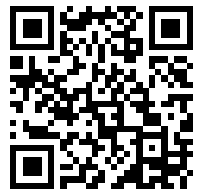

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1915

ANNUAL REPORT

OF THE

BUREAU OF WATER

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DEPARTMENT OF PUBLIC WORKS

OF THE

CITY OF PHILADELPHIA

FOR THE YEAR 1915



ISSUED BY THE
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ANNUAL REPORT

OF THE

BUREAU OF WATER

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CITY OF PHILADELPHIA

FOR THE YEAR ENDING DECEMBER 31, 1915



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INDEX

	Page
A	
Annual Pumpage, Coal, Lubricants, etc.....	20
B	
Boilers	14
C	
Coal Purchased and Consumed.....	16
High service stations.....	17
Low service stations.....	17
Filters	18
Miscellaneous	19
Coal Consumed for Pumpage.....	21
Comparison of Pumpage for 1914 and 1915.....	27
D	
Data and Statistics.....	7
Detailed Description of service mains laid.....	54
Detailed Description of supply mains and supply main connections..	55
Distribution	51
E	
Employes	5
Expenditures	11
F	
Filter statistics	31-50
Fire hydrants by wards.....	56
Free water service.....	6
H	
High pressure fire service.....	58
M	
Maintenance cost.....	24-25
Meters	6

24 N16 Dumbog 114 CBR

iv

	O	Page
Operation cost		22-23

P

Pipe extensions.....		4
Private Water companies.....		3
Pumping Machinery.....		13

R

Revenues		12
----------------	--	----

T

Total gallons pumped and consumed.....		28-29-30
--	--	----------

V

Valves in use.....		57
Volume and cost of main station pumpage.....		26
High service pumpage.....		26
Low service pumpage.....		27

W

Water Bureau a paying proposition.....		3
Work on water pipes.....		52-53-54

BUREAU OF WATER

Carleton E. Davis, CHIEF

Philadelphia, December 31, 1915.

Director,
Department of Public Works.

Dear Sir:

I beg to submit a review of the Bureau of Water's operations for the year 1915.

Not for many years have so large a number of radical improvements to vital features of the water works system been effected as during 1915. This will result in better service, added insurance against breakdowns, decreased cost of operation, and general increased effectiveness. While the actual sums appropriated to the improvements are relatively small, the allotment of funds has been directed to the weak and deficient parts of the plan in a way to bring large returns.

A sedimentation basin for the Torresdale filters, which will permit the raw Delaware River water to settle at least twelve hours before application to the pre-filters, was begun in March, and is well along toward completion. Proper use of this basin will arrest the peak loads of turbidity when the Delaware River is affected by floods, and will permit the Torresdale filters to be operated continuously under normal conditions, thereby increasing their effectiveness and efficiency.

Large supply mains have been laid south of Market Street for the improvement of the water supply of South Philadelphia. These mains adequately cover the entire district and will be sufficient to distribute a greatly increased volume of water under higher pressure, as soon as additional facilities are provided for furnishing the water required for this growing section of the city.

Work was started upon suitable coal storage yards and bunkers for the Queen Lane pumping station. These should be com-

pleted early in 1916, thereby removing an ever-present menace of short coal supply at this important station.

Contracts have been let and work begun upon the replacement of pumping equipment at Shawmont station. Other contracts are about to be let for the revamping and rearrangement of the equipment of the Roxborough high service station and the Upper Roxborough filter booster station, all of which is auxiliary to and connected with the Shawmont plant. These improvements will replace unsafe and inadequate machinery and plant with modern, dependable equipment, and correspondingly insure the integrity of the water supply of Germantown, Chestnut Hill, Roxborough and Manayunk. Incidentally two mains on Eva Street will be freed from pumping service, thereby permitting a single filtered water pipe to be reinforced by a parallel main.

Material progress has been made in replacing wooden trestles under large and vital water pipes with permanent concrete structures.

Plans were completed for protecting certain large pipes under the tracks of the Pennsylvania Railroad. Upon the approval of the Public Service Commission work of construction will proceed at once. These mains are now without protection from passing trains and are subject to frequent injury, with possible serious damage as a consequence.

The extensions to the Belmont pre-filters were completed, adding materially to the capacity and effectiveness of the plant. These filters should now be able to respond to a 50 per cent. increased draft upon them.

At Belmont pumping station one new 20-million gallon turbo-centrifugal pump has been in satisfactory service for some months. The second new unit will be ready to operate early next year. A portion of the new boiler plant is in use, and all the improvements at this station now under contract will be completed soon.

Extensive additions to the general pipe distribution system were made, more pipe being laid than in any recent year. Notable extensions were made in the northeastern section of the city.

New pumping equipment was installed in the Wentz Farm high

service station in anticipation of an increased demand from Byberry Farms and the general northeast district. Arrangements were made for replacing two of the boilers at this station.

Two worn-out boilers at George's Hill high service station were replaced by two practically new boilers from Lardner's Point station where they were no longer needed.

Minor improvements have been made at Lardner's Point station, at Torresdale pumping station where new wash water pumps were installed, and at Torresdale filters, where experiments were made with a mechanical device for removing sand from the beds.

THE WATER BUREAU A PAYING PROPOSITION

The annual receipts from water rents are in excess of \$5,000,000, in addition to free service rendered other municipal or charitable activities of a value at present rates of about \$500,000. Operation and maintenance costs are about \$2,000,000 per year. Interest and sinking fund charges on outstanding bonds chargeable to the Water Bureau amount to about \$2,000,000 annually.

The Water Bureau is, then, a profitable business proposition; and it should receive attention on that basis distinct from that given to an ordinary municipal activity which yields no financial returns. Recent appropriations indicate that the city authorities take this view of the matter, and that they stand ready to make any reasonable investment in the water works equipment and plant that bids fair to yield a reasonable return on the expenditure. In other words, there is a disposition to go beyond the minimum needs of the city in the way of a supply of water, and to keep the water works plant and all its appurtenances in a condition commensurate with both the service rendered to the municipality and the magnitude of the investment. This is certainly a gratifying condition, as doubtless every citizen of Philadelphia desires to feel a sense of pride in this important civic enterprise.

PRIVATE WATER COMPANIES

It is necessary to consider seriously the question of the future of the private water companies serving certain sections of the

city. The Springfield Water Company supplies a portion of the Oak Lane district; the Holmesburg Water Company supplies Holmesburg and adjacent territory in the northeast section of the city; the Overbrook Water Company supplies Overbrook. During the year the question of the relations between the city water works and these private corporations was brought to a head in a small case involving the extension of the city mains in Haines Street, where the Springfield Water Company already had a pipe in service for a distance of some 1400 feet.

In fairness to the corporations, as well as in justice to the residents of the districts immediately affected, and likewise to the city as a whole, the question whether the municipality is to take over these works should be considered and a definite policy laid down. Either the city should plan to supply water to its whole area, or the private companies should be definitely notified that their territory will not be encroached upon. The matter is vital now, for the longer the question is postponed the more complicated will be any settlement. The city is growing, and particularly in the northeastern district the private companies must largely expand to meet the demands for water.

Ultimate taking over of these private works was contemplated under the ordinances granting them permission to enter the field at a time when the city was not prepared to supply water to the territory in question. The city is now, or soon will be, able to furnish water to these districts, and careful consideration should be given to the desirability of exercising the right of taking over the works, thus including the water supply of the whole of Philadelphia in one municipal system.

PIPE EXTENSIONS

The matter of financing pipe extensions should be placed upon a more satisfactory basis. The present practice is for new pipe to be purchased out of loan funds, but trenches are dug and the pipe is laid by employees of the Bureau of Water, who are paid out of current appropriations. As pipe extensions are strictly new work and an addition to the value of the water works plant, it

is proper that the entire cost of such extensions should be paid from bond issues. Such an arrangement would be a proper method of financing, would add to the facilities for doing the work, would give better service to the public, and would provide desirable elasticity by permitting the laying of the pipe as demand therefor arises.

Under existing conditions there is no connection between an authorization to lay pipe in new streets and the provision of funds to pay for the work. The authorization depends upon the demand created by proposed paving, building operations, or similar reason. The provision of funds depends upon the amount of money available when the current appropriations are made. This results in an undue amount of pipe being laid by private contract, or compels building operations to be delayed for lack of water facilities, or delays pavement work done under contract by the Highway Bureau. Current appropriations for paying laborers in the Bureau of Water are more or less constant from year to year. Demands for new pipe fluctuate according to the growth of the city. As a consequence, either new pipe has to be delayed, or necessary maintenance and operation work in the Bureau of Water has to be neglected.

EMPLOYEES

The Mutual Beneficial and Protective Association of the employees of the Bureau of Water, organized in 1914, has proven itself to be a power for good. The object of this association is well expressed in its preamble: "We, employees of the Bureau of Water, Department of Public Works, desiring to improve the efficiency of this portion of the working force of the Bureau of Water and to develop the intellectual and social companionship of its members, and to create a mutual beneficial and protective association for themselves, have established this organization. All employees of the Bureau of Water receiving \$1400 per year or less are eligible for membership."

At the present time about 700 employees belong to the association. The organization is a means by which the widely scat-

tered members geographically can become acquainted; it materially helps the development and enforcement of a code of honor; and it assists in maintaining desirable relationships between the members of the association and the various officers of the bureau.

METERS

More than 15,000 meters were set, the number of services thus equipped at the end of the year reaching a total of about 45,000. With 12½ per cent. of all the service pipe connections in the city thus metered, the influence of this method of paying for water should be appreciably felt. The bureau is still without financial means for placing meters on those consumers who cannot be fairly assessed under fixture rates for the full amount of water they draw from the mains. There is due authorization for such action, but without funds to purchase meters the bureau cannot act. A reasonable yearly appropriation of perhaps \$25,000 to be thus used would bring a large return from the investment in the shape of increased water rents. And the users of water affected would still be paying no more than a fair price.

Attention is called to the suggestion in last year's report for an increase in the meter rate on a sliding scale to 12 cents, 8 cents and 4 cents per thousand gallons, depending upon the quantity of water used. Illustrating the suggestion thus made, the case of a typical consumer may be cited. Under fixture rates this consumer paid \$19 a year. With a meter he pays a yearly minimum of \$5, but actually uses water to the extent of only \$3.90 per year at the rate of four cents per thousand gallons.

Should the rate be increased to 12 cents per thousand gallons, this consumer would pay \$11.70 annually, a fair return to the city for the cost of delivering water to him, but still a substantial decrease over the fixture charge of \$19, which was doubtless too high.

FREE WATER SERVICE

The public schools are still largely uncontrolled in their use of water. The resultant waste is excessive and in many cases

causes serious inconvenience and loss. Instances have been found where not only are the fixtures defective, but automatic flushing devices are allowed to run continuously whether the schools are in session or not. Free service rendered by the Bureau of Water, already large in amount, is constantly increasing, and such free service, if it is to be continued, should, in justice to the paying consumers, be under reasonably economical conditions.

DATA AND STATISTICS

The operation of the filters, pumping stations and distribution system has proceeded along normal lines. In the appendix to this report statistical matter relating to these functions of the Water Bureau is presented, together with comments suggested thereby. In the appendix will likewise be found the usual data of expenditures, revenues, and similar tabulated matter.

Respectfully,

C. E. DAVIS

Chief of Bureau.

