

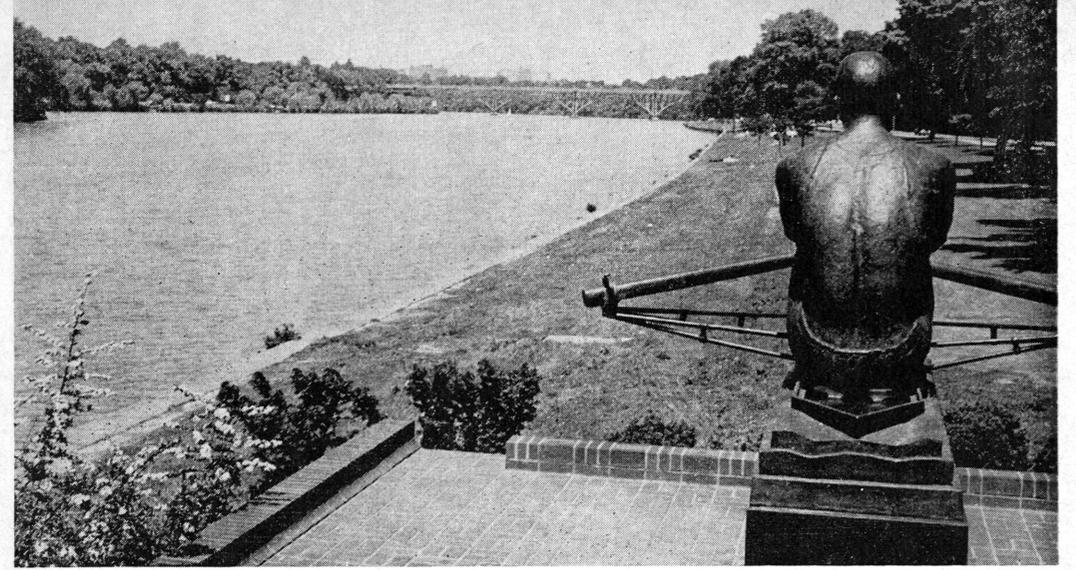
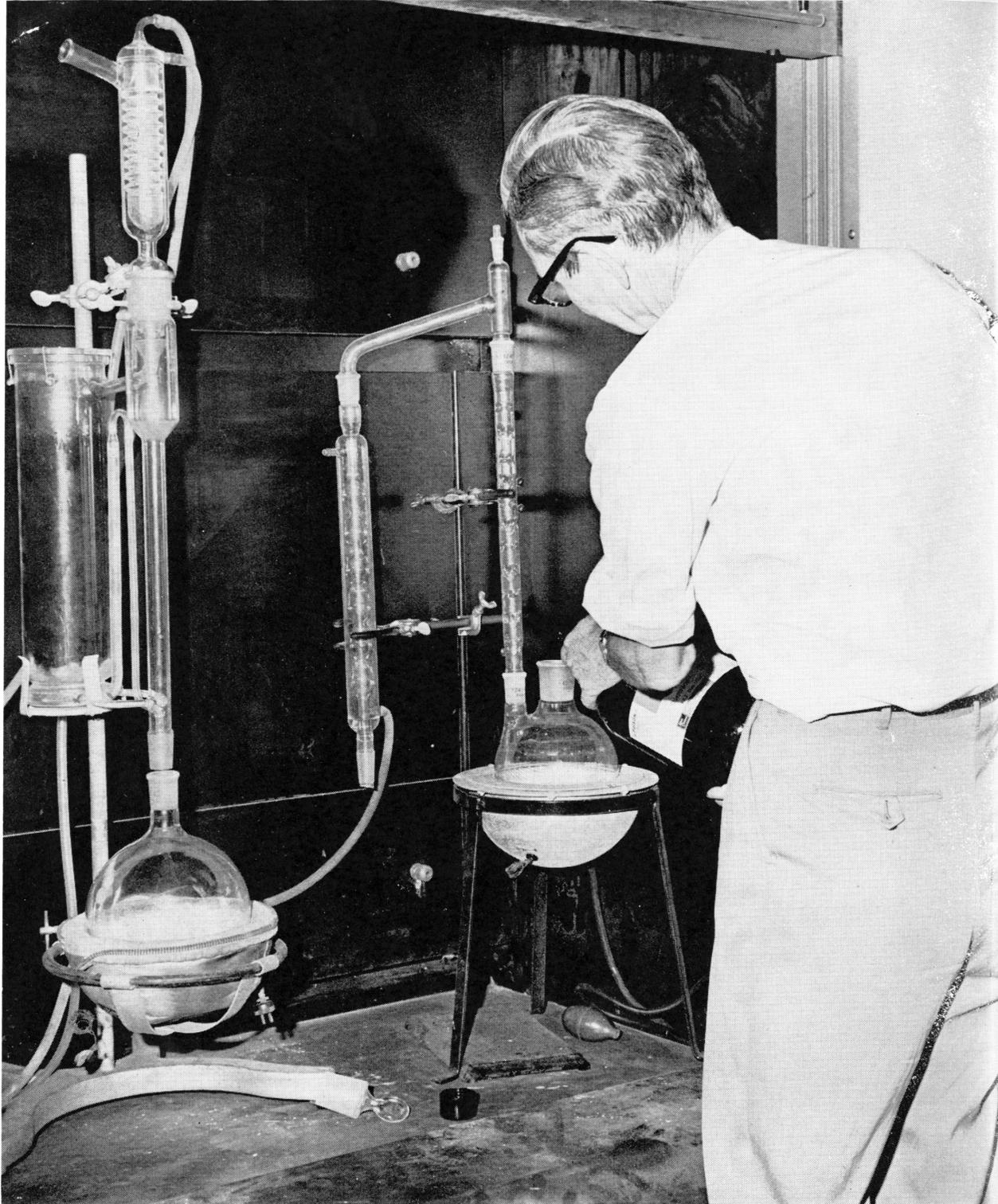
WATER QUALITY IN PHILADELPHIA -- 1970

Analyses by Laboratories

of the

Philadelphia Water Department

2019,004,00068 c2 of 4



Sources of City Water

Philadelphia draws its water from the Delaware and Schuylkill Rivers in approximately equal quantities. These rivers are surface waters which are subject to changes in quality according to rainfall and other conditions existing on their watersheds.

Although the land comprising the watersheds of the two rivers has a fairly high population density and many diversified industries are located on it, an effective pollution abatement program assures the city that this abundant supply of water will not contain impurities that will prevent it from being processed, in the Water Department's purification plants, into a safe and satisfactory water of excellent quality. The success of the program is due largely to the excellent liaison which exists between the communities and industries located on the watershed, the Pennsylvania Sanitary Water Board, and the Water Department of the City of Philadelphia.

Sanitary engineers from the State and

City Governments make regular visits to industries and communities located on the watershed to prevent conditions developing which might prove detrimental to the quality of the surface waters. The Philadelphia Water Department also routinely collects and makes analyses of water samples from locations selected as sensing points in the rivers, and their tributaries, in order to detect changes or trends in the quality of the river waters.

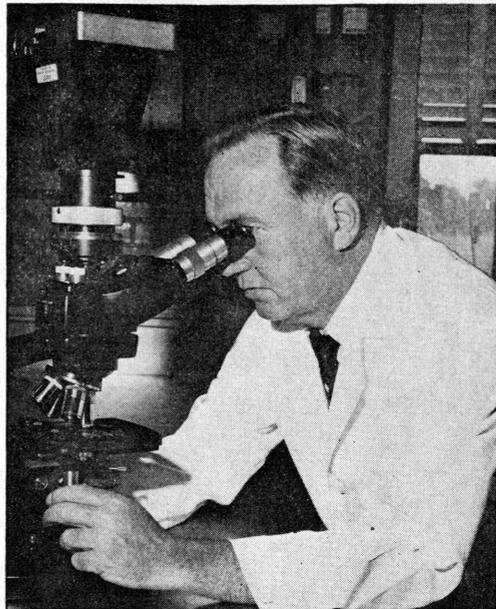
TREATMENT

During the past few years, modern water purification plants have replaced the old plants at Torresdale, Queen Lane and Belmont. The completion of these plants was a significant step in the Water Department's rehabilitation program. Since the Belmont plant was completed in 1965, the entire supply for the city is now purified in modern, efficient plants capable of producing water of excellent quality in sufficient quantity to meet the needs of our customers for many years in the future. Another part of the program has included the construction of modern automatic pumping stations.

To supply customers in all parts of the city with ample water to meet domestic and commercial uses and for adequate fire protection, many new large-sized express mains have been installed. In addition many of the old existing mains have been cleaned and lined with cement. Elevated storage tanks have been strategically placed in distribution to help maintain pressures during periods of heavy usage. Underground storage for filtered water has been significantly increased at the purification plants by conversion of obsolete slow-sand filters to water storage basins. The final phase of this work (at the Queen Lane Plant) is under way.

The treatment processes at the purification plants are under the control of plant chemists who work in shifts, in modern, well-equipped laboratories, to provide "round the clock" control of the treatment processes. Each laboratory is under the direction of a professionally trained sanitary chemist who is responsible for over-all supervision of the treatment processes of his particular plant.

