Department for Supplying the City with Water.

ANNUAL REPORT

OF THE

CHIEF ENGINEER OF THE WATER DEPARTMENT

OF THE

CITY OF PHILADELPHIA.

PRESENTED TO COUNCILS, JANUARY 28, 1864.

PHILADELPHIA:
ANDREW W. McCLASKY, PRINTER.
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COMMITTEE ON WATER WORKS, 1863.

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Purveyors,

1st	District,	JAMES L. MARSHALL,	Office,	615 Carpenter Street.
2d	"	THOMAS SHREINER,	"	918 Cherry Street.
3d	"	JOHN A. MYERS,	"	1420 Frankford Road.
4th	"	WILLIAM H. EVANS,	"	1324 Buttonwood Street.

Engineer's Clerk,

CHARLES PETERS.

Draughtsman.

HENRY J. TAYLOR

Engineers at Works,

Fairmount Works	ANTHONY MCGRANN,	WILLIAM TODD.
Spring Garden Works	JONATHAN C. FINCHER,	WILLIAM OTLEY.
Kensington Works	ROBERT J. HICKMAN,	TOBIAS SIBEL.
24th Ward Works	LEWIS W. SHARPLESS,	ROBERT J. DOWNING.

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ANNUAL REPORT

OF THE

Chief Engineer of the Water Department,

FOR THE YEAR 1863.

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

Gentlemen:

In compliance with your requirements, I beg the liberty of laying before your honorable bodies my Second Annual Report as Chief Engineer of the Department for Supplying the City with Water, and, according to previous custom, will state the operations and condition of the Water Works in the usual order.

FAIRMOUNT WORKS.

During the past year, the main reliance at Fairmount has been upon the new portion of the Works, and it has been fully demonstrated that the new Turbine Wheels and Pumps have been equal to any demand that has been made upon them.

They have been in constant operation upwards of a year, and have proved entirely satisfactory, the only exception being that some parts of the machinery have not proved to be of sufficient strength, but such exceptions have been few and of a character only to be developed by actual tests and continued operation of the machinery. A main of the dimensions recommended in the last Annual Report, which I had the honor to submit, connected with the Corinthian Avenue and Spring Garden Reservoirs, is much needed, and would greatly increase the facilities for more fully and efficiently supplying the districts dependent on those two reservoirs, as well as bring into full operation the whole capacity of the new works at Fairmount, and would further be the means of materially lessening the expense now incurred in pumping from the Spring Garden Works. The question of utilizing the entire water power and capacity of the Fairmount Works, is a subject deserving the early and careful attention of your honorable bodies.

By the further introduction of Turbine wheels, the capacity of these works would be greatly increased, and even in seasons of drought these works would be able to afford a considerably increased supply. Many of the old pumps may be safely pronounced to be totally unfit for use, and they should at an early day be replaced by others of improved and of more efficient and more substantial construction. The wooden wheels are now to be regarded as of a character quite obsolete, and fallen entirely out of use in the construction of works of this description, and their performance, with such immense waste of water, is quite incompatible, not only with the economy of modern machinery, but more especially with the economy which should be most carefully practiced at the Fairmount Works. The annual waste of water by the continued use of these wooden wheels would, if rendered available, be a most important contribution to the supply, and would soon repay the erection of the most effective pumping machinery. The experience with Turbine wheels has so conclusively shown their superiority over all other applications of power for this purpose, that I do not hesitate to say that further improvements in the Fairmount Works, by additions of machinery of that description, should be made at the earliest practicable period.

The Dam at the Fairmount Works should also receive the early consideration of your honorable bodies, as nearly the whole of the supply of water to the City depends upon it; and its destruction or serious injury would be a disaster of the most grave character. It is now rapidly filling up, and its usefulness is even now much impaired. At no distant day it will be necessary to resort to expensive

methods for the purpose of removing the accumulations and to restore it to an efficient condition.

If measures are not entered upon, having in view the introduction of new machinery, a considerable amount will be required for repairs at these works during the coming year. The buildings are in good condition with the exception of the roofs, and will require only the usual expenditure for repairs.

The following is a statement of the operations of the Fairmount Works during the year 1863:—

OPERATIONS OF THE FAIRMOUNT WORKS DURING THE YEAR

1863.	Number of gallons pumped each month.	Average number of gallons raised per day.
January	295,206,564	9,522,792
February	249,813,525	8,921,911
March	328,142,762	10,585,250
April	365,895,154	12,196,505
May	470,595,641	15,180,504
June	490,075,620	16,335,854
July	557,148,468	17,972,531
August	676,208,391	21,813,173
September	584,611,310	19,487,043
October	569,574,845	18,373,382
November	514,421,446	17,147,381
December	485,018,365	15,645,753
Total	5,586,712,091	15,306,060

RUNNING EXPENSES OF FAIRMOUNT WORKS DURING THE YEAR.

Salaries of Engineers and Assistants, . .	$3,100 00
350 gallons of oil, at $1.10, ...	385 00
650 lbs. tallow, at 14 cents, ...	91 00
100 tons coal, at an average price of $5.73.$^{48}_{100}$ per ton, ...	573 48
Packing and small stores, ...	475 00
Gas for lighting, ...	458 62
Repairs, ...	3,996 08
Total, .	$9,079 18

Cost of raising water into reservoir, per million gallons, ... $1,62½

THE SPRING GARDEN WORKS.

These works are in good repair, with the exception of some of the engines and pumps of the earlier erection and construction, which are so much worn, that it has become necessarily very expensive to keep them in proper repair and condition. I beg the liberty of again suggesting that the introduction of engines at these works more effectually and more economically adapted to pumping purposes is a matter which cannot be too early considered. If the same amount now invested could be expended in the most approved pumping engines, these could be raised into the reservoir at least double the amount of water without increasing the running expenses of the works, and as there is assuredly a pressing necessity for additional power at these works for the purpose of meeting the demand at all seasons, the question of enlarging the pumping facilities is of great and urgent importance. There are periods during every year when there is not water in the Schuylkill river for motive power sufficient for pumping all the water that is required in the district now supplied by the Fairmount Works, and to meet such emergencies additional steam power should by all means be provided, and its erection at the Spring Garden Works would be the proper location.

In the event of abolishing the Kensington Water-works,

the increase of the steam power at the Spring Garden Works will be indispensable, because in seasons of a scarcity of water for motive purposes, the Fairmount Works could not possibly meet any additional demand. There is at the Spring Garden Works ample room for the erection and accommodation of engines of greatly increased power and vastly more economical construction and operation than those to which I have above referred.

The additional machinery should be of sufficient capacity to meet any possible disability at the Fairmount Works, and should be so constructed in its ingress and egress mains as to be capable of fully maintaining the supply quite independently of the entire works at Fairmount, the dam included. This subject, I beg to say, should receive that thorough and careful examination and consideration which most certainly its importance deserves. On reference to the tabular statement of the operations of these works, it will be observed that the quantity of water pumped has been much decreased. This circumstance is owing to the fact that the greatest practicable quantity with the increased facilities has been pumped at the Fairmount Works, and the power at the Spring Garden Works has been reserved as far as possible. By this means there has been a considerable saving in the items of coal and other materials, and the district fully supplied much more economically than ever before. It may also be observed that the duty of engines is greater than ever before accomplished.

The buildings at these works are in good order, except the roofs, a portion of which have been renewed during the past year, and the painting, in both of which it is

proposed to make repairs the ensuing year. The machinery also requires re-painting. The following is a statement of the operations at the Spring Garden Works in the year 1863.

OPERATIONS OF THE SPRING GARDEN WORKS DURING THE YEAR.

MONTH. 1863.	Number of gallons of water pumped each month.	Average number of gallons per day.	Pounds of coal consumed.	Average number of lbs. per day.	Gallons rais'd into reservoir p. lb. coal	Gall. raised 1 ft. high per pound of coal.
January	148,125,720	4,778,249	369,936	11,933	400.4	46,046
February	125,019,960	4,464,998	342,048	12,216	365.5	42,032
March	198,966,360	6,418,269	547,568	17,663	363.3	41,786
April	194,828,760	6,494,292	538,160	17,938	362.2	41,632
May	296,011,680	9,548,763	870,912	28,093	339.8	39,076
June	229,604,400	7,653,480	579,600	19,320	396.1	45,556
July	199,606,800	6,438,929	529,872	17,092	376.7	43,320
August	165,685,200	5,344,683	387,968	12,515	427.5	49,110
September	184,796,400	6,159,880	520,688	17,356	354.9	40,813
October	159,710,400	5,151,948	368,704	11,893	433.1	49,813
November	172,244,400	5,741,480	404,208	13,473	426.1	49,003
December	129,169,200	4,166,748	319,312	10,300	404.5	46,519
Total,	2,203,769,280	6,037,724	5,778,976	15,832	381.3	43,854

Average duty for the year, 36,545,000 pounds raised one foot high with 100 pounds of coal.
Average amount of coal consumed per day, 15,832 pounds, or 7 tons, 0 cwts., 5 qrs., 12 lbs.
Total amount of coal consumed by engines, 5,778,976 lbs., or 2,579 tons, 18 cwts.

RUNNING EXPENSES OF THE SPRING GARDEN WORKS DURING THE YEAR.

Salaries of Engineers and Firemen,	$7,200 00
171 gallons Oil, at $1.10,	188 10
1145 lbs. Tallow, at 14 cents,	160 30
2579 tons 18 cwt. Coal, at an average price of $5.22 per ton,	13,467 07
Packing and small stores,	510 00
Gas for lighting works,	279 45
Repairs,	3,957 98
Total,	$25,762 90

Cost of raising water into reservoir, per million gallons, $11,69

THE KENSINGTON WORKS.

The Water Works located on the Delaware river, and known by the above title have, during the past two years, been worked to their utmost capacity, and as at present constituted cannot be further taxed without actual injury and great risk. The necessity and expediency of making other provision for the supply of the District now dependent on them has been fully discussed, and is, I believe, generally admitted. Its earliest possible consummation can scarcely prevent the recurrence of the exceeding inconvenience and suffering experienced by the citizens of that District in late years. This subject most certainly will require early attention and disposal of by your honorable bodies, as in case of the continuance of these works, it will be indispensable that heavy expenditures be made for the purpose of providing facilities for meeting the constantly increasing demand. As these works are at present arranged, with a single pumping main, the present capacity of the pumps is but one-half made available. During the seasons of greatest demand one engine is not sufficient to furnish a necessary supply and it is only by excessively working the engines that an average head of water can be maintained in the reservoirs.

