59	2·39	2·68	4·12	2·77	2·58	1·89	1·54	1·40	3·75	2·87	3·28	30·86
1841	4·39	·90	3·87	4·62	4·90	3·64	2·45	2·07	2·97	1·47	2·94	4·65	38·87
1842	1·23	2·53	2·00	5·13	3·98	3·95	6·47	3·58	2·00	2·77	3·38	2·82	39·84
1843	3·04	2·61	6·18	2·15	2·68	2·02	2·76	4·39	7·30	4·55	3·60	2·84	44·12
1844	4·15	2·15	3·55	1·43	4·60	2·55	2·15	1·71	2·56	3·40	1·80	2·14	32·19
1845	2·27	2·16	2·57	·76	2·49	5·22	·83	2·38	2·11	7·27	3·07	2·15	33·28
1846	2·38	3·50	3·78	2·40	9·38	4·67	3·19	3·20	2·23	3·58	5·10	3·20	46·61
1847	3·70	3·35	3·43	1·00	3·36	3·86	6·04	2·04	7·46	4·46	5·22	6·68	50·60
1848	2·61	1·62	2·88	·69	2·26	2·81	6·00	2·17	1·76	1·69	3·83	5·10	33·42
1849	1·61	1·88	4·98	1·37	4·56	3·96	·39	1·51	·71	6·81	2·38	5·00	35·16
1850	5·61	4·70	3·97	2·09	5·92	6·45	10·14	5·46	8·75	4·61	1·98	4·49	64·17
1851	1·09	4·42	3·25	5·67	4·36	3·30	1·85	2·50	1·36	1·50	4·05	2·15	35·50
1852	2·45	2·45	4·45	4·79	2·61	3·75	3·21	5·47	1·47	1·55	6·65	5·05	43·90
1853	1·55	4·65	1·62	4·25	5·53	·49	5·91	7·82	4·28	3·70	1·79	1·52	43·11
1854	3·08	5·05	2·11	4·43	3·76	4·62	2·92	·80	·92	2·04	5·47	2·38	37·58
1855	3·82	3·45	2·03	2·18	2·98	8·50	10·29	3·17	5·34	5·49	·93	5·45	53·63
1856	2·53	1·30	1·32	4·30	2·93	4·85	2·16	4·46	1·97	1·46	2·56	3·71	32·55
1857	3·07	1·40	1·72	5·19	9·80	10·05	4·94	4·91	2·52	1·58	2·65	4·78	52·61
1858	2·23	1·00	1·09	3·48	9·35	4·52	1·81	4·78	2·00	3·12	4·73	5·17	43·28
1859	3·80	3·48	5·92	5·25	3·37	4·85	4·90	2·43	10·20	3·19	2·42	3·89	53·70
1860	3·06	3·55	1·33	4·45	10·65	5·18	·93	7·63	2·44	4·51	4·95	2·92	51·60
1861	3·57	1·97	2·86	4·09	4·18	1·60	6·28	5·49	4·23	5·47	4·03	1·25	45·02
1862	5·31	1·86	3·45	3·86	2·17	9·22	3·23	1·62	1·10	3·34	2·62	·86	38·64
1863	4·86	3·17	5·25	4·45	3·68	4·54	11·43	·89	4·93	4·33	3·79	5·42	56·74
1864	2·08	·61	3·46	4·06	5·75	2·43	1·87	3·27	6·05	1·77	3·24	3·84	38·43
1865	3·92	1·84	6·65	2·81	5·61	4·95	4·61	1·70	5·38	3·20	2·35	3·50	46·52
1866	1·74	4·39	1·21	2·37	2·98	4·87	3·74	4·28	5·51	2·83	3·34	2·20	39·46
1867	2·00	4·41	4·16	2·48	7·96	3·93	2·86	12·91	2·41	1·57	·70	3·08	48·47
1868	2·82	1·81	1·76	4·30	5·15	4·12	3·06	1·48	4·81	2·13	3·49	2·37	37·30
1869	3·17	2·80	3·62	2·83	3·70	4·55	3·92	1·46	2·57	7·39	2·26	5·13	43·40
1870	3·52	3·75	3·04	4·28	4·24	4·70	3·61	4·17	3·27	2·59	1·71	2·10	40·98
1871	2·43	2·68	5·50	2·54	2·93	4·18	7·03	5·48	2·27	2·02	3·10	1·33	41·49
1872	·99	1·11	1·79	2·52	2·79	3·12	3·09	8·63	3·86	3·79	2·54	2·77	37·00
1873	3·69	3·22	3·05	4·24	4·01	2·67	7·82	9·43	3·42	7·79	3·28	1·95	54·57
1874	2·85	2·86	2·20	5·94	2·79	1·21	6·25	3·28	2·32	·52	2·42	2·42	35·06
1875	2·79	2·79	4·68	2·97	1·86	3·93	2·96	8·24	2·41	3·39	3·49	2·64	42·15
1876	1·70	3·21	5·34	2·13	3·06	4·22	4·56	1·59	8·63	2·38	2·77	2·23	41·82
1877	2·78	2·09	4·33	3·69	1·54	5·73	4·43	1·92	3·27	6·64	5·53	1·30	43·25
1878	3·47	2·76	3·61	3·62	5·12	3·60	1·24	1·99	·91	3·33	2·89	3·92	36·46
1879	2·17	2·21	2·30	2·54	2·76	3·90	3·39	4·26	2·93	1·49	1·77	4·82	34·54
1880	3·59	3·61	3·34	3·74	1·37	4·43	3·28	2·80	3·69	2·08	2·98	2·33	37·24
1881	3·55	3·66	4·57	1·08	3·39	7·11	·53	·50	·77	3·67	2·37	4·93	36·08

Monthly rainfall at Reading, Pennsylvania, observed by A. Harvey Tyson, City Engineer. Elevation, —— feet above tide-water.

Year.	January.	February.	March.	April.	May.	June.	July.	August.	Sept'mb'r.	October.	Novemb'r.	December.	Totals.
1877	.....	.....	.....	.....	.....	.....	.....	2·15	4,34	7·16	5·77	1·46	.....
1878	5·01	2·43	3·44	2·75	3·48	2·73	1·63	1·84	3·18	3·74	2·63	4·37	37·23
1879	2·42	2·21	2·37	3·16	3·31	3·61	3·00	5·40	2·02	·67	1·57	2·48	32·12
1880	1·82	1·97	3·97	2·96	·66	2·58	4·71	2·52	2·36	1·88	2·78	3·25	31·46
1881	3·78	4·37	6·04	·99	3·60	7·08	1·86	1·02	1·68	2·40	2·56	5·34	40·29