APPENDIX

EXPENDITURES

	1914	1915
Operation and maintenance.....	\$1 826 754 16	\$1 963 881 43
New work.....	553 995 33	1 198 659 16
Totals	\$2 380 749 49	\$3 162 540 59

Operation and Maintenance

	1914	1915
Meters	\$14 329 78	\$19 379 39
Revenues	69 256 45	83 000 34
Filtration	294 233 90	345 304 33
Distribution	307 585 56	246 754 90
Pumping	1 141 348 47	1 269 442 47
	\$1 826 754 16	\$1 963 881 43

Cost Per Million Gallons Filtered

	1914	1915
Meters	\$0 13	\$0 19
Revenue	65	78
Filtration	2 76	3 25
Distribution	2 88	2 33
Pumping	10 72	11 97
	\$17 14	\$18 52
Gallons filtered.....	106 482 430 000	106 007 194 000

REVENUES

Collected by Receiver of Taxes, Bureau of Water Rents	1915	1914	Increase	Decrease
Water rents—Appliance rates	\$4 018 704 66	\$4 150 044 55	.....	\$131 339 89
Penalties—Appliance rates...	48 119 97	47 996 92	\$123 05	.....
Water rents—Delinquent.....	70 883 20	78 715 02	.....	7 832 42
Penalties—Delinquent	11 069 41	12 097 12	.....	1 037 71
Penalties—Meter accounts.....	4 860 14	.....	4 860 14	.....
Liens	16 00	15 00	1 00	.....
Interest on liens.....	71 04	113 30	.....	42 26
Permits—Fractional rents....	94 689 22	124 744 02	.....	30 055 40
Meter accounts.....	708 775 92	668 506 94	40 268 98	.....
Pipe frontage.....	88 408 16	105 871 60	.....	17 463 44
Special—Testing meters, re- moval of fire hydrants, etc.	2 866 56	3 229 73	.....	363 17
Totals	\$5 048 454 28	\$5 191 395 40	\$45 193 17	\$183 134 29
Collected by miscellaneous tax office—Fees for searches...	\$2 476 25	\$2 515 00	.....	\$38 75
Collected by City Solicitor— Pipe frontage.....	26 355 71	31 956 68	.....	5 600 97
Collected by tax office for highways—Ferrules deliv- ered	8 277 00	7 893 00	\$384 00	.....
Collected by Department of Supplies for material sold..	15 534 84	8 321 23	7 233 61	.....
Totals	\$5 101 118 08	\$5 242 081 31	.....	\$140 963 23
Total number of accounts December 31, 1915.....				356 841
Number of meter accounts.....				25 283
Total number of meters.....				29 555

PUMPING STATION STATISTICS

PUMPING MACHINERY

Station	No. of units	Year installed	Description				Working conditions			
			Builder	Type		Rated capacity M. G. per 24 hrs.	Steam pressure lbs. per sq. in.	Vacuum in mercury	Total head feet	
			Steam end	Water end						
Belmont	1	1915	Dravo-Doyle	DeLaval turbine....	Two stage ...	22	190	28	316	R
	2	1908	Bethlehem	Hor. cross comp....	Dble. plung...	10	150	26	316	R
Queen Lane.....	2	1900	Holly	Hor. comp.....	2 plung.	10	150	27	316	R
	1	¹ 1895	Worthington	Duplex comp.....	2 plung.	20	100	24	316	R
	4	1896	Southwark	Ver. trip. exp.....	3 plung.	20	150	27	271	R
	1	² 1887	Gaskill	Hor. comp.....	2 plung.	10	100	24	400	R
Shawmont	4	1901	Worthington	Hor. comp. high duty duplex	2 plung.	5	150	26	400	R
	2	1908	Snow	Hor. cross comp....	2 plung.	5	150	26	400	R
Lardner's Pt. No. 2.	6	1903-4	Holly	Vert. trip. exp.....	3 plung.	20	150	28	184	D
Lardner's Pt. No. 3.	4	1908	Holly	Vert. trip. exp.....	3 plung.	20	175	28	.....	D
Torresdale	2	1908	Holly	Vert. trip. exp.....	3 plung.	20	175	28	184	D
	6	1907	Reeves eng., wood pumps	Vert. cross comp....	Centrifugal ..	40	175	26	42	R
Roxborough L. S...	1	1908	Bates eng., Allis-Chalmers pump.....	Vert. cross comp....	Centrifugal ..	40	175	26	42	R
	1	1910	DeLaval	Hor. turbine.....	Centrifugal ..	50	175	28	42	R
	3	1902	Buckeye eng., Worthington pump.....	Vert. cross comp....	Centrifugal ..	10	100	26	17	R
George's Hill.....	1	1908	Allis-Chalmers	Hor. cross comp....	Dble. plung...	6	100	27	136	H
Roxborough H. S...	1	1900	Worthington	Hor. comp. H. D. dup.	Dble. plung...	5	100	27	136	H
	1	1900	Worthington	Hor. comp.....	Dble. plung...	5	100	27	118	H
Wentz Farm.....	1	³ 1866	Worthington	Hor. comp. H. D. dup.	Dble. plung...	5	100	27	118	H
	1	1900	Holly	Hor. comp.....	Dble. plung...	3	110	28	140	H
	1	⁴ 1899	D'Auria	Hor. dup. comp....	Dble. plung...	4	110	25	140	H
ENGINE REMOVED—1915										
Belmont	1	1900	Holly	Hor. comp.....	Dble. plung...	10	150	27	316	R

¹ Moved from Spring Garden in 1895.

² Moved from Spring Garden in 1908.

R—Raw water to filters.

H—High service direct.

³ Moved from Delaware Station in 1890 and from Spring Garden in 1895.

⁴ Moved from Shawmont in 1902.

D—Direct.

BOILERS

Station			Description		Working conditions			
	No. of boilers	Year installed	Kind of boiler	Kind of grates	Rated Horse Power	Steam Press	Method of Firing	Draft
Belmont	5	1890	Fur. fue tubular.....	Stationary	100	100	Hand	Natural
	4	1899	Fur. fue tubular.....	Stationary	100	150	Hand	Natural
	3	1901	Fur. fue tubular.....	Stationary	100	150	Hand	Natural
	10	1906	Fur. fue tubular.....	Stationary	100	150	Hand	Natural
	2	1915	Wickes water tube.....	Grieve dumping.....	500	210	Hand	Forced
Queen Lane.....	4	1913	Badenhausen water tube	Dean dump.....	300	150	Hand	Forced
	5	1914	Badenhausen water tube	Dean dump.....	300	150	Hand	Forced
	1	1914	Badenhausen water tube	Coxe stoker.....	300	150	Stoker	Forced
	4	1908	Edgemoor water tube...	Stationary	500	150	Hand	Induced
Shawmont	4	1908	Edgemoor water tube...	Stationary	500	150	Hand	Induced
Lardner's Pt. No. 2....	8	1905	Fur. fue tubular.....	Stationary	110	150	Hand	Natural
Lardner's Pt. No. 2....	6	1907	Edgemoor water tube...	Wetzel stoker.....	500	150	Stoker	Natural
Lardner's Pt. No. 3....	8	1908	¹ Edgemoor water tube...	Wetzel stoker.....	500	175	Stoker	Induced
Torresdale	6	1907	² Heine water tube.....	Murphy	325	175	Stoker	Natural
	3	1908	² Heine water tube.....	Murphy	325	175	Stoker	Natural
	4	1895	Fur. fue tubular.....	Stationary	80	100	Hand	Natural
Roxborough H. S.....	2	1911	Fur. fue tubular.....	Stationary	100	100	Hand	Natural
George's Hill.....	1	1895	Fur. fue tubular.....	Stationary	80	100	Hand	Natural
	2	1915	Fur. fue tubular.....	Stationary	110	100	Hand	Natural
Wentz Farm.....	3	1900	Fur. fue tubular.....	Stationary	100	160	Hand	Natural

¹ Green economizers.

² Sturtevant economizers.

BOILERS REMOVED—1915

Station	Description				Working conditions			
	No. of boilers	Year installed	Kind of boiler	Kind of grates	Rated Horse Power	Steam Press	Method of Firing	Draft
Belmont	3	1899	Fur. fue tubular.....	Stationary	100	150	Hand	Natural
	1	1900	Fur. fue tubular.....	Stationary	100	150	Hand	Natural
George's Hill.....	3	1895	Fur. fue tubular.....	Stationary	80	100	Hand	Natural

BOILERS INSTALLED

Belmont	2	1915	Wickes water tube.....	Grieve dumping.....	500	210	Hand	Forced
George's Hill.....	¹ 2	1915	Fur. fue tubular.....	Stationary	100	100	Hand	Natural

¹ Boilers built 1905—Removed from Lardner's Point Pumping Station.

COAL PURCHASED AND CONSUMED—1915

Main Service Stations

Station	Classification	Price per ton	Purchased			Consumed		
			Tons	Cost	Total	Tons	Cost	Total
Belmont	Pea	\$3 47	2 825.95	\$9 806 04		2 825.95	\$9 806 04	
Belmont	Pea	3 48	2 975.40	10 354 39		1 664.15	5 791 04	
Belmont	Pea	3 58	18 124.30	64 884 99		18 124.30	64 884 99	
Belmont	Buckwheat	2 38	10 120.40	24 086 55		10 120.40	24 086 55	
Belmont	Buckwheat	2 42	1 451.75	3 513 24		4 630.25	11 205 20	
Belmont	Buckwheat	2 43	2 252.95	5 474 66		2 252.95	5 474 66	
Belmont	Blacksmith	4 00	1.00	4 00	\$118 13 87	1.00	4 00	\$121 252 48
Queen Lane	Buckwheat	2 15	55.40	119 11		55.40	119 11	
Queen Lane	Buckwheat	2 25	97.10	218 48		97.10	218 48	
Queen Lane	Buckwheat	2 60	22 453.15	58 378 19		22 453.15	58 378 19	
Queen Lane	Buckwheat	2 63				191.65	503 94	
Queen Lane	Buckwheat	2 68	2 784.65	7 402 86		2 784.65	7 402 86	
Queen Lane	Buckwheat	2 72	4 580.20	12 458 14		4 098.30	11 146 37	
Queen Lane	Buckwheat	3 22	92.75	298 65	78 935 44	92.75	298 66	78 127 61
Shawmont	Bituminous	2 60	18 021.1123	46 854 87		18 021.1123	46 854 87	
Shawmont	Bituminous	2 62				873.645	2 288 95	
Shawmont	Bituminous	2 87	3 040.67	8 726 72	55 581 59	2 081.2427	5 973 17	55 116 99
Lardner's Point	Bituminous	2 49	4 513.00	11 237 37		4 513.00	11 237 37	
Lardner's Point	Bituminous	2 50	688.00	1 720 00		688.00	1 720 00	
Lardner's Point	Bituminous	2 59				3 068.931	9 502 53	
Lardner's Point	Bituminous	2 64	1 177.00	3 107 28		1 177.00	3 107 28	
Lardner's Point	Bituminous	2 65	37 309.9728	98 871 43		37 309.9728	98 871 43	
Lardner's Point	Bituminous	2 67				3 281.996	8 762 93	
Lardner's Point	Bituminous	2 89	9 391.00	27 139 99		5 487.2402	15 858 12	
Lardner's Point	Bituminous	3 04	2 162.86	6 575 09	148 651 16	2 162.86	6 575 09	155 634 75
Totals and averages		2 78	144 116.0251	\$401 292 06	\$401 292 06	148 657.00	\$410 131 83	\$410 131 83

COAL PURCHASED AND CONSUMED—1915—Continued

High Service Stations

Station	Classification	Price per ton	Purchased			Consumed		
			Tons	Cost	Total	Tons	Cost	Total
George's Hill.....	Buckwheat.....	\$2 88	790.85	\$2 277 65	.....	790.85	\$2 277 65	.....
George's Hill.....	Buckwheat.....	2 95	691.80	2 040 81	.....	129.60	382 32	.....
George's Hill.....	Buckwheat.....	3 05	.....	.....	.....	37.25	113 61	.....
George's Hill.....	Buckwheat.....	3 07	.....	.....	.....	197.65	606 78	.....
George's Hill.....	Buckwheat.....	3 10	.....	.....	\$4 318 46	395.65	1 228 51	\$4 606 87
Roxborough.....	Buckwheat.....	3 01	977.35	2 941 81	.....	977.35	2 941 81	.....
Roxborough.....	Buckwheat.....	3 02	.....	.....	.....	127.30	384 44	.....
Roxborough.....	Buckwheat.....	3 09	145.65	450 06	.....	145.65	450 06	.....
Roxborough.....	Buckwheat.....	3 11	247.98	771 13	4 163 00	72.70	226 10	4 002 41
Wentz Farm.....	Buckwheat.....	2 98	1 030.45	3 070 75	.....	834.15	2 485 77	.....
Wentz Farm.....	Buckwheat.....	3 05	.....	.....	3 070 75	224.85	685 80	3 171 57
Totals and averages.....	.....	\$2 97	3 884.08	\$11 552 21	\$11 552 21	3 933.00	\$11 780 85	\$11 780 85