The suggestions and the plans heretofore presented for the supply of this District and the abolishment of the

Kensington Works, have received most careful examination and consideration by the Committee on Water Works of the past year, and the features of the Ordinance embracing the views matured by that Committee are undoubtedly so familiar as to require no reiteration at my hands. During the year 1863, there has been no water from the Schuylkill river supplied to this District, and though there have been frequent complaints of the quality, as well as of the deficient quantity of the water supplied from the Delaware, this Department has not the necessary arrangement of mains and other facilities for guaranteeing a sufficient supply at the season that it is most needed and necessary.

The operations at the Kensington Water Works for the year 1863, are as follow:

OPERATIONS OF THE KENSINGTON WORKS DURING THE YEAR.

MONTH. 1863.	Number of gallons of water pumped each month.	Average number of gallons pumped per day.	ounds of coal consumed during the month.	Average No. of pounds of coal used per day.	No. of gallons raised into Reservoir per pound of coal.	Duty in gallons raid one foot high per pound of coal.
January, ...	82,972,920	2,676,545	350,922	11,320	236.4	26,481
February, . . .	85,589,050	3,056,751	375,579	13,413	227.8	25,522
March, ...	99,558,970	3,211,579	411,810	13,284	241.7	27,076
April, ...	74,819,680	2,493,989	311,124	10,370	240.4	26,933
May, ...	106,926,770	3,449,250	420,045	13,549	254.5	28,510
June, ...	102,919,530	3,430,651	411,090	13,703	250.3	28,039
July, ...	109,796,200	3,541,812	426,418	13,755	257.4	28,837
August, ...	104,102,560	3,358,147	447,095	14,422	232.8	26,078
September, . . .	109,720,040	3,657,334	484,440	16,148	226.4	25,365
October, ...	109,589,650	3,535,150	484,531	15,630	226.1	25,331
November, ...	96,517,330	3,217,244	465,887	15,529	207.1	23,201
December, . . .	100,(26,980	3,226,676	482,894	15,577	207.1	23,199
Total, ...	1,182,539,680	3,239,834	5,071,835	13,895	233.1	26,112

Average duty for the year, 21,760,000 pounds raised one foot high with 100 pounds of coal.
Average amount of coal consumed per day, 13,895 lbs. or 6 tons, 4 cwts., 0 qrs., 7 lbs.
Total amount of coal consumed by engines 5,071,835 lbs., or 2264 tons, 4 cwts., 0 qrs., 27 lbs.

RUNNING EXPENSES OF KENSINGTON WORKS DURING THE YEAR.

Salaries of Engineers and Firemen, . .	$4,400 00
75 gallons of Oil, at $1.10, ...	82 50
641 pounds of Tallow, at 14 cents, . . .	89 74
2264 tons 4 cwt. 0 qr. 27 lbs., at an average price of $5.56 per ton, ...	12,589 01
Coal Oil for lighting works, ...	71 92
Packing and small stores, ...	132 50
Repairs, ...	1,496 30
Total, . .	$18,861 97

Cost of raising water into reservoir per million gallons	$15 95

THE TWENTY-FOURTH WARD WORKS.

During the year just closed, this Department has experienced great difficulty in furnishing a supply of water to the district attached to these works with but partial success, and I beg leave most earnestly to call the attention of your honorable bodies to their present condition and to the present and future means of supply of this already large and rapidly improving district. These works were originally constructed to furnish a supply of about nine hundred thousand gallons per day, and up to that point no considerable difficulties have been experienced, as the machinery has been found to work with perfect safety at the full measure of its rated capacity, but during the past year the demand for consumption in the district frequently exceeded sixteen hundred thousand gallons per day. This greatly increased demand and the great importance of meeting it, involved the necessity of partially reconstructing and increasing the strength of some of the most important working parts of the machinery, which has been done at intervals; but in consequence of there being only a single ascending or pumping main from the works to the stand-pipe, and not sufficient storage capacity to meet even ordinary requirements of the demand, the works had to be stopped on several occasions, and the supply was of course totally suspended. The district supplied by these

works, is rapidly becoming one of the most extended, wealthy, and profitable of the City, and it is the only one in which the present provision for such purpose does not render it possible to furnish a necessary supply. The entire inadequacy of the means and arrangements at present existing, for supplying the Twenty-fourth Ward with water, must be apparent to any one who will examine the subject.

There can be no valid reason why suitable provision to meet both present and future wants and probable contingencies, should not be made by your honorable bodies, to such extent as would be commensurate with private improvements and the liberal policy evinced by the property owners of this Ward. The consideration of the improvement and better adaptation of these works has received, during the past year, the most careful attention of your Committee on Water Works, and at the instance of that most efficient and excellent Committee an amount was asked for, which though in my opinion, I beg to say not sufficient for all necessary purposes, would have done much towards the consummation of the most desirable and indispensable improvements to which allusion is here made.

There can be no dependence upon for constant supply nor reliable character given to these works without the addition of a reservoir, to be constructed at the earliest practicable period, and of such capacity as to warrant a supply always for at least sixty days. The earliest action of your honorable bodies, I beg leave to say, can scarcely prevent a failure in the supply which must be of the greatest inconvenience to the citizens of the district depen-

dent on these works. An additional pumping main from the works to the stand-pipe, should be laid with the least possible delay, so that both engines could be kept in operation at the same time, and by such means the demand of the approaching summer may be nearly adequately furnished with the average supply, without which no such supply can be guaranteed. The pumping facilities for this district must be considerably increased at no distant day, but their location should be determined by the shortest practicable distance from, and most convenient access to the proposed reservoir. The operations of the Twenty-fourth Ward Works for the year 1863, are as follow:

OPERATIONS OF THE TWENTY-FOURTH WARD WORKS DURING THE YEAR.

MONTH, 1863.	Number of gallons pumped each month.	Average number of gallons raised per day.	Number of p'ds of coal consumed each month.	Average No. of pounds consumed per day.	No. of gallons raised into stand-pipe per pound of coal.	Number of gallons raised one foot high per pound of coal.
January, ...	37,156,140	1,198,585	195,100	6,293	190.4	43,801
February, ...	34,072,740	1,216,883	190,700	6,810	178.6	41,094
March, ...	40,302,720	1,300,087	219,700	7,087	183.4	42,191
April, ...	42,277,500	1,409,250	213,500	7,116	198.2	45,544
May, ...	47,564,190	1,534,328	239,700	7,732	198.4	45,638
June, ...	38,122,290	1,270,743	171,600	5,720	222.1	51,094
July, ...	46,137,330	1,488,300	203,500	6,564	226.7	52,143
August, ...	45,021,510	1,452,306	205,800	6,638	218.7	50,314
September, . . .	49,988,070	1,666,269	228,000	7,600	219.2	50,425
October, ...	46,948,860	1,514,479	220,900	7,125	212.5	48,881
November, . . .	50,181,660	1,672,722	249,300	8,310	201.2	46,296
December, ...	47,981,080	1,547,776	197,000	6,354	243.5	56,016
Total, ...	525,754,090	1,440,422	2,534,800	6,944	207.4	47,704

Average duty for the year, 39,753,333 pounds raised one foot high with 100 pounds of coal.
Average amount of coal consumed per day, 6,944 pounds, or 3 tons, 2 cwts.
Total amount of coal consumed by engines, 2,534,800 lbs., or 1131 tons, 12 cwts., 0 qrs., 16 lbs.

RUNNING EXPENSES OF TWENTY-FOURTH WARD WORKS DURING THE YEAR.

Salaries of Engineers and Firemen, . .	$2,950 00
9¾ gallons oil at $1 10, ...	10 73
186 pounds tallow at 14 cents, . . .	26 04
1131 tons, 12 cwt., 0 qr., 16 lbs. at an average price of $5 82 per ton, . . .	6,585 95
Packing and small stores, ...	78 00
Coal oil for lighting, ...	127 89
Repairs, ...	2,699 99
Total,	$12,478 60

Cost of raising water into stand-pipe, per million gallons, ...	$23 73

TABLE SHOWING THE MAXIMUM CAPACITY OF THE WORKS AND THE CONSUMPTION PER DAY DURING THE MONTH OF AUGUST, 1863.

	Gallons.	Gallons.	Gallons.
The maximum daily capacity of Fairmount Works is	30,000,000		
The average daily consumption in August, 1863, was	21,813,173		
Leaving a daily excess of capacity of		8,186,827	
The increase of daily consumption in August, 1863, over August, 1862, was			9,982,108
The maximum daily capacity of Spring Garden Works is	12,756,800		
The average daily consumption in August, 1863, was	5,344,683		
Leaving a daily excess of capacity of		7,412,117	
The decrease of daily consumption in August, 1863, under August, 1862, was			4,928,826
The maximum daily capacity of Kensington Works is rated at	3,000,000		
The average daily consumption in August, 1863, was	3,358,147		
Leaving a daily excess of demand of		358,147	
The decrease of daily consumption in August 1863, under August, 1862, was			93,154
The maximum daily capacity of 24th Ward Works, is rated at	1,152,076		
The average daily consumption in August, 1863, was	1,452,306		
Leaving a daily excess of demand of		300,230	
The increase of daily consumption in August, 1863, over August, 1862, was			37,787
Total daily excess of capacity over consumption in August, 1863, was		14,940,567	
Total increase of daily consumption in August, 1863, over August, 1862, was			4,997,915

The Fairmount Works are rated exclusive of capacity of mains. The other Works are rated in proportion to the capacity of pumping mains.

NUMBER OF GALLONS PUMPED BY ALL THE WORKS DURING THE YEAR.

MONTHS.	Number of gallons pumped each month.	Average number of gallons pumped each day.
January, ...	563,461,344	18,176,172
February, ...	494,495,275	17,660,545
March, ...	666,970,812	21,515,187
April, ...	677,821,094	22,594,036
May, ...	921,098,281	29,712,847
June, ...	860,721,840	28,690,728
July, ...	912,688,798	29,441,574
August, ...	991,017,661	31,968,311
September, ...	929,115,820	30,970,527
October, ...	885,823,755	28,574,959
November, ...	833,364,836	27,778,827
December, ...	762,195,625	24,586,953
Total, ...	9,498,775,141	26,024,041

AMOUNT OF WATER PUMPED BY WORKS EAST OF THE SCHUYLKILL, (FAIRMOUNT, SPRING GARDEN AND KENSINGTON WORKS,) FROM JANUARY, 1854, TO DECEMBER, 1863, INCLUSIVE.