To determine the quality of the water as it is received by the consumer, samples for sanitary analyses are collected several times each week from approximately sixty locations throughout the city. Along with the sanitary analyses the samples are checked for such characteristics as would be readily apparent to the consumer, such as taste and odor, color, and turbidity. As a part of the sanitary analyses the bacteriological quality is also checked. In 1970, 10,862 samples were collected from the districts for this purpose. From these samples 54,310 bacteriological portions were tested. These produced a coliform count of only 2.4 percent of that allowed by the Drinking Water Standards of the United States Public Health Service for interstate carriers. A glance at Table VI will show that similar low coliform levels are held year after year.



HARDNESS

Hardness will be mentioned as of special interest because of industrial use and the use of modern soap compounds and washing facilities. This varies with the amount of rainfall and runoff, also the temperatures. It is not a seasonal change and therefore cannot be predicted—regardless of the time of the year, the drier the season the higher the hardness.

The range of hardness of treated water from the Delaware River water varies from 3.7 to 7.7 grains per gallon, the long-term average being about 5.8 grains per gallon. The range on treated water from the Schuylkill varies from 5.2 to 16.3 grains per gallon, with the long-term average about 9.5 grains per gallon.

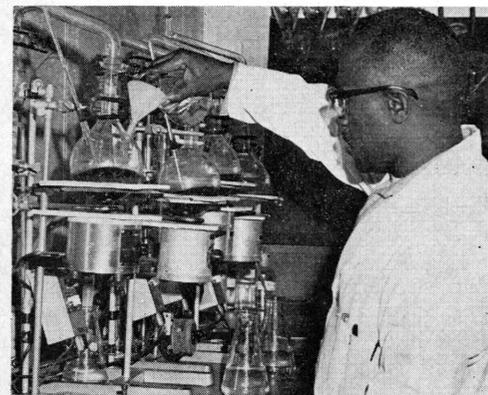
RADIOACTIVITY

Gross counts on water samples collected from both the Delaware and Schuylkill Rivers have been made since 1957. These show the radioactivity to be very slightly above the normal background such as is found in the atmosphere which surrounds us. The normal water treatment processes used by the Department remove more than one half of the radioactive particles found in the river waters. The water delivered to the consumers has always been well below the maximum allowable concentration of mixed fission products in drinking water as recommended by the National Bureau of Standards in their Handbook No. 52. This safe value (100 pc/L or pico-curies per liter) of permissible concentration has been demonstrated as not producing biological damage.

TEMPERATURES

Water temperatures at the plant effluents vary from 32°F to 86°F. At customers' services, due to the effect of ground temperatures, these are slightly higher in winter and lower in summer, ranging from about 35°F to 82°F.

Warming of pipes in the customers' basements, or in the walls of buildings during the colder weather, will cause release of air bubbles in water drawn from the taps, and is the cause of "white water" complaints.



PURIFIED WATERS

Tables III-A, III-B, and III-C show physical and chemical characteristics of the water as it enters the distribution system after purification. The effluent characteristics are listed for each plant individually. The purification plant located at Torresdale is the only plant that treats water from the Delaware River. Although both the Belmont and Queen Lane Treatment Plants draw water from the Schuylkill River, their effluents are not identical.

Tables IV-A1, IV-A2, IV-B1, IV-B2, IV-C1 and IV-C2 list the analytical components of Belmont, Queen Lane and Torresdale Plant effluent waters on a monthly basis.

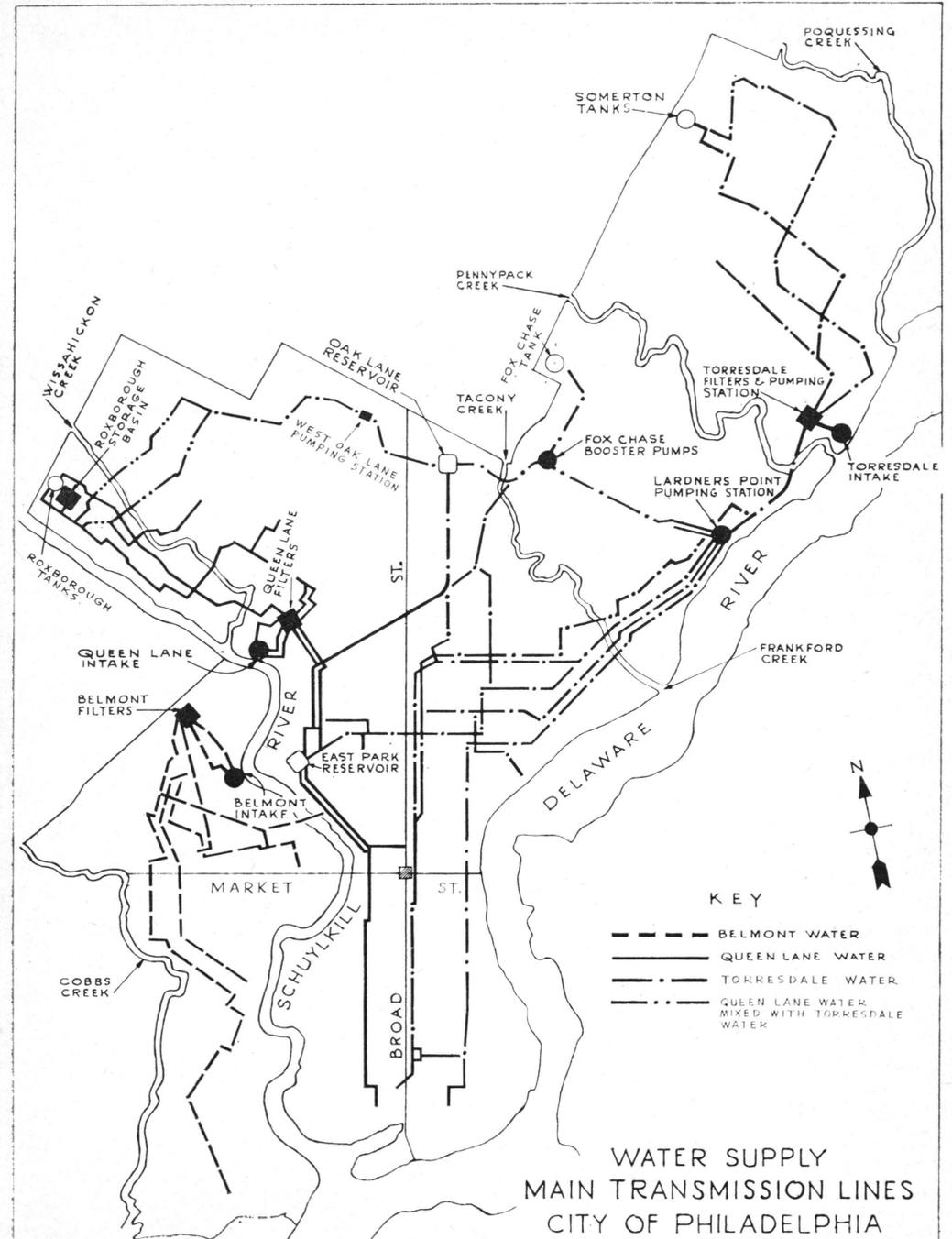
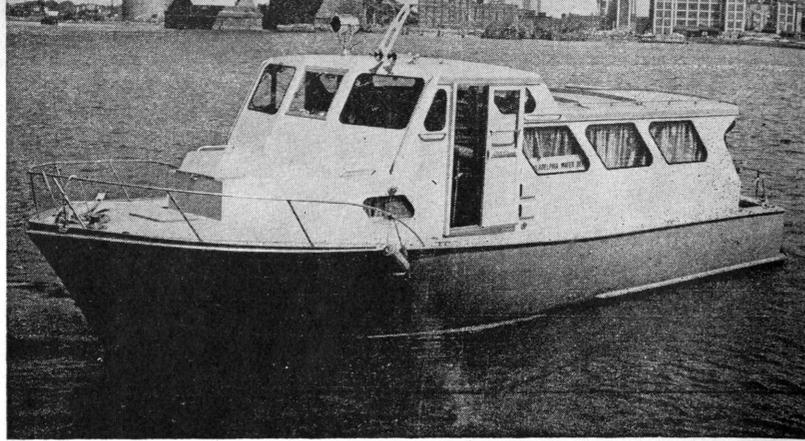
WATER DELIVERED TO YOUR AREA

Delaware water is delivered generally to areas east of Broad Street, and Schuylkill water west of Broad Street. Delaware water is pumped to West Oak Lane and at times to some sections of Chestnut Hill. It is also frequently supplied to many areas south of Erie Avenue.

Schuylkill water is sometimes pumped east of Broad Street, in the area generally bounded by Roosevelt Boulevard, Lehigh Avenue, Wyoming Avenue and Kensington Avenue. Express mains direct from Lardner's Point Pumping Station deliver Delaware water to the vicinity of East Park Reservoir, where it mixes with Schuylkill water before entering the central city area.

With changes in demands, and occasionally required changes in plant operation, it is, therefore, uncertain as to which of the river waters or what combination of the two will be received in much of the center city area south of Callowhill Street, and in many areas west of Broad Street, north of the city center to Erie Avenue. West Philadelphia receives purified Schuylkill water at all times except in emergency.

Stream Monitoring: With its fast motor launch (right), the Water Department collects water samples from many parts of the Delaware River estuary. The samples are tested in the on-board laboratory (below).