Low Service Stations

Roxborough.....	Buckwheat.....	\$3 01	2 058.00	\$6 194 58	.....	2 058.00	\$6 194 58	.....
Roxborough.....	Buckwheat.....	3 09	324.00	1 001 16	.....	324.00	1 001 16	.....
Roxborough.....	Buckwheat.....	3 11	552.00	1 716 72	\$8 912 46	552.00	1 716 72	\$8 912 46
Torresdale.....	Bituminous.....	2 40	20 966.00	50 318 40	.....	20 966.00	50 318 40	.....
Torresdale.....	Bituminous.....	2 49	3 424.00	8 525 76	.....	3 424.00	8 525 76	.....
Torresdale.....	Bituminous.....	2 52	.....	.....	.....	481.00	1 212 12	.....
Torresdale.....	Bituminous.....	2 53	.....	.....	.....	4 227.08	10 694 41	.....
Torresdale.....	Bituminous.....	2 81	4 233.00	11 894 73	.....	.....	.....	.....
Torresdale.....	Bituminous.....	2 89	5 084.00	14 692 76	85 431 65	284.92	823 42	71 574 11
Totals and averages.....	.....	\$2 57	36 641.00	\$94 344 11	\$94 344 11	32 317.00	\$80 486 57	\$80 486 57

COAL PURCHASED AND CONSUMED—1915—Continued

Filters

Station	Classification	Price per ton	Purchased			Consumed		
			Tons	Cost	Total	Tons	Cost	Total
Upper Roxborough...	Pea	\$4 25				33.20	\$141 10	
Upper Roxborough...	Pea	4 29	75.10	\$322 18	\$322 18	16.80	72 08	\$213 18
Lower Roxborough...	Pea	4 25				48.30	203 27	
Lower Roxborough...	Pea	4 29	98.15	421 07	421 07	24.70	106 96	311 23
Belmont	Pea	3 99	390.80	1 559 29		390.80	1 559 29	
Belmont	Pea	4 15	401.60	1 666 64		35.60	147 74	
Belmont	Pea	4 30				364.30	1 566 49	
Belmont	Buckwheat	2 88	128.40	369 79		128.40	369 79	
Belmont	Buckwheat	3 07			3 505 72	250.00	767 50	4 410 81
Queen Lane	Pea	4 11	254.65	1 046 61		197.95	813 57	
Queen Lane	Pea	4 15	50.00	207 50		50.00	207 50	
Queen Lane	Pea	4 20	338.85	1 423 17		338.85	1 423 17	
Queen Lane	Buckwheat	2 85	715.65	2 039 60		715.65	2 039 60	
Queen Lane	Buckwheat	2 93	26.10	76 47		26.10	76 47	
Queen Lane	Buckwheat	3 05			4 793 35	257.45	785 22	5 345 53
Torresdale	Stove	7 15	68.30	488 32		68.30	488 32	
		2 60				760.00	1 976 00	
		2 89			488 32	6 091.00	10 638 09	13 102 41
Totals and averages		\$3 77	2 547.60	\$9 620 64	\$9 620 64	7 387.40	\$23 383 16	\$23 383 16
Grand totals.....			187 189.3051	\$516 809 02	\$516 809 02	192 204.40	\$525 782 41	\$525 782 41
Increase			6 552.7951	\$13 477 44	\$13 477 44	12 004.40	\$17 135 32	\$17 135 32

COAL PURCHASED AND CONSUMED—1915—Continued

Miscellaneous

Station	Classification	Price per ton	Purchased			Consumed		
			Tons	Cost	Total	Tons	Cost	Total
Spring Garden.....	Pea	\$3 48	256.80	\$393 67	.....	88.80	\$319 02	.....
Spring Garden.....	Pea	3 68				64.20	236 26	
Spring Garden.....	Pea	3 70	105.95	392 02	\$1 285 69	105.95	392 02	\$1 285 69
Mt. Airy.....	Stove	7 15	5.00	35 75	.....	5.00	35 75	.....
Mt. Airy.....	Pea	4 79	50.50	241 90	277 65	50.50	241 90	277 65
Mingo Creek.....	Pea	4 48	400.00	1 792 00	.....	400.00	1 792 00	.....
Mingo Creek.....	Pea	4 63	107.75	498 88	.....	107.75	498 88	.....
Mingo Creek.....	Pea	4 69	100.00	469 00	.....	100.00	469 00	.....
Mingo Creek.....	Pea	4 74	77.36	366 72	3 126 60	77.36	366 72	3 126 60
Fairhill High-Pressure	Pea	4 40	60.00	264 00	264 00	60.00	264 00	264 00
Race High-Pressure...	Pea	4 40	25.00	110 00	110 00	25.00	110 00	110 00
Repair Shop.....	Pea	4 40	410.133	1 807 13	.....	410.133	1 807 13	.....
Repair Shop.....	Bituminous	4 00	8.00	32 00	.....	8.00	32 00	.....
Repair Shop.....	Blacksmith	4 00	34.88	139 50	1 978 63	34.88	139 50	1 978 63
918 Cherry Street....	Nut	6 60	14.00	92 40	92 40	14.00	92 40	92 40
Oak Lane Res.....	Nut	6 90	2.00	13 80	13 80	2.00	13 80	13 80
East Park Res.....	Pea	4 40	3.00	13 20	13 20	3.00	13 20	13 20
Corinthian Res.....	Pea	4 40	3.00	13 20	13 20	3.00	13 20	13 20
First District.....	Nut	6 60	6.00	39 60	.....	6.00	39 60	.....
First District.....	Stove	6 45	12.00	77 40	117 00	12.00	77 40	117 00
Third District.....	Stove	6 45	21.00	135 45	.....	21.00	135 45	.....
Third District.....	Blacksmith	4 00	6.00	24 00	159 45	6.00	24 00	159 45
Fourth District.....	Blacksmith	4 00	2.80	11 57	.....	2.80	11 56	.....
Fourth District.....	Stove	6 45	26.00	167 70	.....	26.00	167 70	.....
Fourth District.....	Pea	4 40	4.00	17 60	196 86	4.00	17 60	196 86
Fifth District.....	Nut	7 20	7.00	50 40	.....	7.00	50 40	.....
Fifth District.....	Stove	7 20	7.00	50 40	100 80	7.00	50 40	100 80
Sixth District.....	Stove	6 69	22.00	153 78	.....	22.00	153 78	.....
Sixth District.....	Blacksmith	4 50	5.00	22 50	176 28	5.00	22 50	176 28
Seventh District.....	Nut	6 60	15.00	99 00	99 00	15.00	99 00	99 00
.....	.....	\$4 58	1 751.553	\$8 024 57	\$8 024 57	1 751.553	\$8 024 57	\$8 024 57

ANNUAL PUMPAGE, COAL, LUBRICANTS, ETC., 1915

Stations	Pumpage				Coal		Lubricants		
	Total million Gallons	Average daily million gals.	Million gallons raised 100 feet per lb. of coal	Mean head feet	Total tons	Average daily tons	Grease pounds	Engine oil gallons	Cylinder oil gallons
Belmont	15 449	42	1.4	283	39 618	108	7 432	6 185	6 000
Queen Lane.....	18 205	50	2.0	271	29 773	81	7 441	2 906	3 805
Shawmont	8 441	23	1.9	400	20 976	57	2 316	3 905	4 787
Lardner's Point.....	66 750	183	2.8	212	58 285	160	5 012	15 488	10 593
George's Hill.....	1 081	3	1.1	136	1 551	4	510	143	636
Roxborough High.....	1 122	3	1.2	118	1 323	4	416	185	436
Wentz Farm.....	574	2	.9	138	1 059	3	5	564	367
Roxborough Low.....	4 275	11	.3	17	2 934	8	32	546	533
Torresdale	70 050	192	1.3	42	28 192	77	311	3 621	2 498
Totals and averages.....	185 897	509	2.0	163	183 711	502	23 475	33 543	30 264

COAL CONSUMED FOR PUMPAGE

Stations	Coal—Tons		Pumpage—M. gallons	
	Increase	Decrease	Increase	Decrease
Belmont	7583		332	
Queen Lane.....		196	313	
Shawmont		1207		417
Lardner's Point.....	3468			128
Totals	9648		100	

High Service Stations

George's Hill.....		92		58
Roxborough		200		195
Wentz Farm.....		192		158
Totals		484		411

Low Service Stations

Roxborough		179		399
Torresdale	3419			128
Totals	3240			527
Grand totals.....	12 404			838

OPERATION COST

A

Station	Pumpage, million gallons	Average lift	Engines	Boilers	Buildings	Grounds	Totals	Average cost per M. G. 100 ft. H.
Belmont	15 449	289	\$26 397 50	\$167 633 09	\$9 236 11	\$1 907 15	\$205 284 51	\$4 36
Queen Lane	18 205	271	21 536 08	112 317 87	9 129 97	391 14	143 375 06	2 90
Shawmont	8 441	400	27 442 06	85 724 89	7 037 51	849 32	121 053 78	3 56
Lardner's Point No. 2.....	32 692	184	23 810 12	103 069 30	10 293 95	701 47	137 874 84	2 28
Lardner's Point No. 3.....	34 057	238	20 615 50	104 794 22	8 772 20	775 52	134 957 44	1 65
Torresdale	70 050	42	26 168 81	101 023 47	11 299 99	795 82	139 288 00	4 73
George's Hill	1 032	136	6 522 58	7 952 58	1 729 43	21 24	16 225 83	11 66
Roxborough High Service.....	1 122	118	5 799 84	8 414 93	1 914 20	7 45	16 136 42	12 21
Roxborough Low Service.....	4 275	17	5 810 16	10 946 24	011 46	60 00	17 427 86	24 30
Wentz Farm	574	138	4 727 52	7 183 41	1 676 96	33 29	13 621 18	17 02
Totals and averages....	185 897	183	\$169 830 23	\$709 090 60	\$61 701 78	\$5 632 40	\$945 245 01	\$8 47

OPERATION COST

B

Station	Pumpage, million gallons	Average lift	Labor	Coal	Oils, grease and waste	Packing, rubber valves, etc.	Sundries	Totals	Average cost per M. G. 100 ft. H.
Belmont	15 449	289	\$70 454 81	\$121 252 48	\$2 482 19	\$3 524 19	\$7 570 84	\$205 284 51	\$4 36
Queen Lane.....	18 205	271	54 931 32	78 127 61	1 694 82	3 709 71	4 851 60	143 375 06	2 90
Shawmont	8 441	400	55 143 64	55 116 99	1 278 01	3 740 64	5 774 47	121 053 78	3 56
Lardner's Point No. 2	32 692	184	53 230 73	78 222 54	2 001 51	1 074 16	3 345 90	137 874 84	2 28
Lardner's Point No. 3	34 057	238	47 948 20	77 412 21	2 001 51	1 074 16	6 521 36	134 957 44	1 65
Torresdale	70 050	42	65 191 75	71 574 11	1 602 44	793 66	126 13	139 288 09	4 73
George's Hill	1 032	136	10 545 09	4 606 87	210 60	190 41	672 86	16 225 83	11 66
Roxborough High....	1 122	118	11 567 14	4 002 41	157 60	154 64	254 63	16 136 42	12 21
Roxborough Low.....	4 275	17	9 263 26	7 912 46	211 91	40 23	.....	17 427 86	24 30
Wentz Farm	574	138	9 996 06	3 171 57	125 02	199 32	129 21	13 621 18	17 02
Totals and averages	185 897	183	\$388 272 00	\$501 390 25	\$11 765 04	\$14 561 12	\$29 247 00	\$945 245 01	\$8 47