Month.	1854. Daily Average of Gallons.	1855. Daily Average of Gallons.	1856. Daily Average of Gallons.	1857. Daily Average of Gallons.	1858. Daily Average of Gallons.	1859. Daily Average of Gallons.	1860. Daily Average of Gallons.	1861. Daily Average of Gallons.	1862. Daily Average of Gallons.	1863. Daily Average of Gallons.
January	8,910,827	10,304,355	10,672,187	11,307,342	14,799,368	13,230,316	15,878,414	14,662,966	14,600,383	16,977,586
February ...	7,645,207	10,739,709	10,517,864	13,659,953	13,221,053	13,241,788	14,609,688	16,467,369	15,587,155	16,443,660
March.....	10,026,808	11,408,327	10,598,167	13,739,000	14,816,907	13,450,670	16,990,722	16,923,090	15,485,912	20,215,098
April.....	10,060,254	12,452,746	13,259,815	15,712,565	18,800,360	14,540,278	19,809,436	18,165,190	18,672,859	21,184,786
May.....	11,543,582	14,368,663	14,911,861	18,468,916	17,367,794	17,939,485	18,510,093	20,911,644	21,632,719	28,178,517
June	13,887,357	14,792,087	18,444,348	19,852,918	22,151,572	18,337,702	21,906,881	21,366,530	21,248,612	27,419,985
July.....	15,752,257	16,895,042	21,566,209	21,718,569	23,655,867	23,817,440	26,274,740	23,962,495	23,219,619	27,953,272
August.	14,444,955	16,742,442	19,071,777	21,142,471	21,502,867	24,723,534	24,701,217	24,025,237	25,555,875	30,516,003
September..	14,543,610	14,956,881	19,168,244	19,988,332	21,717,051	21,820,404	23,275,995	23,516,379	22,966,742	29,304,257
October.....	13,325,580	13,846,053	18,194,009	17,060,484	19,096,688	24,346,592	20,849,924	21,810,954	23,632,549	27,060,480
November ..	11,182,072	13,138,838	16,105,115	16,106,474	16,457,501	22,146,675	17,853,350	20,152,969	18,905,237	26,106,105
December...	8,787,095	10,486,732	11,535,746	14,810,475	14,285,159	18,829,172	14,634,994	15,950,299	16,467,831	23,039,177
Tot. average	11,700,791	13,360,352	15,348,066	16,701,348	18,206,159	18,911,165	19,623,216	19,870,641	20,029,249	24,583,618

AMOUNT OF WATER PUMPED BY WORKS WEST OF THE SCHUYLKILL, (TWENTY-FOURTH WARD WORKS,) FROM OCTOBER, 1855, TO DECEMBER, 1863, INCLUSIVE.

Month.	1855. Daily Average of Gallons.	1856. Daily Average of Gallons.	1857. Daily Average of Gallons.	1858. Daily Average of Gallons.	1859. Daily Average of Gallons.	1860. Daily Average of Gallons.	1861. Daily Average of Gallons.	1862. Daily Average of Gallons.	1863. Daily Average of Gallons.
January.....		115,949	210,504	323,654	632,642	656,831	746,042	923,707	1,198,585
February		132,914	189,524	335,378	630,472	611,165	799,232	950,441	1,216,883
March		114,529	226,112	355,135	713,502	617,196	756,499	1,088,442	1,300,087
April		113,814	297,270	349,131	629,886	663,768	841,194	1,111,458	1,409,250
May.....		131,324	357,671	382,094	712,684	697,195	897,689	1,106,651	1,534,328
June.....		147,270	405,303	572,112	695,920	818,415	1,061,301	1,109,028	1,270,743
July.....		178,124	463,967	604,829	824,394	890,910	1,185,102	1,234,469	1,488,300
August		140,054	453,733	469,352	929,861	1,070,436	1,227,939	1,414,950	1,452,306
September.....		128,355	376,479	1,000,843	856,125	869,754	1,154,325	1,301,712	1,666,269
October.....	94,041	179,642	376,856	970,595	747,920	872,579	1,146,756	1,242,937	1,514,479
November	97,275	161,730	316,473	668,703	692,250	749,370	820,725	1,164,483	1,672,722
December.....	119,504	178,699	315,171	670,574	651,173	771,723	962,843	1,160,039	1,547,776
Total....	103,675	143,654	334,106	559,390	727,277	774,989	967,983	1,152,076	1,440,422

RESERVOIRS.

At Fairmount the reservoirs require considerable repairs, although they have been constantly in use during the past year. The lining of one of them is in such a bad condition as to require almost entire renewal, and unless the dividing embankments are removed and this one compartment united to the largest reservoir, its repair will be early necessary. The other compartments of these reservoirs are in much better condition.

The Corinthian Avenue Reservoir is now in excellent condition: some difficulty has been experienced in preventing sliding in some parts of the embankments, but during the past year the slopes in the parts alluded to have been reconstructed and changed to such angles as will very probably insure them from the recurrence of this description of injury.

The Spring Garden Reservoir has been frequently represented to your honorable bodies as not adequate to the proper supply of the district dependent upon it, and with entire truth. Its capacity is nine millions eight hundred thousand gallons, or only something less than one and a half day's supply, and the propriety of constructing a reservoir in this locality capable of containing at least sixty days' supply, to be of increased elevation and con-

nected with both the Spring Garden and Fairmount Works invites serious consideration. This reservoir is in good condition and is constantly in use at its full capacity. The early future must clearly demonstrate the totally insufficient capacity and elevation of the present reservoirs of our water works and even a small additional elevation, quite practicable to be made would prove sufficient to fully supply a greatly increased extent of territory without the necessity of erecting works in any new locality. There is pressing necessity for additional storage, which should be so arranged and quite sufficient to insure an uninterrupted supply in case of derangement in the pumping facilities at the works and also that the pumping operations might be carried on with the greatest possible economy.

The Reservoir at the Kensington Water Works is now in good condition. For the purpose of supplying the rapidly improving district with which these works are connected and especially some localities now being built upon, this reservoir should be raised to the elevation suggested in the last report that I had the honor of submitting. Several of the higher localities in this large district are so scantily supplied that the citizens suffer much annoyance and inconvenience. This unfortunate circumstance is owing to the fact that there is only one supply main of eighteen inches diameter from the reservoir for the supply of the entire district, which is obviously insufficient and in fact, is not more than necessary for the proper supply of one-third of the district. By converting the present pumping main into a distributing or supply main, as has been heretofore suggested, with connections of the principal or all of the distributing or service mains intersecting

it, and with the additional elevation to the reservoir heretofore suggested, the district would be insured a full supply, and many points now deficient would be amply provided.

The Twenty-fourth Ward Works having no provision for storage, that district is especially liable to partial or even entire suspension of the supply of water in the event of derangement of the pumping machinery, or of accident to the pumping main. In the district supplied by these works, the demand rapidly and constantly increases, and any necessary investment, I beg to say, in improving and extending the facilities for insuring a reliable supply would not only add in a most important degree to the comfort and convenience of a large population, but would prove highly remunerative to this Department. The permanent character of the improvements and the rapidly increasing population of the Twenty-fourth Ward, fully warrant your honorable bodies, in my opinion, in making such arrangements and expenditure as would insure an undoubted supply beyond any usual or probable emergency. In the Twenty-fourth Ward, very considerable portions are of such an elevation that they can only be supplied by water works separate and distinct from any at present erected east of the Schuylkill river. The lower or southern and south-western portions might, however, be supplied much more economically from the works at Fairmount and Spring Garden, by taking a supply main across the Schuylkill river for that purpose, at some point below Fairmount. Measures cannot be entered upon too early for the purpose of preventing a very deficient or perhaps a nearly total failure in the supply to this district during even the ensuing summer, and I again beg leave to call

the attention of your honorable bodies to the urgent necessity for the construction of a reservoir, the laying of sufficient pumping and distributing mains and some other improvements in the works which I have had the honor of suggesting.

GROUNDS.

The improvements recently in progress in the grounds at Fairmount are now nearly completed, and with all other parts continue in good condition.

The completion of these improvements as originally designed, will be attended with little expense, but as these grounds are now and very probably will forever remain one of the most popular and favorite resorts of our citizens as well as of nearly all strangers visiting Philadelphia, I beg leave to suggest that further outlays might be judiciously made for the purpose of adding to that highly attractive and ornamental character which is conceded and admired by all.

The lower end of the grounds at Fairmount, north of the reservoir and bordering on the river, yet remain in an unfinished condition, and I beg leave to renew the recommendation made in the last report that I had the honor of submitting, in reference to the subject.

The grounds at the Spring Garden Works are in the same good repair and general condition as stated in my last annual report. The lower portion of these grounds

being in immediate proximity to Fairmount Park, should be graded and otherwise improved to correspond with the grounds north of the works, and I beg leave also again to suggest, it would be desirable that they should be directly connected with the Park. The expense attending these measures would be but a few hundred dollars.

The grounds at the Twenty-fourth Ward Works, including those at the stand-pipe, have never been completed as designed, but are at present in moderately good condition,

DISTRIBUTION.

The arrangements for the proper or necessary supply of water in all the higher localities in this city, must be admitted to be of entirely inefficient description. One immediate and remediable cause of this inefficiency, is the fact that the supply mains are not of sufficient capacity, or, in other words, they are of such areas as do not in any suitable manner correspond to the elevations or *head* of the reservoirs from which the water is to be derived.

There are points at which even an approach to a supply for the purposes of the most strict necessity is with difficulty attained. This is particularly the case in the higher parts of the Fifteenth, Twentieth, and Twenty-first Wards, and also at some points in the Nineteenth Ward, and the late borough of Frankford, and also especially at localities in the Twenty-fourth Ward, previously alluded to in a preceding page. In a great measure this deficiency of

supply is owing to the contracted dimensions or areas of the supply or distributing mains, which are undoubtedly constructed in many cases without the possibility of their ever being required to supply such largely increased populations, having been entertained.

The insufficient elevation of reservoirs, and also the insufficient provision for storage, are also causes of the inadequate supply, to which I have taken the liberty of asking the attention of your honorable bodies. In very nearly all districts in this city, in which there is not a sufficient supply of water, the causes of such insufficiency admit of remedy entirely consistent with the present construction and general organization of the Water Works.