**PHYSICAL AND CHEMICAL SUMMARIES FOR RAW WATER
FROM SCHUYLKILL RIVER AT BELMONT IN 1970**

Table I-A

Figures in mg/1 except for items marked by *

PHYSICAL AND CHEMICAL CHARACTERISTICS		BELMONT INTAKE			
		Freq.	Yearly Avg.	Monthly Arg.	
				Max.	Min.
Rainfall, Pptn.* (Inch)	X	39.14	6.12	0.74	
Temperature, Water* (°F)	1D	60	85	33	
Alkalinity (CaCO ₃)	8D	57	86	40	
Carbon Dioxide (CO ₂)	1W	4	6	2	
Chloride (Cl)	WC	28	42	19	
Color, Apparent (Units)	1W	28	44	14	
Color, Filtered (Units)	1W	10	18	4	
Conductance, Specific (µmhos)	WC	380	560	275	
Detergents, MBAS (ABS)	WC	.06	0.12	.02	
Fluoride (F)	3W	.31	.38	.23	
Hardness, EDTA (CaCO ₃)	WC	154	215	110	
Nitrogen, Ammonia (N)	1W	.82	1.38	.28	
Nitrogen, Nitrate (N)	1W	2.78	3.37	2.34	
Nitrogen, Nitrite (N)	1W	.060	.138	.016	
Oxygen Demand, BOD (O)	1W	2.2	2.7	1.5	
Oxygen Demand, COD (O)	1W	13.6	19.9	8.8	
Oxygen, Dissolved (O)	1W	9.2	13.0	7.0	
Oxygen, % Saturation* (-)	1W	91	110	76	
pH* (Units)	8D	7.4	7.6	7.2	
Phenols (C ₆ H ₅ OH)	1W	.002	.005	.000	
Phosphates, Ortho (PO ₄)	1W	.84	1.64	.33	
Phosphates, Poly (Meta) (PO ₄)	1W	.10	.21	.05	
Radioactivity, Gross Beta* (pc/L)	—	—	—	—	
Residue, Total (-)	WC	302	436	220	
Residue, Filtrable (-)	WC	284	423	203	
Silica (SiO ₂)	WC	9.3	12.1	6.3	
Sulfate (SO ₄)	WC	94	129	73	
Turbidity* (JTU)	8D	25	73	4	
Aluminum (Al)	WC	.01	.02	.01	
Arsenic (As)	WC	.005	.008	.003	
Calcium (Ca)	WC	39	48	31	
Chromium, Hexa (Cr)	1W	.006	.009	.003	
Copper (Cu)	1W	.025	.031	.020	
Iron, Total (Fe)	WC	.51	1.70	.19	
Iron, Dissolved (Fe)	WC	.10	.19	.06	
Lead (Pb)	1W	.009	.015	.000	
Magnesium (Mg)	WC	12	17	8	
Manganese, Total (Mn)	WC	.20	.52	.02	
Manganese, Dissolved (Mn)	WC	.13	.52	.00	
Potassium (K)	WC	3.6	5.7	2.0	
Sodium (Na)	WC	20.0	35.6	12.0	

NOTES: FR=frequency of analyses. Individual or grab samples: (8D) eight per day, (1D) one per day, (1W or 3W) one or three per week. COMPOSITE OF daily (6:00 A.M.) grab samples: (WC) one on weekly composite. (X) Total precipitation at International Airport, Philadelphia, from U.S. Weather Bureau reports. Radioactivity equals gross beta activity in picocuries per liter.

**PHYSICAL AND CHEMICAL SUMMARIES FOR RAW WATER
FROM SCHUYLKILL RIVER AT QUEEN LANE IN 1970**

Table I-B

Figures in mg/1 except for items marked by *

PHYSICAL AND CHEMICAL CHARACTERISTICS		QUEEN LANE INTAKE			
		Freq.	Yearly Avg.	Monthly Arg.	
				Max.	Min.
Rainfall, Pptn.* (Inch)	X	39.14	6.12	0.74	
Temperature, Water* (°F)	1D	58	83	32	
Alkalinity (CaCO ₃)	8D	61	89	47	
Carbon Dioxide (CO ₂)	1W	3	4	2	
Chloride (Cl)	WC	34	58	27	
Color, Apparent (Units)	1W	30	95	10	
Color, Filtered (Units)	1W	10	15	4	
Conductance, Specific (µmhos)	WC	398	566	299	
Detergents, MBAS (ABS)	WC	.06	.13	.03	
Fluoride (F)	3W	.31	.35	.27	
Hardness, EDTA (CaCO ₃)	WC	154	218	115	
Nitrogen, Ammonia (N)	1W	1.06	2.60	.20	
Nitrogen, Nitrate (N)	1W	2.90	3.45	2.07	
Nitrogen, Nitrite (N)	1W	.065	.128	.018	
Oxygen Demand, BOD (O)	1W	2.7	4.7	1.6	
Oxygen Demand, COD (O)	1W	15.7	18.9	10.7	
Oxygen, Dissolved (O)	1W	9.5	13.8	6.0	
Oxygen, % Saturation* (-)	1W	93	108	73	
pH* (Units)	8D	7.6	7.9	7.4	
Phenols (C ₆ H ₅ OH)	1W	.002	.003	.000	
Phosphates, Ortho (PO ₄)	1W	1.51	2.75	1.04	
Phosphates, Poly (Meta) (PO ₄)	1W	.18	.41	.08	
Radioactivity, Gross Beta* (pc/L)	—	4.0	—	—	
Residue, Total (-)	WC	315	454	257	
Residue, Filtrable (-)	WC	290	409	218	
Silica (SiO ₂)	WC	9.6	12.1	6.6	
Sulfate (SO ₄)	WC	88	119	64	
Turbidity* (JTU)	8D	25	60	5	
Aluminum (Al)	WC	.01	.02	.01	
Arsenic (As)	WC	.006	.009	.002	
Calcium (Ca)	WC	39	55	31	
Chromium, Hexa (Cr)	1W	.007	.017	.003	
Copper (Cu)	1W	.020	.028	.010	
Iron, Total (Fe)	WC	.36	1.04	.10	
Iron, Dissolved (Fe)	WC	.09	.16	.05	
Lead (Pb)	1W	.010	.045	.001	
Magnesium (Mg)	WC	13	18	9	
Manganese, Total (Mn)	WC	.11	.31	.01	
Manganese, Dissolved (Mn)	WC	.07	.29	.00	
Potassium (K)	WC	4.1	6.0	2.8	
Sodium (Na)	WC	23.3	38.0	17.0	

NOTES: FR=frequency of analyses. Individual or grab samples: (8D) eight per day, (1D) one per day, (1W or 3W) one or three per week. COMPOSITE OF daily (6:00 A.M.) grab samples: (WC) one on weekly composite. (X) Total precipitation at International Airport, Philadelphia, from U.S. Weather Bureau reports. Radioactivity equals gross beta activity in picocuries per liter.

**PHYSICAL AND CHEMICAL SUMMARIES FOR RAW WATER
FROM DELAWARE RIVER AT TORRESDALE IN 1970**

Table I-C

Figures in mg/1 except for items marked by*

PHYSICAL AND CHEMICAL CHARACTERISTICS		Freq.	TORRESDALE INTAKE		
			Yearly Avg.	Monthly Avg.	
			Max.	Min.	
Rainfall, Pptn.*	(Inch)	X	39.14	6.12	0.74
Temperature, Water*	(°F)	1D	59	84	32
Alkalinity	(CaCO ₃)	8D	30	36	20
Carbon Dioxide	(CO ₂)	1W	10	12	6
Chloride	(Cl)	WC	14	20	10
Color, Apparent	(Units)	1W	—	—	—
Color, Filtered	(Units)	1W	17	27	10
Conductance, Specific	(µmhos)	WC	184	207	123
Cyanide	(CN)	1W	.000	.000	.000
Detergents, MBAS	(ABS)	WC	.04	.05	.03
Fluoride	(F)	3W	.24	.28	.20
Hardness, EDTA	(CaCO ₃)	WC	72	86	58
Nitrogen, Ammonia	(N)	1W	.65	1.10	.26
Nitrogen, Nitrate	(N)	1W	.80	1.15	.44
Nitrogen, Nitrite	(N)	1W	.056	.148	.014
Oxygen Dmand, BOD	(O)	1W	4.0	6.7	1.8
Oxygen Demand, COD	(O)	1W	14.1	24.7	10.0
Oxygen, Dissolved	(O)	1W	8.6	14.2	4.3
Oxygen, % Saturation*	(—)	1W	77	103	49
pH*	(Units)	8D	7.3	7.4	7.1
Phenols	(C ₆ H ₅ OH)	1W	.002	.004	.000
Phosphates, Ortho	(PO ₄)	1W	.40	.50	.26
Phosphates, Poly (Meta)	(PO ₄)	1W	.10	.29	.03
Radioactivity, Gross Beta*	(pc/L)	—	3.3	—	—
Residue, Total	(—)	WC	169	222	140
Residue, Filtrable	(—)	WC	—	—	—
Silica	(SiO ₂)	WC	3.4	5.4	1.1
Sulfate	(SO ₄)	WC	25	30	20
Turbidity*	(JTU)	8D	21	50	12
Aluminum	(Al)	WC	.29	.62	.05
Arsenic	(As)	WC	—	—	—
Calcium	(Ca)	WC	18	21	13
Chromium, Hexa	(Cr)	1W	.008	.017	.002
Copper	(Cu)	1W	.090	.173	.012
Iron, Total	(Fe)	WC	1.23	3.21	.10
Iron, Dissolved	(Fe)	WC	—	—	—
Lead	(Pb)	1W	.017	.039	.006
Magnesium	(Mg)	WC	6	7	4
Manganese, Total	(Mn)	WC	.16	.29	.07
Manganese, Dissolved	(Mn)	WC	—	—	—
Potassium	(K)	WC	2.5	3.6	1.4
Sodium	(Na)	WC	9.7	13.1	7.1

NOTES: FR=frequency of analyses. Individual or grab samples: (8D) eight per day, (1D) one per day, (1W or 3W) one or three per week. COMPOSITE OF daily (6:00 A.M.) grab samples: (WC) one on weekly composite, (X) Total precipitation at International Airport, Philadelphia, from U.S. Weather Bureau reports. Radioactivity equals gross beta activity in picocuries per liter.