MAINTENANCE COST

A

Station	Pumpage, million gallons	Average lift	Engines	Bollers	Buildings	Grounds	Totals	Average cost per M. G. 100 ft. H.
Belmont	15 440	289	\$10 894 82	\$5 608 30	\$1 226 24	\$149 07	\$17 878 43	\$0 39
Queen Lane	18 205	271	13 572 87	9 832 32	3 157 68	885 74	27 448 61	55
Shawmont	8 441	400	12 571 08	4 113 34	1 446 60	123 54	18 254 56	53
Lardner's Point No. 2.....	32 692	184	6 606 48	6 572 12	2 347 59	1 166 07	16 692 26	27
Lardner's Point No. 3.....	34 057	238	5 484 79	13 144 76	2 510 10	604 60	21 744 25	26
Torresdale	70 050	42	13 777 34	8 855 48	2 815 83	550 63	25 999 28	88
George's Hill	1 032	136	461 41	5 014 45	1 729 43	1 86	7 207 15	5 18
Roxborough High	1 122	118	1 086 84	834 92	215 63	3 60	2 140 99	1 62
Roxborough Low	4 275	17	1 376 85	11 93	42 06	.....	1 430 84	1 99
Wentz Farm	574	138	853 60	356 07	1 231 24	78 78	2 519 69	3 15
Totals and averages....	185 807	183	\$66 686 08	\$54 343 69	\$16 722 40	\$3 563 89	\$141 316 06	\$1 48

MAINTENANCE COST

B

Station	Pumpage, million gallons	Average lift	Labor	Sundries	Totals	Average cost per M. G. 100 ft. H.
Belmont	15 449	289	\$14 332 80	\$3 545 63	\$17 878 43	\$0 39
Queen Lane	18 205	271	20 186 46	7 262 15	27 448 61	55
Shawmont	8 441	400	14 151 81	4 102 75	18 254 56	53
Lardner's Point No. 2.....	32 692	184	13 394 26	3 298 00	16 692 26	27
Lardner's Point No. 3.....	34 057	238	17 070 40	4 673 85	21 744 25	26
Torresdale	70 070	42	21 078 23	4 921 05	25 999 28	88
George's Hill	1 032	136	6 055 47	1 151 68	7 207 15	5 18
Roxborough High	1 122	118	1 242 52	898 47	2 140 99	1 62
Roxborough Low	4 275	17	650 54	780 30	1 430 84	1 99
Wentz Farm	574	138	2 131 66	388 03	2 519 68	3 15
Totals and averages.....	185 897	183	\$110 294 15	\$31 021 91	\$141 316 06	\$1 48

VOLUME AND COST OF MAIN STATION PUMPAGE FOR THE YEARS
1905 TO 1915 INCLUSIVE

Years	Number of gallons pumped	Number of gallons pumped 100 feet high	Cost per million gallons pumped 100 feet high	Gallons pumped per capita, per day	Popula- tion, estimated
1905.....	119 483 641 811	257 447 392 820	\$4 93	227.7	1 437 730
1906.....	116 732 205 859	253 264 725 406	4 42	217.8	1 468 411
1907.....	110 406 858 007	238 268 054 129	4 86	201.7	1 499 747
1908.....	117 885 062 022	256 334 927 765	5 44	210.2	1 531 752
1909.....	111 129 767 510	277 020 429 051	4 12	196.2	1 552 000
1910.....	114 938 585 836	284 227 631 428	3 92	203.2	1 549 000
1911.....	116 076 669 254	285 932 295 175	3 65	201.6	1 577 000
1912.....	116 570 226 260	296 213 419 687	3 30	198.3	1 606 000
1913.....	109 176 822 180	274 908 269 779	3 13	182.8	1 635 000
1914.....	108 144 052 330	269 802 307 607	3 28	179.4	1 660 000
1915.....	108 844 874 602	269 712 460 533	3 13	176.4	1 690 000

¹ United States census.

Meters used at Belmont, Queen Lane and Roxborough.

VOLUME AND COST OF HIGH SERVICE PUMPAGE FOR THE YEARS
1905 TO 1915 INCLUSIVE

Years	Number of gallons pumped	Number of gallons pumped 100 feet high	Cost per million gallons pumped 100 feet high
1905.....	2 231 646 920	2 847 970 028	\$18 04
1906.....	2 195 711 849	2 821 442 386	25 58
1907.....	2 681 156 615	3 307 403 147	18 88
1908.....	3 008 496 156	3 781 371 423	27 76
1909.....	3 202 300 942	4 017 996 696	18 74
1910.....	2 901 832 140	3 678 944 116	19 80
1911.....	2 974 246 220	3 788 556 376	18 78
1912.....	3 159 121 670	4 040 849 132	16 64
1913.....	3 021 998 830	3 802 442 062	15 67
1914.....	3 139 324 084	4 045 648 183	13 27
1915.....	2 727 607 180	3 511 286 313	16 47

VOLUME AND COST OF LOW SERVICE PUMPAGE FOR THE YEARS
1905 TO 1915 INCLUSIVE

Years	Number of gallons pumped	Number of gallons pumped 100 feet high	Cost per million gallons pumped 100 feet high
1905.....	3 652 158 445	986 082 780	\$14 95
1906.....	4 380 947 000	1 182 855 690	13 02
1907.....	112 534 198 000	2 895 132 432	17 16
1908.....	39 370 537 000	8 306 843 417	14 02
1909.....	80 171 636 350	32 865 400 640	5 27
1910.....	83 597 208 650	34 090 119 574	5 62
1911.....	82 652 948 130	33 696 370 153	5 65
1912.....	81 244 929 400	33 156 588 838	5 48
1913.....	76 211 251 640	31 045 296 132	5 14
1914.....	74 852 122 010	30 288 698 537	5 83
1915.....	74 324 641 800	30 138 207 029	6 11

¹ Meters used at Belmont, Queen Lane and Roxborough.

² United States census.

COMPARISON OF PUMPAGE FOR 1914 AND 1915

	Gallons			
	1914	1915	Increase	Decrease
Annual pumpage from rivers	108 847 754 425	106 844 874 602	.....	2 879 823
Average daily pumpage from rivers.....	298 213 025	298 205 136	.....	7 889
Pumpage per capita per day	179.4	176.4	.....	3.0
Maximum daily pumpage from rivers during month of greatest consumption.	337 057 170	220 945 020	.....	7 112 150
Pumpage per capita during month of greatest consumption	188.5	188.9	.4	.....
Total supplementary pumpage at high service stations	7 813 292 084	7 002 289 180	.....	811 002 904
Torresdale station low service pumpage from Delaware River	70 178 154 010	70 049 959 800	.....	128 194 210

¹Meters at Roxborough, Belmont and Queen Lane stations.
Plunger displacements at other stations.

TOTAL GALLONS PUMPED AND CONSUMED DURING THE YEAR 1915

Months	Main Pumping Stations					
	Belmont (Meters)	Queen Lane (Meters)	Shawmont (Meters)	Lardner's Point	Totals	Average per day
December, 1914.....						
January, 1915.....	1 287 076 520	1 492 322 500	717 885 000	5 310 167 490	8 807 451 510	284 111 339
February	1 190 237 628	1 298 700 000	610 597 500	5 050 602 720	8 150 137 848	291 076 352
March	1 296 752 388	1 421 712 500	676 320 000	5 377 037 040	8 771 821 928	282 961 998
April	1 247 459 504	1 451 707 500	658 275 000	5 124 560 940	8 482 002 944	282 733 431
May	1 264 503 788	1 557 830 000	685 132 500	5 328 482 850	8 835 949 138	285 030 617
June	1 241 347 200	1 541 262 500	687 105 000	5 407 538 940	8 877 253 640	295 908 455
July	1 285 730 100	1 577 232 500	709 305 000	5 951 098 440	9 523 426 040	307 207 292
August	1 305 917 456	1 588 902 500	727 080 220	6 007 239 000	9 629 139 176	310 617 393
September	1 332 223 488	1 629 977 500	731 602 500	5 934 062 890	9 627 866 368	320 928 870
October	1 381 645 260	1 592 637 500	754 935 000	5 898 704 850	9 627 922 610	310 578 149
November	1 276 372 100	1 498 477 500	719 205 000	5 651 646 570	9 145 761 170	304 858 706
December	1 339 421 650	1 554 522 500	763 380 000	5 708 818 080	9 366 142 230	302 133 620
Totals	15 448 687 082	18 205 285 000	8 440 942 720	66 749 959 800	108 844 874 602	298 205 136
Increase during 1915.....	332 426 262	313 425 000	.....	.....	100 822 272	276 225
Decrease during 1915.....	.....	.....	416 834 780	128 194 210	.....	.....

TOTAL GALLONS PUMPED AND CONSUMED DURING THE YEAR 1915—Continued

Months	Consumption			High Service Stations				
	Stored in reservoirs at end of month	Totals	Average per day	George's Hill	Roxborough	Wentz Farm	Totals	Average per day
December, 1914.....	1 154 753 194	.....	.....	.....	.....	.....	.....	.....
January, 1915.....	1 131 421 353	8 830 783 351	284 863 979	82 582 100	92 769 780	49 158 210	224 510 090	7 242 261
February	1 268 802 776	8 012 756 425	286 169 872	76 937 240	80 132 800	41 482 180	198 552 220	7 091 151
March	1 279 484 396	8 761 140 308	282 617 429	78 894 220	88 701 980	44 346 000	211 942 200	6 836 845
April	1 244 889 433	8 516 597 907	283 886 597	84 118 060	93 958 540	46 414 710	224 491 310	7 483 044
May	1 282 869 426	8 797 969 145	283 805 456	87 612 420	97 609 600	49 298 630	234 520 650	7 565 182
June	1 171 971 608	8 988 151 458	299 605 048	89 012 560	95 508 940	50 917 030	235 438 530	7 847 951
July	1 196 060 148	9 499 337 500	306 430 242	91 103 680	91 278 700	48 410 900	230 793 280	7 444 945
August	1 205 826 339	9 619 372 985	310 302 354	88 641 500	89 214 600	49 600 980	227 547 080	7 340 228
September	1 220 319 587	9 613 373 120	320 445 771	89 529 140	98 860 700	50 332 820	238 722 660	7 957 422
October	1 209 548 550	9 638 693 647	310 925 601	89 172 920	101 874 100	51 276 410	242 323 430	7 816 885
November	1 311 119 476	9 044 190 244	301 473 008	87 245 280	95 530 600	47 887 940	230 663 820	7 688 794
December	1 308 180 554	9 369 072 152	302 228 134	86 723 020	96 197 860	45 180 430	228 101 910	7 358 126
Totals.....	.....	108 691 438 242	297 784 762	1 031 572 740	1 121 638 200	574 396 240	2 727 607 180	7 472 896
Increase during 1915 .....	.....	.....	.....	.....	.....	.....	.....	.....
Decrease during 1915 .....	.....	156 316 183	.....	57 819 334	195 215 100	158 682 470	411 716 904	1 127 991

TOTAL GALLONS PUMPED AND CONSUMED DURING THE YEAR 1915—Continued

Months	Low Service Stations				Total pumpage and auxiliary pumpage	Average per day	Percentage of pumpage	Total pumpage
	Roxborough	Torresdale	Totals	Average per day				
December, 1914.....								
January, 1915.....	373 688 000	5 585 167 490	5 958 855 490	192 221 145	14 990 817 090	483 574 745	8.06	14 900 817 090
February	314 629 000	5 325 602 720	5 640 231 720	201 436 847	13 988 921 788	499 604 349	7.53	13 988 921 788
March	347 865 000	5 652 037 040	5 999 902 040	193 545 227	14 983 666 168	483 344 070	8.06	14 983 666 168
April	323 028 000	5 399 560 940	5 722 588 940	190 752 965	14 429 083 194	480 969 440	7.77	14 429 083 194
May	336 658 000	5 603 482 850	5 940 140 850	191 617 447	15 010 610 638	484 213 246	8.08	15 010 610 638
June	343 672 000	5 682 538 940	6 026 210 940	200 873 698	15 138 903 110	504 630 104	8.15	15 138 903 110
July	360 318 000	6 226 098 440	6 586 416 440	212 465 046	16 340 635 760	527 117 283	8.80	16 340 635 760
August	368 011 000	6 282 239 000	6 650 250 000	214 524 193	16 506 936 256	532 481 814	8.88	16 506 936 256
September	395 612 000	6 209 062 880	6 604 674 880	220 155 820	16 471 263 908	549 042 130	8.87	16 471 263 908
October	371 546 000	6 173 704 850	6 545 250 850	211 137 124	16 415 496 890	529 532 158	8.84	16 415 496 890
November	361 116 000	5 926 646 570	6 287 762 570	209 592 096	15 664 187 560	522 139 586	8.43	15 664 187 560
December	378 539 000	5 983 818 080	6 362 357 080	205 237 325	15 956 601 220	514 729 071	8.53	15 956 601 220
Totals	4 274 682 000	70 049 959 800	74 324 641 800	203 629 156	185 897 123 582	509 307 188	100.00	185 897 123 582
Increase during 1915.....								
Decrease during 1915.....	399 286 000	128 194 210	527 480 210	1 445 151	838 374 842	2 296 917	.....	838 374 842