Claims and controversies, leading to much difficulty in their adjustment, constantly arise with citizens whose water rents include privileges for manufacturing purposes, and of those that may be termed of a temporary or somewhat indefinite character as to quantity required; there might be, I beg to suggest, a useful and satisfactory application of meters for the purpose of determining the quantities consumed. Cases of the description here alluded to are constantly before the Committee on Water Works, and this application of meters would undoubtedly save a very considerable amount, as well as dispense with much difficulty in investigation and adjustment. I beg leave, most respectfully, but strongly, to recommend that this or other definite regulation for the disposal of this description of cases, here alluded to, be established by your honorable bodies.

During the last year there were 56,961 feet, or $10\frac{78}{100}$,

miles of water pipes laid in this city, at a total expense of $70,489 59.

Much misapprehension seems to exist in relation to the cost of this description of improvement. Generally, it is to be observed, that the item of labor is regarded as the most important, which is by no means correct. An account of the expense of laying water pipes in this city since its consolidation will afford correct views on this subject, and for that purpose I present the following statement of all water pipe laid in the years enumerated, with the cost per foot, which includes all expenses properly chargeable:

Year.	Feet of pipe laid.	Cost per foot.
1855	31,574	$1 28
1856	54,879	1 27½
1857	61,182	1 28¼
1858	67,519	1 19¾
1859	97,993	1 18
1860	97,095	1 02
1861	59,405	1 09½
1862	48,475	1 16½
1863	56,961	1 23¾

The principal item of expense in laying water pipe is the cost of the pipe.

The size almost invariably used is six inches in diameter, and may be taken to show the relative cost in the years above given.

For the years above given, prior to 1863, the average price of six-inch pipe was 52½ cents per foot; in 1863, the price paid was 79 cents per foot.

The average price of lead for the same years was $6\frac{3}{10}$ cents per pound; in 1863 the price was 12¼ cents per

pound. The quantity annually used has amounted to about 65,000 pounds.

In the item of labor, the prices have increased thirty per cent. during the last two years.

Another very considerable item of expense is that incurred at the establishment known as the Shop of the Water Department, in Cherry street, at which all the tools, and all the fire plugs, stop-cocks, and other fixtures required for the purposes of the Department, are manufactured and repaired, and the cost of all of which is charged to the item of appropriation for laying water pipe. It is undoubtedly properly so chargeable, as it is a part of the necessary expenditure, incidental, though it may be, and there is, in my opinion, no reason why a separate account of such work should be given, the value of which it is entirely at the option of the Chief Engineer to designate, and can, in fact, only be given according to his opinion, or only at its estimated value.

For the purpose of rendering the provisions and arrangements for the distribution of water in this city, in the highest practicable degree satisfactory, the plan suggested in the last Annual Report that I had the honor of submitting, is, I beg leave to say, yet in my judgment the best adapted to effect that very desirable, and in fact, indispensable object. I do therefore beg the liberty of again recommending those views to the attention of your honorable bodies. It can be determined readily from the statements above given of the expenditure for laying water-pipe, that, taking into consideration the cost of labor and material, the total cost has been lower than in previous years.

TABLE SHOWING THE NUMBER OF WATER TENANTS AND AMOUNTS OF WATER RENTS.

WARDS.	Number of Water Tenants.	TOTAL.	Amount of Water Rents.	TOTAL.	WORKS AND RESERVOIRS Supplied from.	
					WORKS.	RESERVOIRS.
First	5,907		$34,771 50		Fairmount.	Corinthian Avenue.
Second	4,456		26,408 25		"	"
Third	3,084		16,629 75		"	"
Fourth	3,360		17,474 00		"	"
		16,807		$95,283 50		
Fifth	3,362		$27,255 50		Fairmount.	Fairmount.
Sixth	3,052		32,175 75		"	"
Seventh	4,799		32,032 75		"	"
Eighth	3,340		30,797 25		"	"
Ninth	2,884		26,408 75		"	"
Tenth	3,465		28,219 75		"	"
		20,902		176,889 75		
Eleventh	2,694		$16,929 25		Spring Garden.	Spring Garden.
Twelfth	2,671		13,189 00		"	"
Thirteenth	3,468		25,962 50		"	"
Fourteenth	4,043		28,946 75		"	"
Fifteenth	5,200		39,928 25		"	"
Twentieth	4,984		37,054 25		"	"
Twenty-First	35		360 00		"	"
		23,096		162,370 00		
Sixteenth	3,487		$20,283 50		Kensington.	Kensington.
Seventeenth	3,352		18,330 25		"	"
Eighteenth	2,860		18,738 25		"	"
Nineteenth	4,046		23,762 75		"	"
Twenty-third	43		364 25		"	"
Twenty-fifth	776		4,377 50		"	"
		14,564		85,856 50		
Twenty-fourth	1,180	1,180	13,021 00	13,021 00	24th Ward.	Stand-Pipe.
Totals		76,549		$533,420 75		

STATEMENT OF PIPES LAID IN FIRST DISTRICT.

First, Second, Third, and Fourth Wards, during 1863.

Street.	Location.	Size. Inches.	Feet.
Mifflin.	From Twelfth to Thirteenth,	6	445
	Plug Connections,	4	18
Tiernan.	" Wharton to Reed,	4	458
Reed.	" Broad to Fifteenth,	6	580
	Plug Connections,	4	13
Siegel.	" Front to Second,	4	630
Twenty-first.	" Shippen to Catharine,	6	737
	Connections,	4	34
Selfridge.	" Shippen to Fitzwater,	4	358
Mifflin.	" Front to Second,	6	678
	Plug Connections,	4	13
Washington av.	" Nineteenth to west of Twentieth,	6	772
	Plug Connections,	4	13
Do.	" Two hundred and ten feet west of Twentieth to Twenty-second,	6	766
	Plug Connections,	4	13
Do.	" Nineteenth to Twenty-second, north side,	6	1,440
Fitzwater.	" Twentieth to Twenty-first,	6	544
	Plug Connections,	4	13
Pemberton.	" Twentieth to two hundred feet west of Twenty-first,	4	761

Street.	Location.	Size. Inches.	Feet.
Pemberton.	From East of Twenty-second to Twenty-third,	4	750
Twentieth.	" Washington to Federal,	6	603
	Plug Connections,	4	13
Jessamine.	" Two hundred and ninety-five feet east of Fifteenth,	4	295
Ellsworth.	" Twenty-sixth to Twenty-seventh,	6	509
	Plug Connections,	4	11
Labrousse.	" Moyamensing avenue to Second,	4	548
Worth.	" Fifth to Sixth,	4	459
Do.	" Moyamensing avenue to Fourth,	4	426
Montrose.	" Sixteenth to Seventeenth,	4	459
Christian.	" Twenty-second to Gray's Ferry road,	6	1,396
Shippen.	" Twenty-second and Gray's Ferry road (connected),	6	65
Ellsworth.	" Sixteenth to Seventeenth,	6	450
	Plug Connections,	4	13
Alter.	" Twentieth to Twenty-first,	4	551
Christian.	" Below Front,	6	31
	Connections,	4	126
	Do.	3	24
	Do.	6	45
			15,060

STATEMENT OF PIPES LAID IN SECOND DISTRICT.

FIFTH, SIXTH, SEVENTH, EIGHTH, NINTH, TENTH, AND TWENTY-FOURTH WARDS, DURING 1863.

Street.		Location.	Size. Inches.	Feet.
Baltimore Pike.	From	Fortieth to Forty-first (relaid),	8	692
Do.	"	East of Fortieth (relaid),	6	460
Fortieth.	"	Pike to Pine "	10	256
Forty-first.	"	Do. do. "	6	400
Do.	"	Pike to Darby r'd "	6	232
		Fire Plugs "	4	79
Oak.	"	Forty-first to Forty-second,	6	558
		Plug Connections,	4	14
Aspen.	"	Fortieth to Forty-first,	6	792
		Plug Connections,	4	18
Kingsessing av.	"	Forty-fifth to Forty-sixth,	6	486
		Plug Connections,	4	18
Do.	"	Forty-first to Forty-third,	6	882
		Plug Connections,	4	54
Senneff court.	"	Twenty-third to Twenty-fourth,	3	543
Market st. B'dge.	"	East to west side,	4	552
Thirty-second.	"	Lancaster av. to Baring,	6	2,483
		Plug Connections,	4	63
Eadline.	"	Forty-second to Forty-third,	6	596
		Plug Connections,	4	18

Street.	Location.	Size. Inches.	Feet.
Chestnut.	From North to south side of Twenty-fourth,	6	96
	Connections,	4	15
Thirty-sixth.	" Sansom to Walnut,	6	296
Chestnut.	" East, to west of Forty-second,	6	144
Do.	" Forty-second (relaid),	4	23
	Connections and repairs,	6	177
	Do. do.	4	35
	Do. do.	3	56
	Do. do.	10	21
			10,059

STATEMENT OF PIPES LAID IN THIRD DISTRICT.

ELEVENTH, TWELFTH, SIXTEENTH, SEVENTEENTH, EIGHTEENTH, NINETEENTH, TWENTY-THIRD, AND TWENTY-FIFTH WARDS, DURING 1863.

Street.	Location.	Size. Inches.	Feet.
Lehigh av.	From Edgemont to Frankford road,	6	6,500
	Plug Connections,	4	200
Diamond.	" Front to Hancock,	6	870
	Plug Connections,	4	18
Hancock.	" Cumberland to Susquehanna,	6	1,685
	Plug Connections,	4	36
Gordon.	" Sepviva to Geist,	4	200
Huntingdon.	" Salmon to Gunners' Run,	6	825
	Plug Connections,	4	12
Somerset.	" Coral to Amber,	6	385
	Plug Connections,	4	16
Collins.	" One hundred feet south of Huntingdon,	6	100
	Connections,	6	95
	Do.	4	25
			10,967

STATEMENT OF PIPES LAID IN FOURTH DISTRICT.

THIRTEENTH, FOURTEENTH, FIFTEENTH, TWENTIETH, AND TWENTY-FIRST WARDS, DURING 1863.