**COLIFORM ORGANISMS IN RAW WATER FROM
SCHUYLKILL AND DELAWARE RIVERS IN 1970**

Table II

1970 Monthly Average Phelps Index and Most Probable Number Per 100 Milliliters.

MONTH	SCHUYLKILL RIVER				DELAWARE RIVER	
	Belmont		Queen Lane		Torresdale	
	Index	M.P.N.	Index	M.P.N.	Index	M.P.N.
January.....	13,000	31,000	74,000	136,000	11,000	27,000
February.....	45,000	115,000	42,000	102,000	16,000	38,000
March.....	51,000	125,000	77,000	153,000	16,000	39,000
April.....	59,000	146,000	67,000	166,000	16,000	35,000
May.....	5,800	13,000	44,000	107,000	21,000	54,000
June.....	36,000	91,000	80,000	193,000	70,000	178,000
July.....	40,000	100,000	85,000	212,000	20,000	48,000
August.....	23,000	58,000	54,000	132,000	54,000	127,000
September.....	23,000	52,000	27,000	60,000	25,000	59,000
October.....	38,000	93,000	53,000	134,000	26,000	73,000
November.....	58,000	157,000	33,000	75,000	20,000	46,000
December.....	24,000	58,000	26,000	63,000	28,000	73,000
Average.....	35,000	87,000	64,000	128,000	27,000	66,000
Maximum.....	59,000	157,000	85,000	212,000	70,000	178,000
Minimum.....	5,000	13,000	26,000	60,000	11,000	27,000

1961—1970 10-YEAR PERIOD AVERAGES

1961.....	19,000	47,000	16,000	37,000	17,000	41,000
1962.....	19,000	45,000	30,000	72,000	23,000	54,000
1963.....	15,000	36,000	71,000	173,000	33,000	81,000
1964.....	21,000	50,000	84,000	200,000	45,000	110,000
1965.....	9,900	23,000	49,000	116,000	45,000	114,000
1966.....	19,000	46,000	62,000	148,000	21,000	50,000
1967.....	22,000	53,000	80,000	190,000	32,000	92,000
1968.....	17,000	41,000	52,000	117,000	22,000	54,000
1969.....	39,000	96,000	94,000	223,000	24,000	58,000
1970.....	35,000	87,000	64,000	128,000	27,000	66,000
Average.....	22,000	52,000	60,000	140,000	29,000	72,000
Maximum.....	39,000	96,000	94,000	223,000	45,000	114,000
Minimum.....	9,900	23,000	16,000	37,000	17,000	41,000

NOTES: Frequency of analyses: Three individual or grab samples per day at each location (Belmont, Queen Lane, Torresdale Plants.)

**PHYSICAL AND CHEMICAL SUMMARIES FOR FINISHED
WATER FROM THE BELMONT WATER TREATMENT PLANT
ON THE SCHUYLKILL RIVER IN 1970**

Table III-A

Figures in mg/l except for items marked by*

PHYSICAL AND CHEMICAL CHARACTERISTICS		Freq.	Yearly		Monthly Avg.	
			Arg.	Max.	Min.	
Alkalinity	(CaCO ₃)	8D	57	83	38	
Carbon Dioxide	(CO ₂)	1W	2	4	1	
Chloride	(Cl)	WC	41	58	28	
Chlorine Residual						
Total	(Cl)	8D	2.00	2.60	1.50	
Free	(Cl)	8D	.03	.04	.03	
Color, Apparent*	(Units)	1W	0	1	0	
Conductance, Specific*	(μmhos)	WC	430	600	310	
Detergents, MBAS	(ABS)	WC	.07	.21	.03	
Fluoride	(F)	1D	.94	1.07	.88	
Hardness, EDTA	(CaCO ₃)	WC	174	237	132	
Nitrogen, Ammonia	(N)	1W	.38	.44	.26	
Nitrogen, Nitrate	(N)	1W	2.74	3.18	2.48	
Nitrogen, Nitrite	(N)	1W	.060	.138	.016	
Oxygen Demand COD	(O)	1W	5.4	7.6	4.2	
Oxygen Dissolved, DO	(O)	1W	9.4	13.5	6.7	
Oxygen, % Saturation	(—)	1W	97	115	82	
pH*	(Units)	8D	7.8	7.9	7.7	
Phenols	(C ₆ H ₅ OH)	1W	.000	.001	.000	
Phosphates, Ortho	(PO ₄)	1W	.43	.70	.17	
Phosphates, Poly (Meta)	(PO ₄)	1W	1.13	1.36	.95	
Residue, Total	(—)	WC	311	461	231	
Silica	(SiO ₂)	WC	9.2	12.4	6.7	
Sulfate	(SO ₄)	WC	104	135	84	
Turbidity*	(JTU)	8D	.38	.57	.26	
Aluminum	(Al)	WC	.03	.05	.01	
Calcium	(Ca)	WC	48	63	38	
Chromium, Hexa.	(Cr)	1W	.007	.009	.005	
Copper	(Cu)	1W	.014	.024	.008	
Iron, Total	(Fe)	WC	.05	.08	.02	
Magnesium	(Mg)	WC	13	17	9	
Manganese, Total	(Mn)	WC	.00	.01	.00	
Potassium	(K)	WC	3.7	5.8	2.2	
Sodium	(Na)	WC	20.7	36.5	14.0	

NOTES: FREQ. =frequency of analyses. Individual or grab samples: (8D) eight per day, (1D) one per day, (1W or 3W) one or three per week. COMPOSITE OF daily (6:00 A.M.) grab samples: (WC) one on weekly composite.

**PHYSICAL AND CHEMICAL SUMMARIES FOR FINISHED
WATER FROM THE QUEEN LANE WATER TREATMENT PLANT
ON THE SCHUYLKILL RIVER IN 1970**

Table III-B

Figures in mg/l except for items marked by *

PHYSICAL AND CHEMICAL CHARACTERISTICS		Freq.	Yearly		Monthly Avg.	
			Arg.	Max.	Min.	
Alkalinity	(CaCO ₃)	8D	54	75	43	
Carbon Dioxide	(CO ₂)	1W	5	8	3	
Chloride	(Cl)	WC	47	71	37	
Chlorine Residual						
Total	(Cl)	8D	1.40	1.70	1.30	
Free	(Cl)	8D	1.10	1.40	1.00	
Color, Apparent*	(Units)	1W	0	1	0	
Conductance, Specific*	(μmhos)	WC	435	583	339	
Detergents, MBAS	(ABS)	WC	.09	.23	.04	
Fluoride	(F)	1D	.95	1.02	.75	
Hardness, EDTA	(CaCO ₃)	WC	154	216	113	
Nitrogen, Ammonia	(N)	1W	.09	.16	.03	
Nitrogen, Nitrate	(N)	1W	2.91	3.31	2.49	
Nitrogen, Nitrite	(N)	1W	.001	.002	.001	
Oxygen Demand, COD	(O)	1W	6.5	8.4	4.3	
Oxygen, Dissolved, DO	(O)	1W	9.3	11.9	6.9	
Oxygen, % Saturation*	(—)	1W	91	97	84	
pH*	(Units)	8D	7.4	7.6	7.2	
Phenols	(C ₆ H ₅ OH)	1W	.000	.002	.000	
Phosphates (Gravity)						
Ortho	(PO ₄)	1W	.20	.60	.02	
Poly (Meta)	(PO ₄)	1W	.12	.41	.03	
Phosphates (Hi-Service)						
Ortho	(PO ₄)	1W	.30	.71	.10	
Poly (Meta)	(PO ₄)	1W	.93	1.40	.40	
Radioactivity, Gross Beta*	(pc/L)	—	4.0	—	—	
Residue, Total	(—)	WC	315	440	239	
Silica	(SiO ₂)	WC	9.5	12.0	6.7	
Sulfate	(SO ₄)	WC	100	131	77	
Turbidity*	(JTU)	8D	.10	.26	.02	
Aluminum	(Al)	WC	.07	.14	.02	
Calcium	(Ca)	WC	40	55	30	
Chromium	(Cr)	1W	.006	.009	.004	
Copper	(Cu)	1W	.018	.028	.011	
Iron, Total	(Fe)	WC	.05	.09	.01	
Magnesium	(Mg)	WC	13	16	10	
Manganese, Total	(Mn)	WC	.00	.03	.00	
Potassium	(K)	WC	4.1	5.9	2.8	
Sodium	(Na)	WC	32.1	45.2	27.0	

NOTES: FR =frequency of analyses. Individual or grab samples: (8D) eight per day, (1D) one per day, (1W or 3W) one or three per week. COMPOSITE OF daily (6:00 A.M.) grab samples: (WC) one on weekly composite. Radioactivity equals gross beta activity in picocuries per liter.