FILTER STATISTICS

TABLE I—OPERATING COSTS

	Upper Roxborough		Lower Roxborough		Belmont		Queen Lane		Torresdale	
	1914	1915	1914	1915	1914	1915	1914	1915	1914	1915
Prefilters			\$6 129	\$4 146	\$8 705	\$9 227	\$3 149	\$7 389	\$14 814	\$16 180
Final filters	\$14 108	\$12 905	11 062	10 470	41 722	31 413	44 282	44 433	134 153	142 935
Total cost	\$14 108	\$12 905	\$17 191	\$14 616	\$50 427	\$40 640	\$47 431	\$51 822	\$148 967	\$159 115
Million gallons filtered.....	4 674	4 274	3 364	3 219	13 884	14 596	17 948	18 161	66 612	65 756
Cost per million gallons....	\$3 02	\$3 02	\$5 10	\$4 54	\$3 62	\$2 78	\$2 65	\$2 85	\$2 23	\$2 42

TABLE II—METHODS OF OPERATION OF FINAL FILTERS FOR YEAR 1915.

Station	Total quantity filtered, million gallons	Daily average, million gallons	Average rate per acre per day, entire area	Maximum rate per acre per day for area in service	Average number cleanings per filter	Average number days in service between cleanings	Average number cleanings, by Nichols method, per filter	Average number cleanings, by Brooklyn method, per filter	Average number cleanings by ejecting per filter	Average number rakings between cleanings
Torresdale	65 756.751	180.156	3.621	4.682	4.39	77.07	3.85	0.54	.....	1.94
Queen Lane	18 160.775	49.755	3.090	3.910	1.50	219.91	1.50	.....	.....	2.30
Belmont	14 596.282	39.990	2.998	3.808	6.30	57.00	0.56	5.74	.....	0.30
Upper Roxborough	4 274.682	11.712	2.091	3.355	5.50	65.82	0.38	5.13	.....	0.09
Lower Roxborough	3 218.704	8.818	3.328	4.384	10.40	34.57	1.00	9.40	.....	0.19

TABLE III—CHEMICAL AND MICROSCOPICAL CHARACTER OF DELAWARE RIVER WATER, FOR YEAR 1915
Parts per million

Month	Chlorine	Total hardness	Permanent hardness	Alkalinity			Free CO ₂		Dissolved oxygen	Iron	Suspended matter	Oxygen consumed	Micro-organisms	
				Average	Maximum	Minimum	Average	Maximum					Add. units per c. c.	Number per c. c.
January	3.0	36	20	16	33	¹ 10	4	5	13.20	1.44	62	3.65	402	298
February	3.2	34	20	14	19	10	5	5	13.38	2.68	172	3.05	208	130
March	4.0	51	30	21	31	10	3	4	12.38	1.94	29	2.90	211	136
April	3.7	47	23	24	31	14	4	5	9.46	2.72	37	2.95	779	375
May	3.4	51	26	25	29	20	4	4	7.06	3.58	65	2.75	576	340
June	4.6	53	24	29	38	21	5	² 7	6.51	2.32	51	4.05	952	359
July	3.8	43	16	27	38	16	4	4	5.92	2.89	80	4.35	508	396
August	3.7	44	22	22	28	15	4	5	6.39	1.89	42	3.75	362	330
September	4.1	48	21	27	33	18	4	5	6.91	2.32	34	3.65	440	386
October	4.8	56	24	32	37	24	4	4	8.38	1.80	46	3.75	370	310
November	4.8	62	27	35	² 40	27	3	4	10.75	2.94	92	6.15	518	381
December	4.1	54	29	25	32	15	3	4	13.34	3.12	60	3.80	390	188
Average...	3.9	48	23	25	.....	.....	4	.....	9.46	2.47	64	3.75	476	302

AVERAGES FOR PREVIOUS YEARS

Year	Chlorine	Total hardness	Permanent hardness	Average	Maximum	Minimum	Average	Maximum	Dissolved oxygen	Iron	Suspended matter	Oxygen consumed	Add. units per c. c.	Number per c. c.
1914.....	5.1	55	24	31	.....	.....	4	.....	9.8	1.58	34	3.35	656	467
1913.....	6.0	48	20	27	.....	.....	.....	.....	.....	2.28	36	3.70	659	348

¹ Minimum for year.

² Maximum for year.

TABLE IV—CHEMICAL CHARACTER OF WATER IN EFFLUENTS FROM TORRESDALE PLANT, FOR YEAR 1915

Parts per million

Month	Chlorine	Total hardness	Permanent hardness	Alkalinity		Free CO ₂		Iron	Oxygen consumed
				Average	Minimum	Average	Maximum		
January	3.5	34	18	16	10	4	5	.17	2.05
February	3.2	31	15	16	13	5	5	.23	1.00
March	4.1	50	30	20	11	5	5	.21	1.45
April	4.0	46	22	24	18	6	7	.18	1.40
May	3.6	51	25	26	25	7	7	.10	1.65
June	4.3	53	24	29	21	7	9	.10	1.25
July	4.0	44	20	24	19	6	6	.22	1.05
August	4.0	45	22	23	17	6	7	.10	1.55
September	4.0	46	20	26	22	6	7	.11	1.80
October	4.8	57	25	32	24	4	5	.20	2.15
November	5.1	62	27	35	26	4	5	.10	1.85
December	4.2	54	29	25	15	4	5	.27	2.45
Average.....	4.1	48	23	25	¹ 10	5	² 9	.17	1.70

AVERAGES FOR PREVIOUS YEARS

Year	Chlorine	Total hardness	Permanent hardness	Average Alkalinity	Minimum Alkalinity	Average Free CO ₂	Maximum Free CO ₂	Iron	Oxygen consumed
1914.....	5.2	55	24	31	¹ 10	5	.....	.12	1.60
1915.....	6.1	48	20	28	¹ 14	.....	.....	.16	1.85

¹ Minimum.

² Maximum.

TABLE V—TURBIDITY AND COLOR OF DELAWARE RIVER WATER, FOR YEAR 1915
Parts per Million

Month	No. of test days	Mean turbidity	Median turbidity	Turbidity—Variations: No. of test days							No. of test days	Mean color	Color Variations: No. of test days				
				0 to 10	11 to 25	26 to 50	51 to 100	101 to 250	251 to 500	Above 500			0 to 10	11 to 25	26 to 50	51 to 100	Above 100
				January	31	107	40	5	7	7			2	6	3	1	4	20	0	4	0	.....	.....
February	28	65	37	0	10	6	8	3	1	0	4	15	0	4	0	.....	.....
March	31	19	18	0	26	5	0	0	0	0	5	17	0	5	0	.....	.....
April	30	30	26	0	14	13	3	0	0	0	7	12	2	5	0	.....	.....
May	31	44	38	0	9	14	7	1	0	0	20	13	5	15	0	.....	.....
June	30	52	52	0	2	11	17	0	0	0	22	17	0	22	0	.....	.....
July	31	83	74	0	0	4	22	5	0	0	12	15	0	12	0	.....	.....
August	31	70	58	0	0	15	10	6	0	0	17	21	0	15	2	.....	.....
September	30	29	24	0	17	10	3	0	0	0	10	20	0	10	0	.....	.....
October	31	31	30	0	8	22	1	0	0	0	4	23	0	4	0	.....	.....
November	30	52	46	0	2	16	12	0	0	0	5	22	0	5	0	.....	.....
December	31	42	42	0	9	13	9	0	0	0	4	20	0	4	0	.....	.....
Totals	365	.....	.....	5	104	136	94	21	4	1	114	.....	7	105	2	.....	.....
Averages	.....	52	.....	.....	.....	.....	.....	.....	.....	.....	.....	18	.....	.....	.....	.....	.....
Per cent. time	.....	.....	.....	1.4	29	37	26	5.8	1.1	0.3	.....	.....	6	92	2	.....	.....

AVERAGES FOR PREVIOUS YEARS

Year	No. of test days	Mean turbidity	Median turbidity	0 to 10	11 to 25	26 to 50	51 to 100	101 to 250	251 to 500	Above 500	No. of test days	Mean color	0 to 10	11 to 25	26 to 50	51 to 100	Above 100
1914	20	.....	1 44	1 40	1 11	1 2	1 3.	1 0.3	.....	.....	15	1 0	1 98	1 2	.....	.....
1913	20	.....	1 13	1 52	1 24	1 6	1 5.	.....	.....	.....	17	1 6	1 92	1 2	.....	.....

¹ Per cent. time.

TABLE VI—TURBIDITY OF APPLIED WATER TO FINAL FILTERS—TORRESDALE—FOR YEAR 1915
Parts per Million

Month	Turbidity								Per cent. removed
	No. of test days	Mean turbidity	Variations: No. of test days						
			0 to 10	11 to 25	26 to 50	51 to 100	101 to 200	Above 200	
January	31	76	12	5	4	4	2	4	29
February	28	39	9	6	8	2	2	1	40
March	31	6	27	4	0	0	0	0	70
April	30	8	24	5	1	0	0	0	74
May	31	12	13	16	1	1	.....	.....	73
June	30	15	7	20	3	0	.....	.....	72
July	31	30	0	17	9	4	.....	.....	64
August	31	28	4	14	8	5	.....	.....	60
September	30	9	24	3	3	0	.....	.....	70
October	31	9	22	9	0	0	.....	.....	71
November	30	18	5	19	6	0	.....	.....	65
December	31	18	9	16	6	0	.....	.....	57
Totals	365	.....	157	134	49	16	4	5	.....
Averages .....	.....	22	.....	.....	.....	.....	.....	.....	58
Per cent. time.....	.....	.....	43	37	13	4.4	1.1	1.4	.....

TABLE VII—TURBIDITY AND COLOR OF WATER IN EFFLUENTS FROM TORRESDALE PLANT, FOR YEAR 1915

Parts per Million

Month	Turbidity							Color				
	No. of test days	Mean turbidity	Median turbidity	Variations: No of test days				No. of test days	Mean color	Variations: No of test days		
				0	0.5 to 5	6 to 10	Above 10			0 to 5	6 to 10	Above 10
January	31	5.5	0.5	10	12	4	5	4	16	0	0	4
February	28	1.9	0.5	6	19	1	2	4	9	0	4	0
March	31	0	0	28	3	0	0	5	8	0	4	1
April	30	0	0	28	2	0	0	4	7	0	4	0
May	31	0	0	31	0	0	0	4	9	0	4	0
June	30	0	0	30	0	0	0	5	12	0	2	3
July	31	0	0	21	10	0	0	4	10	0	4	0
August	31	0	0	24	7	0	0	5	12	0	2	3
September	30	0	0	30	0	0	0	3	12	0	2	1
October	31	0	0	31	0	0	0	4	17	0	0	4
November	30	0	0	30	0	0	0	5	13	0	2	3
December	31	0	0	21	10	0	0	4	15	0	0	4
Totals	365	.....	.....	290	63	5	7	51	.....	.....	28	23
Averages .....	.....	0.6	.....	.....	.....	.....	.....	.....	12	.....	.....	.....
Per cent. time .....	.....	.....	.....	79	17	1.4	1.9	.....	.....	.....	55	45

TOTALS AND AVERAGES FOR PREVIOUS YEARS

Year	No. of test days	Mean turbidity	Median turbidity	0	0.5 to 5	6 to 10	Above 10	No. of test days	Mean color	0 to 5	6 to 10	Above 10
1914.....	365	0.6	.....	182	110	.....	.....	.....	10	.....	.....	.....
1913.....	365	0	.....	193	17	.....	.....	.....	.....	.....	.....	.....