Street.		Location.	Size. Inches.	Feet.
Grove.	From	Perkiomen to Geary,	4	297
		Connections,	10	10
Tatlow.	"	Eighteenth to Nineteenth,	4	457
Atmore.	"	Thirteenth to Broad	4	680
Carlisle.	"	Jefferson to Columbia av.	6	1,133
		Plug Connections,	4	32
Eighth.	"	Sp. Garden, north of, relaid,	4	29
		Spring Garden Works, "	6	50
		Do. do. "	10	148
		Do. do. "	12	65
Geary.	"	Wiley to Francis,	4	340
		Connections,	6	12
Biddle.	"	Twenty-fifth to Twenty-sixth,	6	465
		Plug Connections,	4	16
Columbia av.	"	Broad to Twentieth,	6	3,172
		Plug Connections,	4	82
Broad.	"	Poplar to Girard avenue,	6	585
Do.	"	Do. do. (relaid),	4	423
Do.	"	Do. do.	10	90
Eleventh.	"	Montgomery to Berks,	6	620
		Plug Connections,	4	23
Edwin.	"	Ridge avenue to Geary,	4	342
		Connections,	10	10
Thompson.	"	Thirty-first street, east of,	3	256

Street.		Location.	Size. Inches.	Feet.
Mulvaney.	From	Columbia av. to Montgomery,	4	646
		Connections,	6	5
Jefferson.	"	Broad to Suydenham,	6	706
		Plug Connections,	4	18
Twelfth.	"	Montgomery to Berks,	6	569
Thirteenth.	"	South of Do. do.	6	592
		Plug Connections,	4	18
Twenty-sixth.	"	North of Brown,	6	184
		Connection,	4	18
Mervine.	"	South of Montgomery to Berks,	6	676
Camac.	"	Do. do.	6	576
Thirty-first.	"	Thompson to Master,	6	524
Ridge avenue.	"	Wood street north, (relaid),	6	90
Perth.	"	Poplar, " south, "	4	27
Buttonwood.		To Foundry,	4	83
		Fairmount Park,	4	4,969
		Do. do.	6	581
		Do. do.	4	470
Do.		Between Seventeenth and Eighteenth (relaid),	6	177
Carlton.		Corner of Fifteenth,	4	40
Twenty-second.		Below Brown,	4	27
Do.		Do.	10	9
Thompson.		At Spring Garden Basin,	10	340
		Connections,	6	93
		Do.	4	100
				20,875

Recapitulation of Pipe Laid in 1863.

DISTRICTS.	DIAMETER IN INCHES.						TOTAL.
	3 Inch.	4 Inch.	6 Inch.	8 Inch.	10 Inch.	12 Inch.	
First . . .	24	5,975	9,061				15,060
Second . .	599	889	7,602	692	277		10,059
Third. . .		507	10,460				10,967
Fourth . .	256	9,137	10,810		607	65	20,875
Total . .	879	16,508	37,843	692	884	65	56,961

Total number of feet of Pipe laid . . . 56,961
or 200 feet more than 10¾ miles.

Total number of Fire Plugs in the four districts, . 3,198

Total number of Stops in the four districts, . . 3,892

STATEMENT OF PIPES, BRANCHES, CASTINGS, AND OTHER STOCK ON HAND, JANUARY 1st, 1864.

FIRST DISTRICT.....DEPOT, 615 CARPENTER STREET.

PIPES, BRANCHES, &c.	DIAMETER IN INCHES.						
	20 Inch.	12 Inch.	10 Inch.	8 Inch.	6 Inch.	4 Inch.	3 Inch.
Pipes 9 feet long, .	1	13	.....	12	1	6	37
Fire Plugs, single, .	.....	.....	.....	.....	.....	4	.....
4 Way Branches, .	.....	.....	.....	2	11	5	6
3 Way Branches, .	.....	.....	1	.....	5	4	1
Caps, ...	.....	1	1	1	.....	12	2
Sleeves, ...	.....	.....	.....	.....	4	3	.....
Reducers, ...	.....	.....	5	4	6	5	.....
Bevel Hubs, . . .	.....	.....	.....	.....	6	7	.....
Curved Pipe, . .	.....	.....	.....	.....	2	1	.....
Quarter Turns, . .	.....	.....	.....	.....	2	.....	.....
Flange Pipes, . .	.....	.....	.....	.....	.....	5	.....
Offset Pipe, . . .	.....	.....	.....	.....	.....	3	.....
Pieces of Pipe, . .	.....	.....	.....	.....	1	4	.....
Stop Cocks, . . .	.....	.....	.....	.....	.....	3	.....
" Covers, . . .	.....	.....	.....	.....	.....	6	.....
" Boxes, . . .	.....	.....	.....	.....	.....	7	.....
Plug Cases, . . .	.....	.....	.....	.....	.....	5	.....
Goose Necks, . .	.....	.....	.....	.....	.....	4	.....

STATEMENT OF PIPES, BRANCHES, CASTINGS, AND OTHER STOCK ON HAND, JANUARY 1st, 1864.

SECOND DISTRICT..... DEPOT, 918 CHERRY STREET.

PIPES, BRANCHES, &c.	DIAMETER IN INCHES.									
	In.	24 In.	20 In.	16 In.	12 In.	10 In.	8 In.	6 In.	4 In.	3 In.
Pipes 9 feet long, .	...	...	...	...	10	6	4	1	26	9
Fire Plugs, 3 Way,	...	...	...	...	...	...	...	...	14	...
" " Single, .	...	...	...	...	...	...	...	...	35	...
4 Way Branches, .	...	...	...	...	...	...	...	37	40	...
3 Way Branches, .	...	...	...	...	1	...	...	33	4	...
Sleeves, ...	1	...	7	1	24	8	...	27	22	3
Reducers, ...	2	...	...	...	1	1	...	4	...	...
Bevel Hubs, . . .	...	...	...	...	...	...	...	2	...	...
Curved Pipe, . . .	...	...	...	...	...	...	...	15	8	8
Flange Pipes, . .	...	...	...	...	...	...	...	2	...	...
Offset Pipes, . . .	...	...	...	...	...	...	...	6	9	...
Pieces of Pipe, . .	...	...	...	...	...	...	...	3	1	1
Stop Cocks, . . .	1	...	1	...	3	4	1	38	10	4
" Covers, . . .	...	...	...	...	...	...	...	...	46	...
" Boxes, . . .	...	...	...	...	...	...	...	12	...	...
Plug Cases, . . .	...	...	...	...	...	...	...	14	...	...
Goose Necks, . .	...	...	...	...	...	...	...	...	10	5
Steam Goose Necks,	...	...	...	...	...	10	...	11	...	...

STATEMENT OF PIPES, BRANCHES, CASTINGS, AND OTHER STOCK ON HAND, JANUARY 1st, 1864.

THIRD DISTRICT.....DEPOT, 1420 FRANKFORD ROAD.

PIPES, BRANCHES, &c.	DIAMETER IN INCHES.				
	10 Inch.	8 Inch.	6 Inch.	4 Inch.	3 Inch.
Pipes 9 feet long, .	.....	.....	64	10	.....
Fire Plugs, single, .	.....	.....	.....	2	.....
" " 3 Way,	.....	.....	1	.....	.....
4 Way Branches, .	12	6	8	4	.....
3 Way " .	5	.....	.....	.....	.....
Sleeves, ...	.....	.....	6	6	2
Reducers, ...	3	.....	1	.....	.....
Stop Cocks, . . .	1	.....	5	.....	.....
" Boxes, . . .	.....	.....	3	.....	.....
Plug Cases, . . .	.....	.....	1	3	.....
Goose Necks, . .	.....	.....	1	.....	.....
Saddles, ...	.....	.....	4	2	.....

STATEMENT OF PIPES, BRANCHES, CASTINGS, AND OTHER STOCK ON HAND, JANUARY 1st, 1864.

FOURTH DISTRICT.....DEPOT, 1324 BUTTONWOOD STREET.

PIPES, BRANCHES, &c.	DIAMETER IN INCHES.										
	30 In.	24 In.	20 In.	18 In.	16 In.	12 In.	10 In.	8 In.	6 In.	4 In.	3 In.
Pipes 9 feet long, .	18	1	3	1	9	...	65	...	69	9	2
4 Way Branches, .	3	...	5	2	1	1	10	...	16	6	...
3 Way Branches, .	2	...	...	1	1	1	3	...	15	...	...
Reducers, ...	...	...	...	...	...	...	...	4	3	1	...
Sleeves, ...	2	...	6	4	...	7	1	...	4	...	...
Bevel Hubs . . .	...	...	...	...	...	...	...	...	...	5	...
Stop Cocks, . . .	...	...	...	...	...	...	...	3	2	...	...
" Covers, . . .	...	...	...	...	...	...		...	...	3	...
Plug Cases, . . .	...	...	...	...	...	...	...	...	...	6	...
Bends, ...	...	...	...	4	...	...	...	...	1	...	...
Goose Necks, . .	...	...	...	...	...	...	7	...	11	6	3

Location of Public Hydrants set during the year 1863.

Districts.	Location.
Second District,	Eighth and Arch.
" "	Tenth and Market.
" "	Front and Market.
Third "	Girard Avenue below Sixth.
Fourth "	Eleventh and Thompson.

Location of Three-way Fire Plugs set during the year 1863.

Districts.	Location.
First District,	Broad and Fitzwater.
Second "	Race east of Fourth.
" "	Race east of Second.
" "	Cor. Third and York.
Third "	Fourth above Brown.
" "	Cor. York av. and Buttonwood.
Fourth "	Ridge Avenue opposite Wood.
" "	Thirteenth and Oxford.

ACCOUNT OF THE NUMBER OF HOLES DRILLED FOR MAKING NEW ATTACHMENTS DURING THE YEAR 1863.

MONTH.	Half-inch Diameter.	Five-eighths Inch Diameter.	Three-fourths Inch Diameter.	One Inch Diameter.	TOTAL.	Shut off for Repairs to Private Pipe.	Shut off for Repairs to Public Pipe.
January.....	46	15	5	3	69	17	5
February	31	9	3	2	45	26	8
March.....	84	18	4	6	112	48	8
April.....	98	32	5	2	137	22	10
May.....	109	35	3	3	150	26	9
June	112	27	9	3	151	16	4
July.....	95	12	5	1	113	16	8
August	91	25	11	5	132	21	7
September.....	79	36	4	4	123	39	9
October.....	68	41	3	4	116	12	8
November	79	43	7	2	131	17	9
December.....	74	50	3	6	133	18	10
Total.	966	343	62	41	1412	278	95

The following attachments were made in the Districts, during the year 1863, as follow :—

DISTRICTS.	Half-Inch Diameter.	Five-Eighths Inch Diameter.	Three-fourths Inch Diameter.	One Inch Diameter.	TOTAL.	Shut off for Repairs to Private Pipe.	Shut off for Repairs to Public Pipe.
First.....	225	58	14	13	310	31	17
Second.....	185	47	9	10	251	64	12
Third.....	245	34	19	7	305	85	33
Fourth.....	311	204	20	11	546	88	33
Total.....	966	343	62	41	1412	278	95

WATER PIPES,

Ordered to be laid in the following Streets, by Councils.