**PHYSICAL AND CHEMICAL SUMMARIES FOR FINISHED
WATER FROM THE TORRESDALE WATER TREATMENT PLANT
ON THE DELAWARE RIVER IN 1970**

Table III-C

Figures in mg/l except for items marked by *

PHYSICAL AND CHEMICAL CHARACTERISTICS		Freq.	Yearly		
			Yearly Avg.	Monthly Avg.	
				Max.	Min.
Alkalinity (CaCO ₃)	8D	38	46	24	
Carbon Dioxide (CO ₂)	1W	1	3	0	
Chloride (Cl)	WC	31	35	25	
Chlorine Residual					
Total (Cl)	8D	1.40	1.60	1.20	
Free (Cl)	8D	1.20	1.40	0.95	
Color, Apparent* (Units)	1W	0	0	0	
Conductance, Specific* (μmhos)	WC	259	283	196	
Detergents, MBAS (ABS)	WC	.05	.08	.03	
Fluoride (F)	ID	.89	1.05	.73	
Hardness, EDTA (CaCO ₃)	WC	109	133	91	
Nitrogen, Ammonia (N)	1W	.03	.14	.01	
Nitrogen, Nitrate (N)	1W	.95	1.53	.56	
Nitrogen, Nitrite (N)	1W	.000	.002	.000	
Oxygen Demand COD (O)	1W	6.2	12.4	2.2	
Oxygen Dissolved, DO (O)	1W	9.1	14.3	5.5	
Oxygen, % Saturation (—)	1W	85	108	63	
pH* (Units)	8D	8.4	8.7	8.2	
Phenols (C ₆ H ₅ OH)	1W	.000	.001	.000	
Phosphate, Ortho (PO ₄)	1W	.10	.20	.03	
Phosphate, Poly (Meta) (PO ₄)	1W	.03	.10	.01	
Residue, Total (—)	WC	183	219	142	
Silica (SiO ₂)	WC	3.3	4.7	1.4	
Sulfate (SO ₄)	WC	27	33	19	
Turbidity* (JTU)	8D	.04	.08	.00	
Aluminum (Al)	WC	.06	.08	.04	
Calcium (Ca)	WC	32	41	27	
Chromium, Hexa (Cr)	1W	.002	.007	.000	
Copper (Cu)	1W	.015	.032	.000	
Iron, Total (Fe)	WC	.02	.05	.00	
Magnesium (Mg)	WC	6	7	5	
Manganese, Total (Mn)	WC	.01	.04	.00	
Potassium (K)	WC	2.5	3.6	1.4	
Sodium (Na)	WC	9.3	12.8	6.3	

NOTES: FREQ. =frequency of analyses. Individual or grab samples: (8D) eight per day, (1D) one per day, (1W or 3W) one or three per week. COMPOSITE OF (6:00 A.M.) grab samples: (WC) one on weekly composite.

**PHYSICAL AND CHEMICAL ANALYSES FOR FINISHED WATER
FROM THE BELMONT WATER TREATMENT PLANT IN 1970**

Table IV-A1

Figures in mg/l unless otherwise indicated

MONTH	Turbidity (JTU)	Residue Total (WC)	Spec. Cond. (μmhos) (WC)	Color Apparent (1W)	pH (Units) (8D)	Alkalinity (CaCO ₃) (8D)	Carbon Dioxide (CO ₂) (1W)	Hardness (CaCO ₃)	
								1W	WC
January.....	.55	330	475	0	7.8	64	3	188	
February.....	.39	251	350	0	7.9	44	3	141	
March.....	.57	262	381	0	7.8	50	2	161	
April.....	.37	231	309	0	7.8	38	1	132	
May.....	.31	293	412	1	7.8	55	1	165	
June.....	.32	336	458	0	7.7	63	1	183	
July.....	.26	335	455	1	7.8	63	4	178	
August.....	.27	319	452	1	7.9	61	2	176	
September.....	.34	461	600	1	7.9	83	4	237	
October.....	.36	402	539	0	7.9	70	4	208	
November.....	.33	243	346	0	7.9	43	2	154	
December.....	.52	269	373	0	7.9	49	2	161	
Average.....	.38	311	430	0	7.8	57	2	174	
Maximum Months.....	.57	461	600	1	7.9	83	4	237	
Minimum Months.....	.26	231	310	0	7.7	38	1	132	

MONTH	Postassium (K) (WC)	Sodium (Na) (WC)	Calcium (Ca) (WC)	Magnesium (Mg) (WC)	Iron Total (Fe) (WC)	Manganese (Mn) (WC)	Aluminum (Al) (WC)	Chloride (Cl) (WC)	Sulfate (SO ₄) (WC)	Silica (SiO ₂) (WC)
January.....	3.0	28.8	52	14	.05	.01	.02	54	128	9.6
February.....	2.9	18.0	41	9	.02	.00	.02	32	90	10.3
March.....	2.5	18.5	47	13	.02	.00	.01	44	104	10.6
April.....	2.2	14.0	38	9	.07	.00	.01	28	85	8.1
May.....	—	—	43	13	.07	.01	.04	34	103	9.3
June.....	4.1	20.7	50	13	.03	.00	.03	40	106	9.3
July.....	4.1	20.0	49	13	.05	.00	.04	40	100	8.5
August.....	4.5	25.0	43	15	.08	.00	.05	44	102	7.9
September.....	5.8	36.5	63	17	.05	.00	.05	58	135	6.7
October.....	5.4	33.6	56	15	.04	.01	.03	55	122	7.7
November.....	5.2	17.5	44	14	.06	.00	.03	31	84	10.2
December.....	4.1	16.0	44	12	.04	.01	.03	37	91	12.4
Average.....	3.7	20.7	48	13	.05	.00	.03	41	104	9.2
Maximum Mo.....	5.8	36.5	63	17	.08	.01	.05	58	135	12.4
Minimum Mo.....	2.2	14.0	38	9	.02	.00	.01	28	84	6.7

NOTES: FREQ. =frequency of analyses. Individual or grab samples: (8D) eight per day, (1D) one per day, (1W or 3W) one or three per week. COMPOSITE OF daily (6:00 A.M.) grab samples: (WC) one on weekly composite.

**PHYSICAL AND CHEMICAL ANALYSES FOR FINISHED WATER
FROM THE BELMONT WATER TREATMENT PLANT IN 1970**

Table IV-A2

Figures in mg/1 unless otherwise indicated

MONTH	Chromium (Cr ⁺⁶) FREQ.	PHOSPHATES		Fluoride (F) 1D	CHLORINE RESID. (Cl) (Chloramine)		Chem. O. D. (C.O.D.) 1W
		Ortho (PO ₄) 1W	Poly (PO ₄) 1W		Total 8D	(Free) 8D	
January.....	.008	.21	1.15	1.07	1.90	.03	5.3
February.....	.006	.17	.96	.98	1.50	.03	5.0
March.....	.006	.29	1.29	.97	1.60	.03	5.1
April.....	.005	.31	1.36	.90	1.90	.03	4.4
May.....	.005	.40	1.06	.88	1.60	.03	4.7
June.....	.009	.70	1.04	.93	1.70	.03	6.2
July.....	.008	.58	1.07	.95	2.50	.03	5.7
August.....	.009	.56	.95	.91	2.60	.04	4.2
September.....	.008	.69	1.25	.93	2.60	.03	6.6
October.....	.006	.64	1.04	.92	2.60	.03	7.6
November.....	.007	.34	1.09	.90	2.00	.03	5.5
December.....	.006	.29	1.27	.95	1.80	.03	5.0
Average.....	.007	.43	1.3	.94	2.00	.03	5.4
Maximum Mo.....	.009	.70	1.36	1.07	2.60	.04	7.6
Minimum Mo.....	.005	.17	.95	.88	1.50	.03	4.2

MONTH	DISSOLVED OXYGEN		NITROGEN			Detergents (ABS) WC
	PPM (D.O.) 1W	Sat'n. Per Cent 1W	NH ₃ (N) 1W	NO ₂ (N) 1W	NO ₃ (N) 1W	
January.....	13.5	115	.31	.001	2.48	.21
February.....	13.1	111	.39	.001	2.88	.09
March.....	10.8	100	.36	.003	3.00	.07
April.....	10.7	105	.42	.003	2.50	.03
May.....	8.0	91	.26	.002	2.48	.04
June.....	7.2	88	.29	.003	2.90	.07
July.....	7.1	88	.36	.002	2.79	.06
August.....	6.7	82	.44	.002	2.54	.07
September.....	7.5	92	.42	.004	2.62	.04
October.....	7.8	89	.47	.007	3.18	.06
November.....	9.8	102	.44	.002	2.77	.06
December.....	10.6	99	.34	.002	2.70	.08
Average.....	9.4	97	.38	.003	2.74	.07
Maximum Months.....	13.5	115	.44	.007	3.18	.21
Minimum Months.....	6.7	82	.26	.001	2.48	.03

NOTES: FREQ. =frequency of analyses. Individual or grab samples: (8D) eight per day, (1D) one per day, (1W or 3W) one or three per week. COMPOSITE OF daily (6:00 A.M.) grab samples: (WC) one on weekly composite.