¹ Per cent. time.

TABLE VIII—NUMBER OF BACTERIA IN DELAWARE RIVER WATER, FOR YEAR 1915

Month	Number of bacteria on gelatin at 20° C.									Bacillus coli									
	No. of test days	Mean per c. c.	Median per c. c.	Variations: No. of test days						No. of test days	0.01 c. c. tests			0.1 c. c. tests			1.0 c. c. tests		
				0 to 100	100 to 300	300 to 1000	1000 to 10000	10000 to 100000	Above 100000		Total No.	Total No. +	Per cent. +	Total No.	Total No. +	Per cent. +	Total No.	Total No. +	Per cent. +
January	31	34 800	22 000	0	0	0	10	20	1	12	12	0	0	12	12	100	12	12	100
February	28	10 000	8 400	0	0	0	21	7	0	11	11	0	0	11	10	91	11	11	100
March	31	10 900	9 000	0	0	0	16	15	0	15	15	0	0	15	10	67	15	14	93
April	30	9 210	6 000	0	0	1	17	12	0	12	12	0	0	12	11	92	12	12	100
May	31	6 630	4 400	0	0	2	23	6	0	12	12	2	17	12	10	83	12	12	100
June	30	4 610	3 900	0	0	1	28	1	0	14	14	4	29	14	14	100	14	14	100
July	31	8 540	8 500	0	0	0	23	8	0	11	11	1	9	11	10	91	11	11	100
August	31	5 390	3 600	0	0	0	26	5	0	14	14	1	7	14	14	100	14	14	100
September	30	3 520	2 900	0	0	0	30	0	0	12	12	1	8	12	100	12	12	100	
October	31	3 440	3 000	0	0	0	31	0	0	11	11	2	18	11	11	100	11	11	100
November	30	5 660	5 100	0	0	0	29	1	0	13	13	1	8	13	13	100	13	13	100
December	31	20 500	18 000	0	0	0	11	20	0	13	13	0	0	13	13	100	13	13	100
Totals	365	.....	.....	0	0	4	265	95	1	150	150	12	.....	150	140	.....	150	149	99.3
Averages .....	.....	10 300	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Per cent. time .....	.....	.....	.....	0	0	1	73	26	0.3	.....	.....	.....	8	.....	.....	94	.....	.....	.....

TOTALS AND AVERAGES FOR PREVIOUS YEARS

Year	No. of test days	Mean per c. c.	Median per c. c.	0 to 100	100 to 300	300 to 1000	1000 to 10000	10000 to 100000	Above 100000	No. of test days	Total No.	Total No. +	Per cent. +	Total No.	Total No. +	Per cent. +	Total No.	Total No. +	Per cent. +
1914.....	365	16 800	5 500	0	0	1 ¹	1 ⁶³	1 ³²	1 ³	154	154	24	1 ¹⁶	154	115	1 ⁷⁵	154	154	1 ¹⁰⁰
1913.....	365	7 680	.....	0	0	1 ¹	1 ⁸³	1 ¹⁶	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

¹ Per cent. time.

TABLE IX—NUMBER OF BACTERIA IN EFFLUENTS FROM TORRESDALE PLANT, FOR YEAR 1915

Month	Gelatin at 20° C.									Agar at 37½° C.								
	No. of test days	Mean per c. c.	Median per c. c.	Variations: No. of test days						No. of test days	Mean per c. c.	Median per c. c.	Variations: No. of test days					
				0 to 10	11 to 25	26 to 50	51 to 100	101 to 250	Above 250				0 to 10	11 to 25	26 to 50	51 to 100	Above 100	
January	31	160	64	0	7	7	2	8	7	31	48	41	1	5	14	10	1	
February	28	22	20	3	17	7	1	0	0	28	27	22	1	15	10	2	0	
March	31	8	8	24	7	0	0	0	0	31	11	9	17	14	0	0	0	
April	30	6	5	28	2	0	0	0	0	30	8	6	26	4	0	0	0	
May	31	5	5	29	2	0	0	0	0	31	5	5	30	1	0	0	0	
June	30	4	3	30	0	0	0	0	0	30	7	4	27	2	0	1	0	
July	30	7	6	25	5	0	0	0	0	29	9	7	20	7	2	0	0	
August	31	7	5	28	2	0	1	0	0	31	12	8	22	6	2	1	0	
September	30	5	4	29	1	0	0	0	0	29	11	7	23	3	1	2	0	
October	31	6	5	30	1	0	0	0	0	30	7	5	24	6	0	0	0	
November	30	4	3	30	0	0	0	0	0	30	5	4	27	3	0	0	0	
December	31	100	32	7	8	3	5	5	3	31	14	9	17	9	5	0	0	
Totals	364	.....	.....	263	52	17	9	13	10	361	.....	.....	235	75	34	16	1
Averages .....	.....	28	.....	.....	.....	.....	.....	.....	.....	.....	14	.....	.....	.....	.....	.....	.....
Per cent. time .....	.....	.....	.....	72	14	4.7	2.5	3.6	2.7	.....	.....	.....	65	21	9.4	4.4	0.3

TOTALS AND AVERAGES FOR PREVIOUS YEARS

Year	No. of test days	Mean per c. c.	Median per c. c.	0 to 10	11 to 25	26 to 50	51 to 100	101 to 250	Above 250	No. of test days	Mean per c. c.	Median per c. c.	0 to 10	11 to 25	26 to 50	51 to 100	Above 100
1914.....	364	51	.....	164	115	16	14	16	15	.....	12	.....	163	128	16	13	.....
1913.....	365	13	.....	177	119	.....	12.2	11.4	10.3	.....	.....	.....	.....	.....	.....	.....	.....

¹ Per cent. time.

TABLE X—COMPARISON BETWEEN BACTERIAL COUNTS ON GELATIN AND AGAR, TORRESDALE, FOR YEAR 1915

Month	Average temperature degrees Fahr.	Bacteria per cubic centimeter					
		Delaware River		¹ Effluent of filters		² Filtered water basin	
		Gelatin	Agar	Gelatin	Agar	Gelatin	Agar
January	36	34 800	1 520	700	76	160	48
February	40	10 000	1 200	257	40	22	27
March	38	10 900	242	86	17	8	11
April	49	9 210	534	38	15	6	8
May	61	6 630	1 690	12	10	5	5
June	71	4 610	3 280	14	14	4	7
July	76	8 540	8 630	31	47	7	9
August	77	5 390	5 170	16	24	7	12
September	76	3 520	5 330	12	22	5	11
October	63	3 440	3 100	24	25	6	7
November	47	5 660	2 010	56	24	4	5
December	36	20 500	1 060	446	47	100	14
Averages	56	10 300	2 810	141	30	28	14

¹ Untreated.² Treated with liquid chlorine.

Gelatin 48 hours at 20° C.

Agar 24 hours at 37½° C.

TABLE XI—BACTERIA RESEMBLING B. COLI COMMUNIS IN EFFLUENTS FROM TORRESDALE PLANT,¹ FOR YEAR 1915

Month	Bacillus Coli						
	No. of test days	One c. c. tests			Ten c. c. tests		
		Total number	Number +	Per cent. +	Total number	Number +	Per cent. +
January	31	31	0	0	31	0	0
February	28	28	0	0	28	2	7
March	31	31	0	0	31	0	0
April	30	30	0	0	30	0	0
May	31	31	0	0	31	1	3
June	30	30	0	0	30	0	0
July	29	29	0	0	29	2	7
August	31	31	0	0	31	1	3
September	30	30	1	3	30	6	20
October	30	30	0	0	30	3	10
November	30	30	0	0	30	0	0
December	31	31	0	0	31	3	10
Totals	362	362	1	.....	362	18	.....
Average .....	.....	.....	.....	.....	.....	.....	.....
Per cent. time...	.....	.....	.....	0.3	.....	.....	5

TOTALS AND AVERAGES FOR PREVIOUS YEARS

Year							
1914.....	365	365	2	² 0.5	365	31	² 8.5
1913.....	365	365	5	² 1.4	365	31	² 8.5

¹ Disinfected.

² Per cent.

Effluent of final filters (before treatment) 363 tests, 1 c. c. + in 88 tests = 24 per cent.

Effluent of final filters (before treatment) 363 tests, 10 c. c. + in 238 tests = 66 per cent.

TABLE XII—CHEMICAL CHARACTER OF SCHUYLKILL RIVER WATER, FOR YEAR 1915
Intake at Belmont Pumping Station. Parts per Million.

Month	Chlorine	Total hardness	Permanent hardness	Alkalinity			Iron	Suspended matter	Total solids	Oxygen consumed
				Average	Maximum	Minimum				
January	4.2	77	53	24	37	16	3.56	83	203	4.06
February	4.0	83	55	28	32	23	1.98	47	195	2.21
March	4.6	90	56	34	42	24	.82	14	152	1.41
April	5.5	105	56	49	52	46	.88	12	172	2.05
May	5.1	98	50	48	55	38	3.03	61	222	3.19
June	6.6	106	56	50	54	44	.68	12	186	2.20
July	6.5	107	61	46	57	41	1.29	26	208	2.50
August	4.3	80	56	33	44	25	3.38	89	248	3.40
September	5.6	109	69	40	46	32	.58	11	198	1.69
October	6.4	119	69	50	54	48	.70	9	217	1.71
November	7.0	114	65	49	58	37	.78	11	208	2.23
December	5.6	96	60	36	48	21	2.46	50	212	3.28
Averages	5.4	99	59	41	48	33	1.68	35	202	2.50

TABLE XIII—CHEMICAL CHARACTER OF WATER IN EFFLUENTS FROM SCHUYLKILL PLANTS, FOR YEAR 1915

Parts per Million

Month	Lower Roxborough Filters		Upper Roxborough Filters Auxiliary Pumping Station		Belmont Filters		Queen Lane Filters	
	Oxygen consumed	Total solids	Oxygen consumed	Total solids	Oxygen consumed	Total solids	Oxygen consumed	Total solids
January	1.10	125	.98	129	.68	106	1.10	120
February .....	.50	130	.68	102	.55	102	.80	109
March .....	.57	130	.57	125	.45	136	.68	132
April .....	.68	158	.68	154	.85	158	.85	152
May .....	.90	160	.62	168	.68	170	.75	163
June .....	.72	174	.72	160	.72	171	.90	169
July	1.00	182	.78	191	.98	192	1.08	186
August	1.00	167	.97	153	1.05	132	1.22	136
September .....	.80	182	.62	176	.65	186	.68	181
October .....	.52	210	.52	198	.62	195	.70	190
November .....	.82	196	.72	208	.85	195	.93	196
December .....	.72	178	.68	186	.78	154	1.02	160
Averages	0.78	166	0.71	162	0.74	158	.89	158

Analyses made once in two weeks—Lower Roxborough—Upper Roxborough and Belmont—Queen Lane, alternating.

TABLE XIV—TURBIDITY AND COLOR OF SCHUYLKILL RIVER WATER, FOR YEAR 1915
Parts per Million

Month	Turbidity										Color				
	No. of test days	Mean turbidity	Variations: No of test days								No. of test days	Mean color	Variations: No. of test days		
			0 to 10	11 to 25	26 to 50	51 to 100	101 to 500	501 to 1000	1001 to 1500	1501 to 2000			0 to 10	11 to 20	21 to 50
January	31	260	.....	1	10	7	10	.....	2	1	4	7	3	1	.....
February	28	120	.....	8	5	4	10	1	.....	.....	4	5	4	.....	.....
March	31	15	3	26	2	.....	.....	.....	.....	.....	5	6	5	.....	.....
April	29	26	3	19	5	1	1	.....	.....	.....	4	11	3	1	.....
May	31	43	6	22	1	.....	1	1	.....	.....	5	16	2	2	1
June	30	17	2	26	1	1	.....	.....	.....	.....	4	10	4	.....	.....
July	31	64	2	7	9	9	4	.....	.....	.....	4	15	1	3	.....
August	31	89	.....	8	11	4	8	.....	.....	.....	5	14	3	1	1
September	30	15	10	18	2	.....	.....	.....	.....	.....	4	8	4	.....	.....
October	31	15	13	16	1	.....	1	.....	.....	.....	4	10	4	.....	.....
November	30	15	17	9	3	1	.....	.....	.....	.....	5	12	4	1	.....
December	31	56	9	10	3	3	6	.....	.....	.....	4	11	3	1	.....
Totals	364	.....	65	170	53	30	41	2	2	1	52 ⁸	.....	40	10	2
Per cent. time.....	.....	.....	18	47	15	8	11	1	1	0.3	.....	.....	.....	.....	.....