PIPES ORDERED TO BE LAID IN FIRST DISTRICT.

Moore.	From Seventh to Ninth.
Taylor.	" Eighth to Ninth.
Twenty-sixth.	" Park to Gray's Ferry Road.
Twelfth.	" Wharton to Passyunk Road.
Wharton.	" Sixteenth to Seventeenth.
Ninth.	" Jackson to Buck Road.
Pierce.	" Seventh to Eighth.
Watkins.	" Seventh to Eighth.

Twenty-second.	From	Montrose to Carpenter.
Reed.	"	Eleventh to Thirteenth.
Moore.	"	Seventh to Broad.
Reed.	"	Fifteenth to Sixteenth.
Fernon.	"	Tenth to Eleventh.
Montrose.	"	170 feet west of Jessamine.
Pierce.	"	Passyunk Road to Thirteenth.
Montrose.	"	Twentieth to Twenty-first.

PIPES ORDERED TO BE LAID IN SECOND DISTRICT.

Chestnut.	From	Forty-first to Forty-second.
Brooklyn.	"	Haverford to Lancaster Avenue.
Forty-second.	"	Kingsessing Av. to Baltimore Pike.
"	"	Sansom to Walnut.

PIPES ORDERED TO BE LAID IN THIRD DISTRICT.

York.	From	Second to Germantown Road.
Toronto.	"	Melvale to Bank.
Wager.	"	Fourth to Fifth.
Day.	"	Girard Av. to Thompson.
Tilton.	"	Emery to Huntingdon.
Thompson.	"	William to Somerset.
Huntingdon.	"	Almond to Frankford Road.
Sergeant.	"	Cedar to Frankford Road.
Hancock.	"	Cumberland to Lehigh Avenue.
Thompson.	"	Norris to Adams.
"	"	Somerset to William.
Emlen.	"	Trenton Avenue to Cedar.

Salmon.	From	Ann to Alleghany Avenue.
Adrian.	"	Otter to Girard Avenue.
Gordon.	"	Geisse to West.
Moyer.	"	Norris to York.
Dauphin.	"	Wilson to Moyer.
Trenton Av.	"	Norris to Otis.

PIPES ORDERED TO BE LAID IN THE FOURTH DISTRICT.

Wallace.	From	Twenty-second to Twenty-third.
Thompson.	"	William to Schuylkill Works.
Master.	"	Twenty-seventh to Twenty-eighth.
Franklin.	"	Diamond to Susquehanna.
Diamond.	"	Seventh to Ninth.
Geary.	"	Poplar to Wiley.
North.	"	Fifteenth to Sixteenth.

THE FOLLOWING AMOUNTS HAVE BEEN RECEIVED AT THE ENGINEER'S OFFICE DURING THE YEAR 1863, AND PAID TO CITY TREASURER.

For Rent of wharf at Fairmount . . .	$200 00
" " " Lot on Poplar street, . .	75 00
" Old Iron, ...	304 38
" " Brass, ...	126 16
" Attachments, ...	142 15
" Old portable Engine, . . .	90 00
	$937 69

THE APPROPRIATIONS FOR THE YEAR 1863, AND THE AMOUNTS EXPENDED ARE AS FOLLOW:

Date of Appropriation.		Amount of Appropriation.	Amount Expended.	Balances.
1862. Dec. 31. 1863. Nov. 2.	General Appropriation, ...	$187,925 00	$187,486 49	$ 438 51
1862. Dec. 31.	To pay Packer & Overfield, ...	2,449 35	2,449 35	
" "	To pay Edw. Schreiner,	1,290 88	1,282 80	8 08
" "	To pay Murry, Brodie & Painter, ...	2,471 74	2,471 74	
1863. May 11.	To pay Bills of 1862,	1,697 93	1,697 93	
" "	To pay for repairing damages done to Corinthian av. Basin,	3,000 00	2,989 28	10 72
" 25.	To pay Hoff & Fontaine for repairing Boilers,	1,994 47	1,994 47	
Aug. 5.	To pay for fitting up new office Fifth below Chestnut street,	1,800 00	1,799 79	21
" "	To pay for laying Pipes in Fairmount Park,	1,500 00	1,500 00	
Sept. 18.	To pay for further improvements at Fairmount, ...	10,724 69	8,163 52	2,561 17
Dec. 30.	To pay Balances due for fitting up new office, ...	1,795 17	1,795 03	14
	Total, ...	$216,649 23	$213,630 40	$3,018 83
1859. April 16.	To pay Bills of 1857–8,	$ 90 25	$ 65 00	25 25
July 9.	To pay for Drinking Hydrants, . . .	220 52	53 80	166 72

TABLE SHOWING THE AMOUNT OF RAIN AND SNOW (MELTED) THAT FELL AT PHILADELPHIA, PA., SINCE JULY, 1851, AS MEASURED BY PROF. JAMES A. KIRKPATRICK.

YEAR.	JANUARY	FEBR'Y.	MARCH.	APRIL.	MAY.	JUNE.	JULY.	AUGUST.	SEPT'R.	OCTOB'R.	NOV'R.	DEC'R.	ANNUAL TOTAL.
	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Inches.
1851.....	.....	.....	.....	.....	.....	.....	4.360	3.420	3.600	3.038	3.410	1.880	.....
1852.....	2.010	2.710	4.270	6.440	3.040	4.500	4.060	4.400	1.290	2.250	6.050	5.180	46.200
1853.....	1.840	4.440	2.460	3.880	5.170	1.050	8.630	3.080	4.460	3.470	2.320	2.165	42.965
1854.....	2.320	4.200	1.625	8.145	7.299	3.441	3.837	0.918	4.883	1.918	3.460	3.185	45.231
1855.....	2.601	2.480	1.979	2.148	3.033	8.008	6.594	3.237	4.129	3.416	2.022	5.006	44.653
1856.....	3.368	1.128	2.939	3.149	2.334	1.677	1.127	5.186	5.702	1.303	2.886	3.619	33.518
1857.....	2.989	0.921	1.773	6.932	6.043	7.426	3.373	8.039	1.132	2.742	1.575	5.503	48.448
1858.....	2.686	2.393	1.124	4.681	5.308	4.205	1.454	5.157	1.589	1.778	5.225	5.459	41.059
1859.....	5.230	3.569	6.503	5.668	1.946	5.229	3.915	4.447	7.779	3.210	3.796	3.460	54.752
1860.....	3.351	2.724	1.323	3.646	3.589	3.706	0.851	9.260	2.907	4.685	6.057	3.301	45.408
1861.....	4.620	2.124	3.903	4.150	6.240	4.485	2.826	2.864	4.976	3.597	4.613	2.016	46.414
1862.....	4.500	4.277	3.509	3.947	2.083	6.592	2.841	1.455	6.282	4.160	4.455	1.555	45.656
1863.....	4.968	3.824	6.379	7.294	4.792	4.053	5.690	1.460	0.978	2.653	2.960	4.871	49.642
Monthly Av'ge.....	3.351	2.899	3.148	5.006	4.239	4.531	3.812	4.071	3.823	2.940	3.756	3.630	45.328

FUTURE MEANS OF SUPPLY.

This very important subject has been so fully discussed in the reports formerly submitted by my predecessors and myself, that I have little to add to former suggestions. There have occurred to me, however, no reasons whatever for changing the views presented in the last Annual Report which I had the honor of making to your honorable bodies. Any expenditure made in the proper extension of the Water Works has, without exception, been found very remunerative to the city, and has invariably paid much above the interest on the investment. As already stated, an increase in the pumping machinery at the Spring Garden Works is much needed during the summer months, and a very considerable increase in the capacity of reservoirs is indispensable for the full supply at present, and in a measure to anticipate the demand in the immediate future throughout the city. There should be, in my opinion, an increase of storage capacity amounting to, at least, two thousand millions of gallons, arranged and distributed in such manner as to insure to all parts of the city the same supply and for the same length of time. So far as relates to the resources of this city for the supply of water, they are fortunately so ample and so apparent, that there is not the smallest cause for doubt or apprehension. The rivers

Delaware and Schuylkill will furnish the most ample supply for any length of time however indefinite; and on their banks, and at no impracticable distances, locations may be found for the erection of reservoirs of any necessary elevations, and for the construction, under suitable circumstances, of pumping machinery of any desired capacity. By the observance of a proper system of sewerage of the city, either of these rivers will afford a full supply of water of very superior quality.

This is the case on the Schuylkill at any point between Fairmount and the northwestern limit of the city, and on the Delaware at a point above Tacony. The river Schuylkill will certainly furnish a supply of water to the city of Philadelphia for a period reaching so far into the future, that it is not now in any degree important nor necessary to anticipate resorting to any other source. I beg leave, however, again to repeat, that for the purpose of obtaining from this river a supply which will very soon be required, it will be absolutely indispensable to resort to steam power to a much greater extent than is now provided. There is at all times in the Schuylkill an abundant supply, readily to be obtained by steam pumping, but which is not adequate to always furnish sufficient water power for motive purposes as well as at the same time supply the demand for consumption in the city. Even at present the water power at Fairmount, available for motive purposes, is fully brought into requisition, and is not sufficient during that important period of the year when a copious supply is most desirable. As this city extends northward on the Delaware river, it may become expedient to make it a source of supply, which is quite prac-

ticable. It will be necessary in reference to such purpose, that the entire sewerage of the city be so arranged as to discharge their contents at points quite beyond the reach of the pumps, and indeed at such distance from them that the action of the tides could not possibly cause their contents to be brought into proximity with any works that might be established. Of the water of the Schuylkill river and its fitness for domestic, manufacturing, and all other purposes, it is not necessary for me to make further mention, but I beg leave to again lay before your honorable bodies the fact, that with the present facilities, even now the supply is by no means sufficiently abundant, especially in localities and at periods of the year before mentioned.

It must always be borne in mind, however, that the water of the Schuylkill river is not entirely and undividedly at the disposal of the authorities of the city of Philadelphia.

Under an existing, and unless by mutual agreement, apparently an irrevocable contract, that important interest is largely participated in by the Schuylkill Navigation Company, the advantage being decidedly in favor of the latter. That this very important matter may be fully before your honorable bodies, I beg leave to insert here a copy of the contract or compact at present in force between the city of Philadelphia and the Schuylkill Navigation Company.

FINAL AGREEMENT,

Between the Mayor, Aldermen and Citizens of Philadelphia, and the Schuylkill Navigation Company, relative to the Water Power, &c., at Fairmount.