**PHYSICAL AND CHEMICAL ANALYSES FOR FINISHED WATER
FROM THE QUEEN LANE WATER TREATMENT PLANT IN 1970**

Table IV-B1

Figures in mg/1 unless otherwise indicated

MONTH	Turbidity (JTU) FREQ.	Residue Total WC	Spec. Cond. (µmhos) WC	Color Appar- ent 1W	pH (Units) 8D	Alka- linity (CaCO ₃) 8D	Carbon Dioxide (CO ₂) 1W	Hard- ness (CaCO ₃) WC
February.....	.26	272	386	0	7.4	44	3	120
March.....	.10	280	398	0	7.2	48	8	143
April.....	.21	239	339	0	7.5	43	5	113
May.....	.04	294	428	0	7.4	53	5	151
June.....	.06	351	459	0	7.3	58	5	166
July.....	.04	331	443	0	7.5	60	4	157
August.....	.03	321	440	1	7.6	61	4	153
September.....	.02	440	583	0	7.5	75	8	216
October.....	.08	388	510	0	7.3	60	7	184
November.....	.18	246	352	0	7.5	47	3	137
December.....	.05	270	368	0	7.3	50	7	146
Average.....	.10	315	435	0	7.4	54	5	154
Maximum Months.....	.26	440	583	1	7.6	75	8	216
Minimum Months.....	.02	239	339	0	7.2	43	3	113

MONTH	Potas- sium (K) WC	So- dium (Na) WC	Cal- cium (Ca) WC	Magne- sium (Mg) WC	Iron Total (Fe) WC	Manga- nese (Mn) WC	Alu- minum (Al) WC	Chlo- ride (Cl) WC	Sul- fate (SO ₄) WC	Sil- ica (SiO ₂) WC
February.....	3.4	37.0	33	11	.03	.00	.12	51	89	10.2
March.....	3.6	33.5	37	14	.01	.00	.07	51	98	10.6
April.....	2.8	36.0	30	10	.06	.00	.12	37	80	10.0
May.....	—	—	39	12	.06	.00	.04	39	100	8.8
June.....	4.6	31.3	44	12	.03	.00	.04	44	112	9.6
July.....	4.1	30.5	40	14	.07	.01	.02	38	96	8.8
August.....	4.5	33.5	36	14	.09	.00	.03	44	100	7.9
September.....	5.9	42.0	55	15	.04	.00	.02	59	131	7.0
October.....	5.6	40.8	50	13	.06	.00	.04	54	116	6.7
November.....	5.1	28.3	34	12	.08	.00	.12	37	77	10.4
December.....	5.2	27.0	36	13	.04	.01	.03	41	84	12.0
Average.....	4.1	32.1	40	13	.05	.00	.07	47	100	9.5
Maximum Mo.....	5.9	45.2	55	16	.09	.03	.14	71	131	12.0
Minimum Mo.....	2.8	27.0	30	10	.01	.00	.02	37	77	6.7

NOTES: FREQ. =frequency of analyses. Individual or grab samples: (8D) eight per day, (1D) one per day, (1W or 3W) one or three per week. COMPOSITE OF (6:00 A.M.) grab samples: (WC) one on weekly composite.

PHYSICAL AND CHEMICAL ANALYSES FOR FINISHED WATER FROM THE QUEEN LANE WATER TREATMENT PLANT IN 1970

Table IV-B2

Figures in mg/1 unless otherwise indicated

MONTH FREQ.	Chrom-ium (Cr ⁺⁶)	PHOSPHATES (PO ₄) Gravity				Fluo-ride (F)	CHLORINE RESID. (Cl) (Break-Point)		Chem. O. D. (COD)
	1W	Ortho 1W	Poly 1W	High Oriho 1W	Service Poly 1W	Total 8D	Free 8D	1W	
January.....	.006	.02	.11	.12	.65	1.02	1.70	1.30	6.5
February.....	.005	.07	.03	.10	.40	.94	1.60	1.20	4.5
March.....	.006	.10	.41	.15	.85	1.01	1.70	1.40	7.7
April.....	.004	.05	.06	.17	1.16	.92	1.50	1.20	5.6
May.....	.004	.08	.10	.22	1.40	.96	1.40	1.10	4.3
June.....	.009	.18	.07	.30	.78	1.01	1.30	1.10	5.8
July.....	.007	.28	.09	.39	.76	1.01	1.30	1.00	6.9
August.....	.009	.25	.08	.40	.57	.95	1.30	1.00	5.4
September.....	.007	.54	.13	.63	.84	1.05	1.40	1.10	7.8
October.....	.006	.60	.12	.71	1.30	.96	1.40	1.10	8.4
November.....	.006	.10	.07	.22	1.33	.80	1.40	1.10	8.1
December.....	.006	.14	.11	.21	1.07	.75	1.30	1.00	6.7
Average.....	.006	.20	.12	.30	.93	.95	1.40	1.10	6.5
Maximum Mo.....	.009	.60	.41	.71	1.40	1.02	1.70	1.40	8.4
Minimum Mo.....	.004	.02	.03	.10	.40	.75	1.30	1.00	4.3

MONTH FREQ.	DISSOLVED OXYGEN PPM		NH ₃ (N)	NITROGEN		Deter- gents (ABS)
	(D.O.) 1W	Sat'n. Per Cent 1W		NO ₂ (N) 1W	NO ₃ (N) 1W	
January.....	11.9	91	.03	.001	2.90	.23
February.....	11.5	93	.08	.001	3.05	.13
March.....	11.4	96	.08	.002	3.25	.10
April.....	10.5	97	.07	.002	2.58	.04
May.....	8.2	90	.06	.001	2.65	.04
June.....	7.7	90	.06	.001	3.00	.07
July.....	7.5	91	.12	.001	2.94	.07
August.....	7.0	86	.16	.001	2.49	.09
September.....	6.9	84	.10	.001	2.87	.05
October.....	7.7	85	.14	.001	3.31	.07
November.....	10.0	92	.08	.001	2.72	.08
December.....	10.8	93	.06	.001	3.14	.11
Average.....	9.3	91	.09	.001	2.91	.09
Maximum Months.....	11.9	97	.16	.002	3.31	.23
Minimum Months.....	6.9	84	.03	.001	2.49	.04

NOTES: FREQ. =frequency of analyses. Individual or grab samples: (8D) eight per day, (1D) one per day, (1W or 3W) one or three per week. COMPOSITE OF daily (6:00 A.M.) grab samples: (WC) one on weekly composite.

PHYSICAL AND CHEMICAL ANALYSES FOR FINISHED WATER FROM THE TORRESDALE WATER TREATMENT PLANT IN 1970

Table IV-C1

Figures in mg/1 unless otherwise indicated

MONTH FREQ.	Turbid-ity (JTU)	Res-idue Total	Spec. Cond. (μhos)	Color Appar-ent	pH (Units)	Alka- linity (CaCO ₃)	Carbon Dioxide (CO ₂)	Hard- ness (CaCO ₃)
	8D	WC	WC	1W	8D	8D	1W	WC
January.....	.00	183	280	0	8.2	36	3	115
February.....	.00	153	248	0	8.6	29	2	99
March.....	.00	165	283	0	8.6	35	3	112
April.....	.00	142	196	0	8.5	24	2	91
May.....	.00	174	223	0	8.4	34	0	103
June.....	.00	219	269	0	8.6	43	0	133
July.....	.08	202	258	0	8.7	45	0	124
August.....	.08	219	280	0	8.6	46	0	110
September.....	.08	201	282	0	8.7	46	0	107
October.....	.08	193	270	0	8.7	43	0	105
November.....	.08	178	258	0	8.6	34	0	101
December.....	.08	179	265	0	8.6	36	0	107
Average.....	.04	183	259	0	8.4	38	1	109
Maximum Months.....	.08	219	283	0	8.7	46	3	133
Minimum Months.....	.00	142	196	0	8.2	24	0	91

MONTH FREQ.	Potas- sium (K)	So- dium (Na)	Cal- cium (Ca)	Magne- sium (Mg)	Iron Total (Fe)	Manga- nese (Mn)	Alu- minum (Al)	Chlo- ride (Cl)	Sul- fate (SO ₄)	Sil- ica (SiO ₂)
	WC	WC	WC	WC	WC	WC	WC	WC	WC	WC
January.....	2.0	12.8	33	6	.01	.04	.04	33	25	3.1
February.....	1.6	10.2	30	5	.03	.00	.05	31	21	3.5
March.....	1.6	9.7	31	7	.00	.00	.05	33	21	4.7
April.....	1.4	6.3	27	5	.02	.02	.08	27	19	3.9
May.....	1.7	7.4	34	6	.02	.00	.07	27	22	3.3
June.....	2.6	8.8	41	7	.02	.00	.05	29	28	3.7
July.....	3.0	9.6	37	7	.04	.00	.06	25	28	2.1
August.....	3.6	10.0	32	6	.03	.00	.07	28	31	2.6
September.....	3.5	10.8	30	6	.01	.00	.08	32	33	1.4
October.....	3.1	10.6	29	6	.02	.00	.05	33	29	2.0
November.....	2.8	7.1	31	5	.05	.00	.04	35	33	4.5
December.....	2.6	8.6	33	6	.01	.00	.05	35	29	4.7
Average.....	2.5	9.3	32	6	.02	.01	.06	31	27	3.3
Maximum Mo.....	3.6	12.8	41	7	.05	.04	.08	35	33	4.7
Minimum Mo.....	1.4	6.3	27	5	.00	.00	.04	25	19	1.4

NOTES: FREQ. =frequency of analyses. Individual or grab samples: (8D) eight per day, (1D) one per day, (1W or 3W) one or three per week. COMPOSITE OF daily (6:00 A.M.) grab samples: (WC) one on weekly composite.