TABLE XV—TURBIDITY OF WATER IN EFFLUENTS FROM SCHUYLKILL PLANTS, FOR YEAR 1915
Parts per Million

Month	Lower Roxborough					Upper Roxborough Auxiliary Pumping Station					Belmont					Queen Lane						
	No. of test days	Mean turbidity	Variations: No. of test days			No. of test days	Mean turbidity	Variations: No. of test days			No. of test days	Mean turbidity	Variations: No. of test days			No. of test days	Mean turbidity	Variations: No. of test days				
			0+	0.5-5	Above 5			0+	0.5-5	Above 5			0+	0.5-5	Above 5			0+	0.5-5	Above 5		
January	31	0+	28	3	.....	31	0+	21	10	.....	31	0+	20	11	.....	31	1	.....	31	.....	31	.....
February	28	0+	28	.....	.....	28	0+	28	.....	.....	28	0+	28	.....	.....	28	0+	15	13	.....	.....	.....
March	31	0+	31	.....	.....	31	0+	31	.....	.....	31	0+	31	.....	.....	31	0+	31	.....	.....	.....	.....
April	30	0+	30	.....	.....	30	0+	30	.....	.....	30	0+	30	.....	.....	30	0+	30	.....	.....	.....	.....
May	31	0+	31	.....	.....	31	0+	31	.....	.....	31	0+	31	.....	.....	31	0+	31	.....	.....	.....	.....
June	30	0+	30	.....	.....	30	0+	30	.....	.....	30	0+	30	.....	.....	30	0+	30	.....	.....	.....	.....
July	31	0+	31	.....	.....	31	0+	31	.....	.....	31	0+	31	.....	.....	31	0+	31	.....	.....	.....	.....
August	31	0+	31	.....	.....	31	0+	31	.....	.....	31	0+	31	.....	.....	31	0+	31	.....	.....	.....	.....
September	30	0+	30	.....	.....	30	0+	30	.....	.....	30	0+	30	.....	.....	30	0+	30	.....	.....	.....	.....
October	31	0+	31	.....	.....	31	0+	31	.....	.....	31	0+	31	.....	.....	31	0+	31	.....	.....	.....	.....
November	30	0+	30	.....	.....	30	0+	30	.....	.....	30	0+	30	.....	.....	30	0+	30	.....	.....	.....	.....
December	31	0+	30	1	.....	31	0+	31	.....	.....	31	0+	28	3	.....	31	0.5	23	8	.....	.....	.....
Totals	365	.....	361	4	.....	365	.....	355	10	.....	365	.....	351	14	.....	365	.....	313	52	.....	.....	.....
Per cent. time...	.....	.....	99	1	.....	.....	.....	97	3	.....	.....	.....	96	4	.....	.....	.....	86	14	.....	.....	.....

TABLE XVI—NUMBER OF BACTERIA IN SCHUYLKILL RIVER WATER, FOR YEAR 1915
Intake at Belmont Pumping Station

Month	Number of bacteria on gelatin at 20° C.									Bacteria resembling B. Coli Communis						
	No. of test days	Mean per c. c.	Median per c. c.	Variations: No. of test days						0.1 c. c. tests			1.0 c. c. tests			
				0 to 100	100 to 500	500 to 1000	1000 to 10000	10000 to 100000	100000 to 500000	Above 500000	Total No.	No. +	Per cent. +	Total No.	No. +	Per cent. +
January	31	20 000	8 300	.....	.....	.....	17	13	1	.....	31	21	70	31	28	90
February	28	9 900	5 200	.....	.....	.....	22	6	.....	.....	28	18	64	28	28	100
March	31	9 100	7 400	.....	.....	.....	20	11	.....	.....	31	16	52	31	30	97
April	30	15 000	12 000	.....	.....	.....	10	20	.....	.....	30	19	63	30	30	100
May	31	15 000	12 000	.....	.....	.....	12	19	.....	.....	31	28	90	30	30	100
June	30	12 000	4 800	.....	.....	.....	22	8	.....	.....	30	14	47	30	27	90
July	31	10 000	8 000	.....	.....	1	19	11	.....	.....	31	28	90	31	30	97
August	31	27 000	16 000	.....	.....	.....	7	24	.....	.....	31	26	84	31	30	97
September	30	8 500	6 700	.....	.....	.....	20	10	.....	.....	30	23	77	30	28	93
October	31	44 000	36 000	.....	.....	.....	4	25	2	.....	31	24	77	31	29	94
November	30	27 000	22 000	.....	.....	.....	.....	26	4	.....	30	20	67	30	29	97
December	31	44 000	39 000	.....	.....	.....	.....	31	.....	.....	31	21	70	31	30	97
Totals	365	.....	.....	.....	.....	1	153	204	7	.....	365	258	.....	364	349	.....
Averages .....	.....	20 000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Per cent. time..	.....	.....	.....	.....	.....	0.3	42	56	2	.....	.....	71	.....	.....	96	.....

TABLE XVII—NUMBER OF BACTERIA IN EFFLUENTS FROM SCHUYLKILL PLANTS, FOR THE YEAR 1915.

Month	Gelatin at 10° C.																		
	Lower Roxborough					Upper Roxborough Auxiliary Pumping Station													
	No. of test days	Mean per c. c.	Median per c. c.	Variations: No. of test days					No. of test days	Mean per c. c.	Median per c. c.	Variations: No. of test days							
				0 to 10	11 to 50	51 to 100	101 to 500	Above 500				0 to 10	11 to 50	51 to 100	101 to 500	Above 500			
January	31	21	13	10	20	.....	1	.....	31	7	5	26	5	.....	.....	.....	.....	.....	.....
February	27	5	4	26	1	.....	.....	.....	28	3	2	28	.....	.....	.....	.....	.....	.....	.....
March	31	3	2	31	.....	.....	.....	.....	31	2	2	31	.....	.....	.....	.....	.....	.....	.....
April	30	2	2	30	.....	.....	.....	.....	30	1	1	30	.....	.....	.....	.....	.....	.....	.....
May	31	3	2	31	.....	.....	.....	.....	31	1	1	31	.....	.....	.....	.....	.....	.....	.....
June	30	3	3	30	.....	.....	.....	.....	30	1	1	30	.....	.....	.....	.....	.....	.....	.....
July	28	3	2	27	1	.....	.....	.....	31	2	2	31	.....	.....	.....	.....	.....	.....	.....
August	28	4	2	27	1	.....	.....	.....	31	2	1	31	.....	.....	.....	.....	.....	.....	.....
September	29	2	1	29	.....	.....	.....	.....	30	1	1	30	.....	.....	.....	.....	.....	.....	.....
October	30	1	1	30	.....	.....	.....	.....	31	1	1	31	.....	.....	.....	.....	.....	.....	.....
November	30	2	2	30	.....	.....	.....	.....	30	1	1	30	.....	.....	.....	.....	.....	.....	.....
December	31	130	120	6	2	5	18	.....	31	11	6	19	12	.....	.....	.....	.....	.....	.....
Totals	356	.....	.....	307	25	5	19	.....	365	.....	.....	348	17	.....	.....	.....	.....	.....	.....
Averages	.....	15	.....	.....	.....	.....	.....	.....	.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....
Per cent. time	.....	.....	.....	86	7	1.4	5	.....	.....	.....	.....	95	5	.....	.....	.....	.....	.....	.....

TABLE XVIII—NUMBER OF BACTERIA IN EFFLUENTS FROM SCHUYLKILL PLANTS, FOR THE YEAR 1915.

Month	Gelatin at 20° C.															
	Belmont								Queen Lane							
	No. of test days	Mean per c. c.	Median per c. c.	Variations: No. of test days					No. of test days	Mean per c. c.	Median per c. c.	Variations: No. of test days				
				0 to 10	11 to 50	51 to 100	101 to 500	Above 500				0 to 10	11 to 50	51 to 100	101 to 500	Above 500
January	31	11	8	21	10				31	98	58		14	12	4	1
February	28	4	4	27	1				28	10	8	19	9			
March	31	2	2	31					31	4	4	31				
April	30	2	2	30					30	3	2	29	1			
May	31	2	2	31					31	6	4	28	3			
June	30	2	2	30					30	4	3	29	1			
July	31	2	2	31					31	3	2	29	2			
August	29	2	2	29					31	2	2	31				
September	30	1	1	30					30	2	1	29	1			
October	31	1	1	31					31	2	1	31				
November	30	2	1	30					30	17	4	22	4	2	2	
December	31	240	160	5	4	5	12	5	31	400	260	5	7		10	9
Totals	363			326	15	5	12	5	365			283	42	14	16	10
Averages		23								46						
Per cent. time.....				90	4	1.4	3	1.4				78	12	4	4	3

TABLE XIX—BACTERIA RESEMBLING B. OOII COMMUNIS IN EFFLUENTS FROM SCHUYLKILL PLANTS, FOR THE YEAR 1915

Month	Lower Roxborough						Upper Roxborough Filters Auxiliary Pumping Station					
	No. of days test	One c. c. tests		No. of test days	Ten c. c. tests		No. of test days	One c. c. tests		No. of test days	Ten c. c. tests	
		Total number	Per cent. +		Total number	Per cent. +		Total number	Per cent. +		Total number	Per cent. +
January	31	1	3	31	7	23	31	0	0	31	3	10
February	28	0	0	28	0	0	28	0	0	28	2	7
March	31	0	0	31	1	3	31	0	0	31	0	0
April	30	0	0	30	0	0	30	0	0	30	0	0
May	31	0	0	31	1	3	31	1	3	31	0	0
June	30	2	7	30	1	3	30	0	0	30	0	0
July	31	0	0	31	1	3	31	0	0	31	1	3
August	31	1	3	31	4	13	31	0	0	31	0	0
September	30	0	0	30	0	0	30	0	0	30	0	0
October	31	0	0	31	0	0	31	0	0	31	0	0
November	30	0	0	30	1	3	30	0	0	30	0	0
December	31	1	3	31	3	10	31	0	0	31	0	0
Totals	365	5	.....	365	19	.....	365	1	.....	365	6	.....
Per cent. time .....	.....	.....	1.4	.....	.....	5.2	.....	.....	0.3	.....	.....	1.6

TABLE XX—BACTERIA RESEMBLING B. COLI COMMUNIS IN EFFLUENTS FROM SCHUYLKILL PLANTS, FOR YEAR 1915

Month	Belmont Filters						Queen Lane Filters										
	No. of test days	One c. c. tests		No. of test days	Ten c. c. tests		No. of test days	One c. c. tests				No. of test days	Ten c. c. tests				
		Total number	Per cent. +		Total number	Per cent. +		Total number		Per cent. +			Total number	Per cent. +	Total number	Per cent. +	
								N. Basin	S. Basin	N. Basin	S. Basin						N. Basin
January	31	0	0	31	0	0	31	0	2	0	6	31	7	1	23	3	
February	28	0	0	28	0	0	28	0	1	0	4	28	2	2	7	7	
March	31	0	0	31	0	0	31	0	0	0	0	31	3	1	10	3	
April	30	0	0	30	0	0	30	1	0	3	0	30	1	1	3	3	
May	31	1	3	31	1	3	31	0	1	0	3	31	2	1	6	3	
June	30	0	0	30	0	0	30	1	0	3	0	30	2	0	7	0	
July	31	0	0	31	0	0	31	1	0	3	0	31	4	3	13	10	
August	31	0	0	31	0	0	31	1	0	3	0	31	4	3	13	10	
September	30	0	0	30	1	3	30	0	0	0	0	30	0	0	0	0	
October	31	0	0	31	0	0	31	0	0	0	0	31	2	3	7	10	
November	30	0	0	30	0	0	30	0	1	0	3	30	2	3	7	10	
December	31	1	3	31	3	10	31	0	0	0	0	31	1	5	3	16	
Totals	365	2	.....	365	5	.....	365	4	5	.....	.....	365	30	23	.....	.....
Per cent. time.....	0.5	1.4	8.2	6.3