ARTICLES OF AGREEMENT made, concluded and agreed upon, this fourteenth day of June, in the year of our Lord one thousand eight hundred and twenty-four, between the president, managers and company of the Schuylkill Navigation Company of the one part, and the mayor, aldermen and citizens of Philadelphia of the other part; WHEREAS in and by certain articles of agreement, made and concluded between the said parties, and bearing date the third day of June, one thousand eight hundred and nineteen, the said president, managers and company of the Schuylkill Navigation Company, did grant to the said mayor, aldermen and citizens of Philadelphia the right, and they the said mayor, aldermen and citizens of Philadelphia, did agree to erect a dam across the river Schuylkill at Fairmount, of the height and in the manner in the said articles set forth, and that the said mayor, aldermen and citizens of Philadelphia, should have the use of the water of the said river, to the extent in the said articles limited and declared.

And whereas in and by the same articles it was agreed, that the said mayor, aldermen and citizens of Philadelphia, should make and build a certain guard lock, chamber locks

and canal, and the same, together with sufficient and suitable ground adjoining the said locks whereon to erect a convenient toll house, should deliver over and put into possession of the said Schuylkill Navigation Company, to be and remain their property for ever.

And whereas in and by the same articles it was covenanted and agreed that the said mayor, aldermen and citizens of Philadelphia, and their successors, should not lease or dispose of any water power of the said river Schuylkill, nor use the water power in the said articles referred to for manufacturing purposes, except only for boring pipes, pumps and such other matters and things as might be useful to and connected with the public works of the said mayor, aldermen and citizens of Philadelphia therein referred to.

And whereas in and by certain other articles of agreement between the said parties, bearing date the twentieth day of July, one thousand eight hundred and twenty, the said president, managers and company of the Schuylkill Navigation Company did grant to the said mayor, aldermen and citizens of Philadelphia, the right to raise the said dam at Fairmount eighteen inches additional height, and to use, exercise and enjoy all the rights and powers of the said Navigation Company for the erection of the same, as fully as for the dam before agreed upon by the said parties, with an agreement that all the articles, agreements and stipulations, clauses, rights and liabilities contained, made, reserved or assumed in and by the former articles by and between the said parties, should be deemed and held to be in like manner contained, made, reserved or assumed by the said articles now reciting in reference and relative to

the dam of increased height thereby authorized, and the waters raised thereby, as fully as if therein particularly and distinctly repeated, saving and excepting only such as might relate to the height of the said dam, and elevation of the waters to be caused thereby, as in and by the said two articles of agreement, remaining of record in the office of the recorder of deeds, &c., in and for the city and county of Philadelphia, in Deed Book M. R., No. 23, page 284, and in Deed Book I. W. No., 5, page 306, reference being thereto had, will more fully and at large appear.

And whereas the said mayor, aldermen and citizens of Philadelphia have, since the date of the said articles of agreement, and by virtue thereof, erected a dam across the river Schuylkill at Fairmount, and also have caused to be made and built a guard lock, chamber locks and canal, and have put the same into possession of the Schuylkill Navigation Company, together with sufficient and suitable ground for a toll house, adjoining the said locks.

And whereas the said parties have come to a new arrangement in regard to the water power of the said dam at Fairmount, and to the management of the said locks and canal, it being agreed and intended that the said mayor, aldermen and citizens of Philadelphia, for the consideration hereafter mentioned, shall have the full absolute and uncontrolled use and enjoyment of the whole water and water power of the river Schuylkill at the said dam at Fairmount, without any restrictions or reservations whatever, saving only the reservation of so much thereof as may be necessary for the purpose of the navigation of the said river, as in the said articles of agreement first and herein recited is provided, and shall also have charge of the said locks and

canal, under the superintendence of the said president, managers and company of the Schuylkill Navigation Company, as hereinafter particulary set forth

Now this Agreement witnesseth, that the said the president, managers and company of the Schuylkill Navigation Company, in consideration of the sum of twenty-six thousand dollars, to them in hand paid by the mayor, aldermen and citizens of Philadelphia, the receipt whereof is hereby acknowledged, and also for the further consideration hereafter mentioned, do hereby covenant, promise and agree, to and with the mayor, aldermen and citizens of Philadelphia, in manner following, that is to say, the said the president, managers and company of the Schuylkill Navigation Company, do hereby for themselves and their successors, covenant and agree that the said the mayor, aldermen and citizens of Philadelphia and their successors, shall henceforward and forever have, hold, take, use and enjoy the whole water and water power of the river Schuylkill at Fairmount that shall remain after drawing off from the dam there erected so much as may be necessary for the purpose of the navigation of the said river, canal and locks, without any restriction or other reservation whatever, and that it shall and may be lawful to and for the said mayor, aldermen and citizens of Philadelphia and their successors, to lease, sell or dispose of the said water power, and to use the same and every or any part thereof, for any and every purpose whatsoever, without any let or hindrance by the said the president, managers and company of the Schuylkill Navigation Company or their successors, for or by reason or under pretence of any restriction contained in the articles of agreement hereinbefore recited, or either of them and

they the said the president, managers and company of the Schuylkill Navigation Company, do by these presents, and for the consideration before mentioned, grant, bargain and sell to the mayor, aldermen and citizens of Philadelphia and their successors, the whole water power of the said river produced by the dam at Fairmount, and the use of the whole water of the said river at Fairmount aforesaid, that shall remain after drawing off as aforesaid what shall be necessary for the purpose of the navigation of the said river TO HAVE AND TO HOLD the same to them and to their successors for ever, to and for their own proper and unlimited use and behoof for ever. And they do hereby remise and release to the said the mayor, aldermen, and citizens of Philadelphia, so much of any promise, covenant and agreement on their part, in the said articles of agreement before recited, or either of them contained, as shall or may be construed to restrain or limit the use of the said water or water power in any other way or manner than as is herein contained and set forth. It being nevertheless the true intent and meaning of the parties to these presents, that the said the mayor, aldermen and citizens of Philadelphia, shall only have such use of the said water, as with the use thereof for the purpose of the navigation aforesaid, will not reduce it below the surface or top of the said dam or keep it so reduced.

And this Agreement further witnesseth, that the said the president, managers and company of the Schuylkill Navigation Company, do hereby acknowledge that the said locks, canal and sufficient and suitable ground for the toll house aforesaid, has been delivered over and put into their hands and possession by the mayor, aldermen and

citizens of Philadelphia; and they the said the president, managers and company of the Schuylkill Navigation Company, do hereby covenant, promise and agree with the mayor, aldermen and citizens of Philadelphia, that the canal and locks at Fairmount shall not at any time hereafter be a place for collecting tolls for boats, arks or other thing whatsoever that pass the locks at Flat Rock, but that all boats, arks or other thing which shall pass the locks at Flat Rock, either in ascending or descending the said river, shall not have any tolls collected from them upon such ascent or descent at the said locks at Fairmount, but that the tolls on boats, arks or other things that pass the locks at Fairmount, may be collected at Flat Rock, or such other place as the said president, managers and company may fix upon, not nearer to Fairmount than the southernmost lock of the said Flat Rock canal, and that whensoever hereafter the said president, managers and company, shall sell, demise or dispose of any water power at Flat Rock, or water power produced by the dam or canal at Flat Rock, they will introduce into the deed or other instrument of sale, demise or disposition, one or more clause or clauses, covenant or covenants, on the part of the purchaser, lessee or grantee, whereby he, his heirs, assigns and successors shall be at all times during the continuance of their possession and title, effectually restrained and protected from suffering any dye-stuffs, or any noxious, fetid or injurious articles or matter whatsoever, to flow, pass or fall from their respective premises into the river Schuylkill, and shall be obliged and bound to confine all such dye-stuffs, or noxious, fetid or injurious articles or matters, within one or more wells or reposito-

ries sunk or made upon their respective premises, and at a reasonable distance from the margin of the said river Schuylkill, and of any canal, water course or passage leading into the same. And it is further agreed by and between the parties to these presents, that they the mayor, aldermen and citizens of Philadelphia, shall and will have and take charge of the locks and canal aforesaid at Fairmount, and at all times hereafter for ever, cause the same to be well and faithfully attended, and kept in good order and repair, at the proper expense of the said mayor, aldermen and citizens of Philadelphia, and that they the said mayor, aldermen and citizens of Philadelphia, will cause such tolls as may be fixed by the said president, managers and company, not exceeding the tolls payable by law on boats, arks and other things passing the said locks at Fairmount, excepting such boats, arks and other things as have passed the locks at Flat Rock, or shall be destined to pass the said locks at Flat Rock on the then trip or passage, to be collected and paid over to the said president, managers and company without charge. Provided always, and the said the president, managers and company of the Schuylkill Navigation Company, do hereby covenant and agree to and with the said mayor, aldermen and citizens of Philadelphia, that the boats, arks, rafts and other things, the property of the said mayor, aldermen and citizens of Philadelphia, or in their employment or use, at all times hereafter for ever, shall pass and repass, in, through and out of the said locks and canal at Fairmount, in ascending or descending the said river, without payment of any toll or charge whatever. Provided also, nevertheless, and it is the true intent and

meaning of these presents, that the said the president, managers and company of the Schuylkill Navigation Company shall and they do hereby retain the right of superintending the management of the said locks and canal, and the collection of the said tolls by the mayor, aldermen and citizens of Philadelphia, or their agents or servants, and that they shall be and are hereby authorized and empowered, at the expense of the said mayor, aldermen and citizens of Philadelphia, to remove any obstructions, and make any repairs, which, according to the true intent of these presents, or the said recited agreements, the said mayor, aldermen and citizens of Philadelphia are bound, and shall, after reasonable notice, neglect to remove and make. And provided further, that the said the mayor, aldermen and citizens of Philadelphia, shall, notwithstanding these presents or any thing contained therein, be and continue bound and obliged to execute and perform all such matters and things as are stipulated by them to be done or performed in and by any prior agreement or agreements made between them and the said the president, managers and company of the Schuylkill Navigation Company, and which shall or still remain in any manner unperformed or incomplete, if any such there be. And it is also further agreed by the parties to these presents, that should it at any time happen that the water should be drawn off below the top or surface of the dam, it shall be lawful for the said president, managers and company to fasten up the gates or openings used by the said mayor, aldermen and citizens of Philadelphia to draw off the water, and keep the same fastened until the water shall be raised as high as the top or surface of the dam:

and they the said president, managers and company of the Schuylkill Navigation Company, do finally covenant, promise and agree to and with the mayor, aldermen and citizens of Philadelphia, to put them forthwith in possession of the said locks and canal at Fairmount, and of the toll house and ground thereto adjacent and annexed, to the end that the said mayor, aldermen and citizens of Philadelphia may forthwith enter upon the execution of their covenants in this behalf as aforesaid. In witness whereof, the president, managers and company of the Schuylkill Navigation Company, and the mayor, aldermen and citizens of Philadelphia, have caused their respective corporate seals to be hereto affixed the day and year first above written.