PHYSICAL AND CHEMICAL ANALYSES FOR FINISHED WATER FROM THE TORRESDALE WATER TREATMENT PLANT IN 1970

Table IV-C2

Figures in mg/1 unless otherwise indicated

MONTH	Chromium (Cr ⁺⁶)	PHOSPHATES			CHLORINE RESID. (Cl ₂)		Chem. O. D. (C.O.D.)
		Ortho (PO ₄)	Poly (PO ₄)	Fluoride (F)	(Total)	(Free)	
FREQ.	1W	1W	1W	1D	8D	8D	1W
January.....	.003	.03	.02	1.05	1.40	1.10	5.0
February.....	.001	.04	.10	1.01	1.30	1.10	12.4
March.....	.001	.05	.06	1.03	1.20	.95	5.0
April.....	.004	.05	.02	.94	1.20	1.00	5.5
May.....	.007	.06	.01	.89	1.20	1.00	5.8
June.....	.003	.08	.01	.91	1.20	1.00	7.9
July.....	.001	.18	.01	.85	1.30	1.10	10.1
August.....	.000	.20	.02	.80	1.60	1.40	6.5
September.....	.000	.17	.03	.73	1.50	1.30	7.7
October.....	.000	.14	.02	.79	1.60	1.40	3.4
November.....	.000	.09	.02	.86	1.60	1.40	3.4
December.....	.000	.11	.02	.85	1.50	1.30	2.2
Average.....	.002	.10	.03	.89	1.40	1.20	6.2
Maximum Mo...	.007	.20	.10	1.05	1.50	1.40	12.4
Minimum Mo....	.000	.03	.01	.73	1.20	.95	2.2

MONTH	DISSOLVED OXYGEN		NITROGEN			Detergents (ABS)
	PPM (D.O.)	Sat'n. Per Cent	NH ₃ (N)	NO ₂ (N)	NO ₃ (N)	
FREQ.	1W	1W	1W	1W	1W	WC
January.....	14.1	100	.01	.000	.57	.08
February.....	14.3	108	.01	.002	.57	.04
March.....	11.4	95	.06	.001	.56	.06
April.....	10.9	96	.03	.000	.65	.03
May.....	8.1	86	.01	.000	.56	.04
June.....	5.6	63	.14	.000	1.17	.04
July.....	5.7	68	.10	.000	1.53	.04
August.....	5.5	68	.01	.000	1.36	.04
September.....	6.2	74	.01	.000	1.22	.04
October.....	6.9	76	.00	.000	1.29	.05
November.....	9.4	93	.02	.000	1.04	.04
December.....	11.6	96	.01	.000	.92	.04
Average.....	9.1	85	.03	.000	.95	.05
Maximum Months.....	14.3	108	.14	.002	1.53	.08
Minimum Months.....	5.5	63	.01	.000	.56	.03

NOTES: FREQ. =frequency of analyses. Individual or grab samples: (8D) eight per day, (1D) one per day, (1W or 3W) one or three per week. COMPOSITE OF daily (6:00 A.M.) grab samples: (WC) one on weekly composite.

COLIFORM ORGANISMS IN WATER TREATMENT PLANT EFFLUENTS AND IN THE DISTRIBUTION SYSTEM—1970

Table V

MONTH	*Number of Std. Samples	No. 10 ml. Portions Tested	10 ml. Portions Positive		Samples with 3 or more Portions	
			No.	%	No.	%
EFFLUENTS—DELAWARE AND SCHUYLKILL TREATMENT PLANTS						
January.....	551	2755	0	0.00	0	0.00
February.....	499	2495	1	0.04	0	0.00
March.....	539	2695	10	0.37	2	0.37
April.....	535	2675	2	0.08	0	0.00
May.....	552	2760	1	0.04	0	0.00
June.....	537	2685	6	0.22	1	0.19
July.....	550	2750	0	0.00	0	0.00
August.....	557	2785	11	0.40	2	0.36
September.....	538	2690	0	0.00	0	0.00
October.....	556	2780	1	0.04	0	0.00
November.....	516	2580	4	0.16	1	0.19
December.....	519	2595	0	0.00	0	0.00
TOTAL.....	6449	32245	36	.....	6	.....
Percent.....	.....	.....	.....	0.11	..	0.11
Maximum Months..	557	2785	11	0.40	2	0.37
Minimum Months....	499	2495	0	0.00	0	0.00

DISTRIBUTION SYSTEM—DELAWARE AND SCHUYLKILL						
January.....	890	4450	14	0.31	2	0.23
February.....	770	3850	0	0.00	0	0.00
March.....	880	4400	4	0.09	0	0.00
April.....	907	4535	0	0.00	0	0.00
May.....	908	4540	4	0.09	1	0.11
June.....	946	4730	12	0.25	2	0.21
July.....	966	4830	29	0.60	6	0.61
August.....	935	4675	11	0.24	1	0.11
September.....	934	4670	28	0.60	5	0.53
October.....	946	4730	12	0.25	2	0.21
November.....	814	4070	13	0.32	2	0.25
December.....	966	4830	1	0.02	0	0.00
TOTAL.....	10862	54310	128	.....	21	.....
Percent.....	.....	.....	.....	0.24	.....	0.19
Maximum Months..	966	4830	29	0.60	6	0.61
Minimum Months....	770	3850	0	0.00	0	0.00

NOTE:—*Each Standard Sample consists of five-10 ml. Standard Portions as defined by U.S. Public Health Service Drinking Water Standards for 1962.

COLIFORM ORGANISMS IN THE FINISHED WATERS OF THE DISTRIBUTION SYSTEM—1961-1970

Table VI

Per Cent of 10 Milliliter STANDARD PORTIONS Having Positive Confirmed Tests

YEAR	MONTHLY PERCENTAGES												Annual	MONTHLY	
	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Aver.	Max.	Min.
1961.....	0.05	0.00	0.00	0.07	0.35	0.49	0.47	0.37	0.59	0.61	0.40	0.10	0.30	0.61	0.00
1962.....	0.07	0.06	0.00	0.00	0.21	1.30	3.30	0.50	0.40	0.32	0.15	0.03	0.53	3.30	0.00
1963.....	0.02	0.03	0.02	0.12	0.26	0.16	0.79	0.66	0.46	0.35	0.30	0.06	0.27	0.79	0.02
1964.....	0.02	0.10	0.04	0.00	0.05	0.23	0.60	0.88	1.10	0.27	0.00	0.09	0.29	1.10	0.00
1965.....	0.00	0.00	0.02	0.00	0.12	0.23	1.54	1.63	0.36	0.02	0.03	0.00	0.35	1.63	0.00
1966.....	0.00	0.08	0.06	0.00	0.05	0.45	1.55	0.37	0.56	0.14	0.07	0.07	0.28	1.55	0.00
1967.....	0.02	0.00	0.89	0.39	0.23	0.02	0.00	0.25	0.05	0.09	0.07	0.14	0.18	0.89	0.00
1968.....	0.11	0.00	0.22	0.18	0.12	0.32	0.70	0.75	0.28	0.40	0.00	0.00	0.26	0.75	0.00
1969.....	0.00	0.03	0.00	0.09	0.00	0.11	0.40	0.13	0.48	0.02	0.45	0.02	0.14	0.48	0.00
1970.....	0.31	0.00	0.09	0.00	0.09	0.25	0.60	0.24	0.60	0.25	0.32	0.02	0.24	0.60	0.00
10 YEAR PERIOD — 1961-1970 INCLUSIVE															
Average.....	0.06	0.03	0.13	0.08	0.15	0.36	0.99	0.58	0.49	0.35	0.18	0.05	0.28	.....	.....
Maximum....	0.41	0.22	0.89	0.39	0.35	1.30	3.30	1.63	1.10	0.78	0.90	0.63	0.53	3.30	.....
Minimum....	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.13	0.05	0.02	0.00	0.00	0.14	.....	0.00

NOTE:—U.S. Public Health Service Drinking Water Standards (1962) require that when 10 ml. standard portions are examined, NOT MORE THAN 10% OF THESE PORTIONS in any month shall show the presence (positive confirmed tests) of coliform group.