DISTRIBUTION

TOTAL FEET OF PIPE IN USE DECEMBER 31, 1915

Size in inches	Total in use Dec. 31, 1914	Extensions and relays during 1915			Deductions during 1915			Total in use Dec. 31, 1915
		Laid	Relaid	Total	Taken up	Abandoned	Total	
1	175							175
1½	3 566							3 566
2	3 655							3 655
3	77 905	421	53	474	43	41	84	78 295
4	154 044	281		281	173	1149	1322	153 003
6	6 037 626	70 255	232	70 487	2130	5294	7424	6 100 689
8	604 101	88 271	1848	90 119	47		47	694 173
10	595 737	18 865	727	19 592	32	50	82	615 247
12	617 647	23 756	230	23 986		107	107	641 526
16	201 623	6 314		6 314				207 937
18	16 044							16 044
20	285 858	17 389		17 389		50	50	303 197
22	364							364
23	27							27
24	23 330	1 495		1 495				24 825
30	297 102	3 243		3 243				300 345
36	106 514	132		132				106 646
42	564							564
48	344 690	19 329		19 329				364 019
60	43 801							43 801
Totals	9 414 373	249 751	3090	252 841	2425	6691	9116	9 658 098

WORK ON WATER PIPES

Purposes for which used	Size in inches						
	3	4	6	8	10	12	16
New pipe or feet added:							
Service mains.....			63 531	77 003	13 064	9 374	1 709
Supply mains.....			1 055	10 376	4 790	14 276	4 308
Service main connections.....			65	501	135	9	
Supply main connections.....			238	301	276	97	237
Fire hydrant connections.....			4 471				
Fire connections (private).....		50	600				
Supply connections (private).....	421	222	156				
Drains			139				
Total:							
Feet	421	281	70 255	88 271	18 865	23 756	6 314
Pounds	6 315	5 620	2 107 650	3 972 195	1 131 900	1 900 480	726 110
Pipe used but adding nothing to feet underground:							
Pipe relaid.....	53		232	1 848	727	230	
Repairs, general.....	5	60	1 968	319	511	237	72
Pipe taken up.....	43	173	2 130	47	32		
Pipe lowered			40	50		909	
Pipe raised.....			47				
Pipe shifted.....			860	657			
Total:							
Feet	101	242	5 277	2 921	1 270	1 376	72
Pounds	1 515	4 840	158 310	131 445	76 200	110 080	8 280
Total handled:							
Feet	522	523	75 532	91 192	20 135	25 132	6 386
Pounds	7 830	10 460	2 265 960	4 103 640	1 208 100	2 010 560	734 300
Pipe cut off and abandoned.....	41	1 149	5 294		50	107	

450 feet of 4 1/2-inch pipe laid 1817 cut off and abandoned

WORK ON WATER PIPES—Continued

Purposes for which used	Size in inches					Totals in feet and pounds
	20	24	30	36	48	
New pipe or feet added:						
Service mains.....						165 341
Supply mains.....	17 352	1 480	3 238	132	19 329	76 330
Service main connections.....						800
Supply main connections.....	37	15	5			1 208
Fire hydrant connections.....						4 471
Fire connections (private).....						650
Supply connections (private).....						799
Drains.....						139
Total:						
Feet.....	17 389	1 495	3 243	132	19 329	249 751
Pounds.....	2 605 295	313 950	1 070 190	55 440	12 563 850	26 548 905
Pipe used but adding nothing to feet underground:						
Pipe relaid.....						3 090
Repairs, general.....	28		108		12	3 329
Pipe taken up.....						2 425
Pipe lowered.....					269	1 268
Pipe raised.....						47
Pipe shifted.....	300					1 817
Total:						
Feet.....	328		108		281	11 976
Pounds.....	50 840		35 640		182 650	759 800
Total handled:						
Feet.....	17 717	1 495	3 351	132	19 610	261 727
Pounds.....	2 746 135	313 950	1 105 830	55 440	12 746 500	27 308 795
Pipe cut off and abandoned.....	50					6 691

450 feet of 4½-inch pipe laid 1817 cut off and abandoned

COMPARISON OF WORK DONE IN 1914 AND 1915

	1914	1915	Increase	Decrease
Service mains, 6 inches to 16 inches.....	135 844	165 341	29 997	.....
Supply mains, 6 inches to 48 inches.....	14 333	76 336	62 003	.....
Connections and miscellaneous work.....	17 924	20 050	2 126	.....
Totals in feet.....	167 601	261 727	94 126	.....

DETAILED DESCRIPTION OF SERVICE MAINS LAID IN 1915

	6-inch	8-inch	10-inch	12-inch	16-inch	Total
By Water Bureau force.....	27 833	54 541	11 845	8 732	1 760	104 720
By contract, Bureau of Highways	270	1 744	.....	.....	.....	2 020
Private contract.....	35 422	20 718	1 819	642	.....	58 601
Totals	63 531	77 003	13 664	9 374	1 760	165 341
Contract, Bureau of Highways, service main connections .....	.....	.....	123	.....	.....	123
Grand totals.....	63 531	77 003	13 787	9 374	1 760	165 464

DETAILED DESCRIPTION OF SUPPLY MAINS AND SUPPLY MAIN
CONNECTIONS LAID IN 1915

<i>Supply Mains</i>	
Laid by Contract:	
6-inch	1,055 feet
8-inch	10,376 feet
10-inch	4,790 feet
12-inch	14,276 feet
16-inch	4,308 feet
20-inch	11,408 feet
24-inch	1,480 feet
30-inch	3,238 feet
36-inch	132 feet
48-inch	19,329 feet
<hr/>	
Total	70,392 feet
Laid by Bureau:	
20-inch	5,944 feet
<hr/>	
Grand total	76,336 feet

<i>Supply Main Connections</i>	
Laid by Contract:	
6-inch	135 feet
8-inch	50 feet
10-inch	38 feet
12-inch	31 feet
16-inch	42 feet
20-inch	26 feet
24-inch	15 feet
<hr/>	
Total	337 feet

FIRE HYDRANTS BY WARDS

Wards	O. S.	No. 1	No. 2	No. 3	No. 4	No. 5	High pressure	Set during 1915	Total
1	1	214	64	8	.....	.....	.....	11	287
2	1	135	88	15	.....	.....	.....	.....	239
3	3	83	43	6	.....	.....	.....	.....	135
4	1	68	33	14	.....	.....	.....	.....	116
5	13	117	56	2	.....	.....	29	.....	217
6	8	106	36	4	.....	.....	81	2	235
7	5	162	72	3	.....	.....	.....	.....	242
8	8	151	76	3	.....	1	35	1	274
9	.....	157	55	2	.....	1	60	.....	275
10	.....	124	56	.....	.....	4	43	2	227
11	4	82	20	1	.....	.....	10	.....	117
12	7	79	14	2	.....	.....	.....	.....	102
13	23	99	40	5	.....	.....	.....	.....	167
14	.....	113	65	.....	.....	.....	21	.....	190
15	.....	274	168	3	1	2	13	6	461
16	2	101	21	3	1	.....	26	.....	154
17	11	103	15	1	.....	.....	38	.....	168
18	11	231	48	6	.....	.....	51	1	347
19	31	380	83	4	.....	.....	198	1	606
20	16	169	110	.....	.....	.....	27	.....	322
21	34	468	36	7	.....	.....	.....	8	545
22	25	1 374	135	14	.....	.....	.....	8	1 548
23	36	433	73	3	.....	.....	.....	5	545
24	7	375	139	8	.....	.....	.....	.....	529
25	.....	326	50	2	.....	.....	15	1	393
26	.....	254	124	14	.....	.....	.....	1	392
27	2	213	52	6	.....	1	.....	.....	274
28	.....	196	118	23	.....	.....	.....	.....	337
29	.....	134	94	3	.....	1	.....	.....	232
30	5	130	111	5	.....	.....	.....	.....	251
31	.....	275	53	4	.....	.....	43	.....	375
32	5	163	74	7	.....	1	13	.....	263
33	15	554	100	8	1	.....	110	9	788
34	5	541	37	3	.....	1	.....	17	587
35	.....	276	25	5	.....	.....	.....	31	306
36	2	293	76	17	.....	.....	.....	19	388
37	2	132	63	2	.....	.....	22	.....	221
38	7	613	87	12	.....	.....	.....	9	719
39	.....	298	95	7	.....	.....	.....	17	400
40	5	515	65	2	.....	.....	.....	19	587
41	.....	73	8	7	.....	.....	.....	2	88
42	.....	502	38	7	.....	.....	.....	32	547
43	6	424	56	5	.....	.....	15	3	506
44	1	264	56	7	.....	.....	.....	.....	328
45	.....	387	69	2	.....	.....	10	9	468
46	.....	487	70	14	.....	.....	.....	19	571
47	4	129	86	1	.....	.....	4	.....	224
48	1	160	36	9	.....	.....	.....	4	206
Total	307	12 937	3 180	280	3	12	864	237	17 598

FIRE HYDRANTS IN USE DECEMBER 31, 1915

Old style
307New style
17,291 or 98 per cent.

VALVES IN USE

Pattern	Total, 1915
Department	31,918
Butterfly, Bureau of Water	148
Barton	64
Viney	535
Smith Patent	652
Ludlow	72
Eddy	414
Rensselaer	68
Pratt & Cady	50
VanWinkle	5
Water Works Equipment Company	1
Chapman	182
Kennedy Electric	1
Kennedy	228
Nelson	132
Fairbanks	327
Belfield	1
American	3
Wood	17
Crane	4
Dimmick	1
High Pressure:	
Williamsport	263
Chapman	18
Smith	433
Ludlow	4
Grand total	35,541

HIGH-PRESSURE FIRE SERVICE

OPERATION OF HIGH-PRESSURE FIRE SYSTEM

During the year 1915 the Race Street High-Pressure Pumping Station was in service on 32 fires, and started up on 149 fire alarms where no actual service was rendered.

The Fairhill High-Pressure Pumping Station was in service on 5 fires, and started up on 201 fire alarms where no actual service was rendered.

SUMMARY OF RUNS AT RACE STREET H. P. PUMPING STATION FOR YEAR 1915

Kind of run	No.	Time		Average time		Cu. ft. of gas consumed	Average Amount per run	Remarks
		Hr.	Min.	Hr.	Min.			
Service	32	55	30	1	46	228 196	7 131	.....
Non-service ...	149	38	55	0	16	144 390	969	.....
Tests	100	40	11	0	24	122 407	1 224	.....
Air						37 860		.....
						60 500		Gas range, etc.
Totals ...	281	134	36			593 353		.....

Longest run, 10 hrs., 4 min., September 14, 1915—Box 1213.

SUMMARY OF RUNS AT FAIRHILL H. P. PUMPING STATION FOR YEAR 1915

Kind of run	No.	Time		Average time		Cu. ft. of gas consumed	Average Amount per run	Remarks
		Hr.	Min.	Hr.	Min.			
Service	5	5	31	1	06	20 995	4 199	.....
Non-service ...	201	42	29	0	12	125 540	625	.....
Tests, etc.....	101	41	53	0	25	140 885	1 395	.....
						44 980		Gas range, etc.
Totals ...	307	89	53			332 400		.....

Longest run, 2 hrs., 3 min., October 24, 1915—Box 591.

The linewalkers responded to a total of 387 alarms during the year.

The item for fuel for power in the above statement is worthy of notice, the total cost of same being less than \$1000.

UNIVERSITY OF ILLINOIS-URBANA



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