{Seal of the Schuylkill Navigation Company.}

CADW. EVANS,
President.

Attest.—THOS. HARPER, *Treas. and Sec.*

{Seal of the city of Philadelphia.}

JOSEPH WATSON,
Mayor.

It will be readily seen from the above that the water of the Schuylkill cannot be made available in any considerably greater degree for motive purposes; and even at present, in seasons of great demand or drought, it is not available for such purposes without interfering with the guaranteed privileges of the Schuylkill Navigation Company and the operations of their canal. It is also unfortunately a fact,

that scarcely a summer elapses in which the working of the canal alluded to does not seriously interfere with that of the Water Works. During the period in which I have had the honor of occupying the position of Chief Engineer, I have been served with notices repeatedly by the Schuylkill Navigation Company relating to supposed difficulties and alleged infringements of provisions in the above agreement, but which in every case proved easily to be adjusted with the assistance of your Committee on Water Works, and I mention the fact for the purpose only of showing that the agreement alluded to and above inserted, is held by the Company to be in full force.

Any conflict of interests or interference with, or encroachment upon, the rights of either party to the contract or agreement above inserted, could be readily avoided, and I beg to say it would be highly expedient to make such provision for the purposes of the water supply in the early future. It is only necessary, first, to economize the water power at Fairmount by the introduction of machinery of improved construction, and giving the greatest attainable pumping power. Second, by increasing the steam power at the Spring Garden Works; and it would be necessary also that additional reservoirs of corresponding storage capacity be provided. By means of these improvements there would be no difficulty in obtaining from the Schuylkill river an ample supply for a period quite indefinite at present, without possibility of failure and without invading the vested rights of the Schuylkill Navigation Company. These suggestions I have had the honor previously of making both in a preceding page of this communication, and more fully in the last Annual

Report that I had the honor of making to your honorable bodies, and to which I most respectfully beg leave to refer, and to say that my views remain as there stated.

During the past year the constantly fluctuating and generally increasing prices of all description of material, and also of wages of labor, and in nearly all trades, have rendered it quite impossible to make correct or reliable estimates of anticipated expenditures of any description. Various operations of this department have in fact, during the past year, been carried on under some difficulties from the cause here mentioned.

In the latter part of the month of November, 1863, the Department commenced the occupancy of the offices newly provided for it in the hall of the American Philosophical Society in Fifth Street below Chestnut Street. These much more commodious and enlarged accommodations for the department, must result in greatly increased advantage and convenience to the public and insure important facilities in the business of the department. Heretofore the several offices included in this department have been located very disadvantageously. The office of the Chief Engineer has been at No. 918 Cherry Street, that of the Register has been at Fifth and Chestnut Streets, and that of the Draughtsman has been at Fairmount Works. As at present arranged these anomalies are entirely corrected, and the entire department is concentrated at the new offices. In the arrangement of the apartments occupied at the new offices, much care has been taken to economize all available space as far as

practicable. The different desks and offices are within easy and immediate access of citizens, having business with the department, and the means of ingress and egress are made in the highest practicable degree convenient.

It would much increase the facilities of this department in important particulars, if the Police and Fire Alarm Telegraph were extended to the several Water Works and to the Purveyors' Offices.

My views having undergone no change in relation to the contemplated and necessary improvements in the Water Department, which I have not considered it proper nor expedient to dwell on in this report, I beg the liberty of referring you, with reference to such improvements and views, to the last annual report that I had the honor of submitting to your honorable bodies.

The following statement of the Register gives a detailed account of all moneys received, and of the sources of revenue. It will be seen that the receipts of the Department for 1863 are considerably greater than those of the preceding year.

Very respectfully,

ISAAC S. CASSIN,

Chief Engineer Water Department.

REGISTER'S STATEMENT.

DEPARTMENT FOR SUPPLYING THE CITY WITH WATER,
REGISTER'S OFFICE, JANUARY 18, 1864.

ISAAC S. CASSIN, ESQ.,

Chief Engineer of Water Department.

DEAR SIR:—I desire to present to you in as concise a form as possible the operations of the department intrusted to my care for the year 1863.

The estimated receipts at this office for the year 1863 was $550,000. You will see by reference to the Tabular Statement, enclosed, that they amount to the sum of $568,740 60, the increase in the item of Water Rents alone, notwithstanding the large number of declines and suspension of operations in some branches of business, being $18,024 53, the total amount of Rents in 1862 being $501,909 70, and in 1863, $519,934 23.

The amount due for iron pipes, still outstanding, is $10,995 58, exclusive of the amount of $14,350 70 sent to City Solicitor for lien during the year.

We can now congratulate ourselves upon having obtained a suitable office for the transaction of the business of this portion of the department. It has enabled me to

simplify and arrange its operations, which it was impossible to do in the old office; though not large, it is sufficiently commodious to properly accommodate the public, even in the very busy season of the year.

During the year the Select and Common Councils made an appropriation of $2,500 to re-assess some of the wards. It has been attended with the best results, the increase in the Nineteenth Ward alone being $8,624 25; other wards although not so largely increased, have shown clearly the necessity of making a re-assessment at stated periods. This additional revenue together with the large income in new permits being $14,693 24 in 1862, and in 1863, $18,091 35, will all tend to swell the revenue of the Department above the estimated receipts for 1864—($600,000.)

I annex the amount of the duplicates, arranged in wards, for the years 1863 and 1864, to show more clearly the increase:

Amount of Duplicates of 1863 *and* 1864.

1863.		1864.	
WARDS.	AMT. CTS.	WARDS.	AMT. CTS.
First	$34,771 50	First	$39,847 75
Second	26,408 25	Second	26,892 75
Third	16,629 75	Third	16,524 50
Fourth	17,474 00	Fourth	17,351 75
Fifth	27,255 50	Fifth	27,067 75
Sixth	32,175 75	Sixth	32,705 75
Seventh	32,032 75	Seventh	31,611 75
Eighth	30,797 25	Eighth	31,266 50
Ninth	26,408 75	Ninth	26,966 25
Tenth	28,219 75	Tenth	28,410 50
Eleventh	16,929 25	Eleventh	17,301 00
Twelfth	18,189 00	Twelfth	19,056 00
Thirteenth	25,962 50	Thirteenth	26,514 00
Fourteenth	28,946 75	Fourteenth	29,314 00
Fifteenth	39,928 25	Fifteenth	45,620 75
Sixteenth	20,283 50	Sixteenth	21,162 25
Seventeenth	18,330 25	Seventeenth	18,181 00
Eighteenth	18,738 25	Eighteenth	19,052 00
Nineteenth	23,762 75	Nineteenth	32,389 50
Twentieth	37,054 25	Twentieth	39,521 75
Twenty-first	360 00	Twenty-first	410 50
Twenty-third	364 25	Twenty-third	474 00
Twenty-fourth	13,021 00	Twenty-fourth	18,439 25
Twenty-fifth	4,377 50	Twenty-fifth	4,052 00
Total	$538,420 75	Total	$570,133 25
			538,420 75
		Increase	$31,712 50

We have frequent complaints in this office from the owners of steam engines, who claim that the amount of water charged for is not used; this complaint is not well grounded, for in no city is the charge so reasonable as in ours: it is customary to charge them according to the rateable capacity of the engine, three dollars for each horse power. By the Croton Aqueduct Department of New York, the charges for steam engines are as follow:—For each horse power up to and not exceeding ten, the sum of ten dollars per annum; for each exceeding ten, and not over fifteen, the sum of seven dollars and fifty cents each; and for each horse power over fifteen, the sum of five dollars. A very large number of the steam engines introduced into factories and other manufacturing establishments will not exceed fifteen horse power, so that the New York rates are nearly treble ours. I know of no remedy to silence this, and indeed all other complaints, but one, and that is the introduction of a water meter, when the actual amount of water used can be obtained by measurement, and I am satisfied from my experience in this department, that this would tend to increase the revenue and be much more satisfactory to the consumer.

Yours, very respectfully,

CHARLES L. WOLFF,

Register.

STATEMENT OF RECEIPTS AT REGISTER'S OFFICE, FROM JANUARY 1ST TO DECEMBER 31ST, 1863.

MONTHS. 1863.	Rents of 1861.	Penalties of 1861.	Rents of 1862.	Penalties of 1862.	Rents of 1863.	Penalties of 1863.	Fractional Rents.	Iron Pipes.	TOTAL.
January.....	196 75	22 03	1,391 75	171 20	36,676 75	.....	1,065 10	3,151 19	42,674 77
February	177 50	25 89	963 50	138 23	77,241 50	....	1,503 45	2,262 14	82,312 21
March.....	228 25	20 95	883 00	94 30	140,050 75	....	1,670 70	2,766 19	145,714 14
April...	430 00	38 45	1,689 75	184 81	183,401 25	.....	2,215 20	1,380 04	189,339 50
May.....	53 75	1 50	895 75	110 47	8,591 00	352 56	2,229 68	528 75	12,763 46
June.....	80 00	6 75	667 25	83 20	18,600 75	870 02	1,988 12	1,813 53	24,109 62
July.....	90 50	8 93	329 50	39 87	2,402 50	302 57	1,429 50	3,371 53	7,974 90
August.....	36 00	3 75	295 00	38 25	7,042 75	972 35	1,353 20	861 32	10,602 62
September.....	119 75	13 03	471 50	56 05	7,169 25	971 91	1,034 80	2,199 67	12,035 96
October.....	152 75	11 49	742 25	96 61	7,695 00	1,003 47	1,077 40	4,903 13	15,682 10
November	195 50	14 72	641 50	70 65	5,596 00	760 88	986 35	5,195 72	13,461 32
December.....	130 00	9 08	615 00	78 34	6,472 65	945 27	1,537 85	2,281 81	12,070 00
	*$1,890 75	$176 57	$9,585 75	$1,161 98	$500,940 15	$6,179 03	$18,091 35	$30,715 02	$568,740 60

* Rents of 1858, 1859, and 1860 included in Statement of Rents of 1861.