COLIFORM ORGANISMS IN THE FINISHED WATERS OF THE DISTRIBUTION SYSTEM—1961-1970

Table VI-A

Per Cent of SAMPLES Having Three or More 10 Milliliter Portions with Positive Confirmed Tests

YEAR	MONTHLY PERCENTAGES												Annual	MONTHLY	
	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Aver.	Max.	Min.
1961.....	0.00	0.00	0.00	0.00	0.23	0.35	0.50	0.32	0.49	0.35	0.50	0.00	0.23	0.50	0.00
1962.....	0.00	0.00	0.00	0.00	0.23	1.00	3.50	0.20	0.24	0.21	0.13	0.00	0.46	3.50	0.00
1963.....	0.00	0.00	0.00	0.12	0.21	0.00	0.44	0.49	0.26	0.21	0.28	0.00	0.17	0.49	0.00
1964.....	0.00	0.13	0.00	0.00	0.00	0.11	0.62	0.79	0.70	0.23	0.00	0.11	0.23	0.79	0.00
1965.....	0.00	0.00	0.00	0.00	0.12	0.11	1.14	0.99	0.36	0.00	0.00	0.00	0.23	1.14	0.00
1966.....	0.00	0.00	0.00	0.00	0.00	0.34	1.60	0.22	0.23	0.12	0.00	0.00	0.21	1.60	0.00
1967.....	0.00	0.00	0.76	0.46	0.21	0.00	0.00	0.21	0.00	0.11	0.12	0.12	0.17	0.76	0.00
1968.....	0.11	0.00	0.11	0.12	0.10	0.24	0.88	0.64	0.23	0.30	0.00	0.00	0.23	0.88	0.00
1969.....	0.00	0.00	0.00	0.11	0.00	0.11	0.45	0.00	0.35	0.00	0.42	0.00	0.12	0.45	0.00
1970.....	0.23	0.00	0.00	0.00	0.11	0.21	0.61	0.11	0.53	0.21	0.25	0.00	0.19	0.61	0.00
10 YEAR PERIOD—1961-1970 INCLUSIVE															
Average.....	0.03	0.01	0.09	0.08	0.12	0.25	0.97	0.40	0.40	0.17	0.17	0.02	0.22	.....	.....
Maximum.....	0.34	0.13	0.76	0.46	0.23	1.00	3.50	0.99	0.72	0.86	0.77	0.50	0.46	3.50	.....
Minimum.....	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	.....	0.00

NOTE:—U.S. Public Health Service Drinking Water Standards (1962) require that when 10 ml. standard portions are examined, not more than 5% of the standard samples in any month shall have three or more 10 ml. standard portions positive.

WATER TEMPERATURES TAKEN AT 6:00 A.M. AT WATER TREATMENT PLANTS

Table VII
Temperatures in Degrees Fahrenheit

MONTH	<i>BELMONT—1970</i>			<i>QUEEN LANE—1970</i>			<i>TORRESDALE—1970</i>			<i>ALL PLANTS ANNUAL 1970</i>		
	<i>Mo. Avg.</i>	<i>Daily Max. Min.</i>		<i>Mo. Avg.</i>	<i>Daily Max. Min.</i>		<i>Mo. Avg.</i>	<i>Daily Max. Min.</i>		<i>Mo. Avg.</i>	<i>Daily Max. Min.</i>	
January.....	37	42	33	36	40	32	36	39	35	36	42	32
February.....	40	43	35	37	42	32	39	46	32	39	46	32
March.....	45	50	42	44	50	41	43	51	40	44	51	40
April.....	52	65	44	49	62	40	49	59	41	50	65	40
May.....	70	77	63	66	74	60	66	71	59	69	77	59
June.....	76	79	73	73	76	68	76	78	72	75	79	68
July.....	81	85	77	76	81	71	80	83	78	79	85	71
August.....	82	85	79	79	83	76	82	84	81	81	85	76
September.....	78	83	74	75	78	70	79	81	75	78	83	70
October.....	65	72	58	65	70	60	68	74	57	66	74	57
November.....	50	59	44	55	61	46	53	58	44	53	61	44
December.....	44	51	37	47	51	38	42	45	39	44	51	37
Annual.....	60	85	33	58	83	32	59	84	32	59	85	32

10 YEAR PERIOD AVERAGES (1961-1970)

Year	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	<i>Annual Avg.</i>	<i>Daily Max.</i>	<i>Min.</i>
1961.....	37	37	44	51	63	74	79	80	79	67	57	44	59	85	32
1962.....	40	40	44	54	67	76	78	80	74	66	51	41	59	82	32
1963.....	35	35	43	57	67	75	81	79	71	66	55	40	59	86	32
1964.....	37	38	45	53	67	75	82	79	75	65	56	45	60	85	32
1965.....	40	39	45	54	70	75	79	79	75	64	53	45	60	86	32
1966.....	39	38	47	53	62	74	82	80	73	62	55	44	59	88	32
1967.....	40	39	41	54	59	76	79	78	72	65	50	42	58	87	32
1968.....	35	38	43	58	63	71	78	81	75	67	54	43	59	86	32
1969.....	39	41	43	53	66	74	78	78	76	66	55	45	59	86	32
1970.....	36	39	44	50	69	75	79	81	78	66	53	44	59	85	32
Average.....	38	38	44	54	65	75	79	79	75	65	54	43	59	....	....
Maximum.....	40	41	47	58	70	76	82	81	79	67	57	40	*35	88	....
Minimum.....	35	35	41	50	59	71	78	78	71	62	50	45	*82	....	32

*Equals 10-year maximum and minimum monthly average.

TOTAL PRECIPITATION AT PHILADELPHIA INTERNATIONAL AIRPORT †

Table VIII

Precipitation in Inches

MONTH	*NORMAL VALUES AND AVERAGES			RECORD VALUES 1941-1970				TOTAL PRECIPITATION	
	1872 1969	1931 1960	1961 1970	Maximum Pptn. Yr.		Minimum Pptn. Yr.		1970	1969
	January.....	3.19	3.32	2.44	6.06	1949	0.45	1955	0.74	1.57
February.....	3.09	2.80	2.54	4.64	1958	1.37	1954	2.08	1.88
March.....	3.51	3.80	3.40	6.27	1953	0.68	1966	3.83	1.92
April.....	3.24	3.40	3.31	6.58	1947	1.13	1963	6.12	1.68
May.....	3.31	3.74	2.55	7.41	1948	0.47	1964	2.57	3.30
June.....	3.56	4.05	3.86	7.40	1962	0.11	1949	4.60	7.31
July.....	4.13	4.16	4.10	8.33	1969	0.64	1957	2.75	8.33
August.....	4.52	4.63	3.45	9.70	1955	0.49	1964	3.99	2.66
September.....	3.38	3.46	3.46	8.78	1960	0.44	1968	0.82	4.38
October.....	2.77	2.78	2.17	5.21	1943	0.09	1963	3.66	1.13
November.....	3.05	3.40	3.12	6.67	1963	1.05	1965	4.71	1.97
December.....	3.17	2.94	4.19	7.23	1969	0.25	1955	3.27	7.23
Annual.....	40.92	42.48	38.06	49.06	1948	29.34	1965	39.14	43.36

TOTAL PRECIPITATION

MONTH	1968	1967	1966	1965	1964	1963	1962	1961	1960
January.....	2.90	1.67	2.82	2.35	3.92	2.31	2.95	3.16	3.11
February.....	1.40	1.82	4.30	2.18	2.83	2.19	3.51	3.13	3.44
March.....	4.98	4.53	0.68	3.19	1.94	3.94	3.91	5.17	1.96
April.....	1.57	2.17	4.35	2.33	5.27	1.13	3.69	4.82	2.92
May.....	5.17	3.49	2.95	1.23	0.47	1.06	1.85	3.38	3.65
June.....	5.89	4.12	0.41	2.85	0.21	2.88	7.40	2.95	0.71
July.....	2.00	7.11	2.35	3.22	3.83	3.13	2.30	5.96	5.52
August.....	1.24	7.08	1.63	4.06	0.49	3.35	6.58	3.42	3.19
September.....	0.44	2.96	8.70	3.02	2.42	6.44	2.77	2.41	8.78
October.....	3.15	2.00	5.12	2.02	1.73	0.09	0.95	1.83	2.79
November.....	4.17	1.99	2.36	1.05	1.64	6.67	4.60	2.04	1.92
December.....	2.54	5.88	4.33	1.85	5.13	1.76	2.11	2.78	3.16
Annual.....	35.45	44.82	40.00	29.34	29.88	34.95	42.62	41.05	41.15

NOTE: †WEATHER BUREAU DATA—U.S. Weather Bureau, International Airport, Philadelphia, Pa.

*Normal Values: 1872-1969 = Record mean values unadjusted
1931-1960 = Climatological standard normals
1961-1970 = 10 year averages, inclusive

COMPARATIVE HARDNESSES OF FINISHED WATER 1961-1970

Table IX

SCHUYLKILL WATER

YEAR	PARTS PER MILLION			GRAINS PER GALLONS		
	Yearly Avg.	Monthly Avg. Max. Min.		Yearly Avg.	Monthly Avg. Max. Min.	
1961.....	153	266	97	9.0	15.6	5.7
1962.....	148	251	89	8.7	14.7	5.2
1963.....	160	230	99	9.4	13.5	5.8
1964.....	164	278	108	9.6	16.3	6.3
1965.....	180	230	125	10.5	13.5	7.3
1966.....	171	238	114	10.0	13.9	6.7
1967.....	149	185	125	8.7	10.8	7.3
1968.....	163	236	113	9.5	13.8	6.6
1969.....	189	269	127	11.0	15.7	7.3
1970.....	164	237	113	9.5	13.9	6.7
10 Year Avg....	164	278	89	9.5	16.3	5.2

DELAWARE WATER

1961.....	90	102	64	5.3	6.0	3.7
1962.....	93	107	69	5.4	6.3	4.0
1963.....	99	108	87	5.8	6.3	5.1
1964.....	97	114	74	5.7	6.7	4.3
1965.....	99	120	74	5.8	7.0	4.3
1966.....	98	116	80	5.7	6.8	4.7
1967.....	99	115	75	5.8	6.7	4.4
1968.....	99	113	86	5.8	6.6	5.0
1969.....	104	131	77	6.0	7.7	4.4
1970.....	109	133	91	6.3	7.7	5.3
10 Year Avg....	99	133	64	5.8	7.7	3.7

NOTE: One grain per gallon is equivalent to 17.1 parts per million (P.P.M.)



Data prepared by Belmont unit of Water Quality Control
and Research Division. Charles I. Pierce, unit supervisor.