city of philadelphia water department annual report 1965

For Modern Administration: In 1965, the graceful new Municipal Services Building became headquarters for many City departments. Equipped with many advanced features, the building has a special area for meeting all the needs of the public quickly and efficiently. Center city units of the Water Department moved into the building in late spring.

JAMES H. J. TATE
Mayor

FRED T. CORLETO
Managing Director

SAMUEL S. BAXTER
Commissioner &
Chief Engineer

city of philadelphia water department annual report 1965

the water department

SAMUEL S. BAXTER
Commissioner and Chief Engineer

WATER OPERATIONS

CHARLES E. VICKERMAN
Deputy Commissioner
Water Operations

Division Chiefs

†ELWOOD L. BEAN
Water Treatment

ELMER GOEBEL
Distribution

VICTOR A. PAGNOTTO
Load Control Center

HENRY F. KALINOSKI
Pumping

ROBERT F. WALKER
Customer Service

W. FRANK SCOTT
Water Main Records

WILLIAM SNYDER
Automotive Maintenance

WATER POLLUTION CONTROL

CARMEN GUARINO
Chief, Water Pollution Control

Division Chiefs

RALPH A. HOOT
Wastewater Treatment

ABRAHAM L. BARMISH
Sewer Maintenance

JACOB S. REICH
Industrial Wastes

EUGENE V. BONNER
Sewer Records
and Information

COMMISSIONER'S STAFF

SAMUEL J. SCHWARTZ
Assistant

RAYMOND J. HARRIS
Administrative Assistant

ERVIN L. DAVIS
Executive Assistant

ADMINISTRATIVE SERVICES

B. BARNEY PALMER
Administrative Services Director

FLOYD PLATTON
Personnel Officer

JACOB BALK
Meter Shop

FISCAL SERVICES

LEIGH B. HEBB
Chief, Fiscal Division

ENGINEERING

JOHN BRIGGS
Assistant Chief Engineer

Division Chiefs

ABRAHAM FINKELSTEIN
Design

KENNETH ZITOMER
Construction

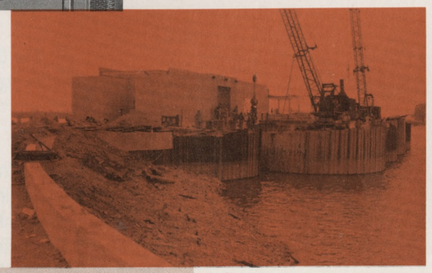
JAMES A. BRADY, JR.
Projects Control

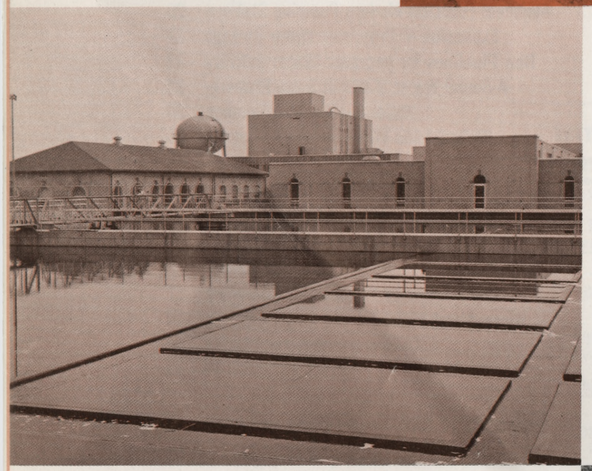
WILLIAM R. CROOKS
Testing Laboratory

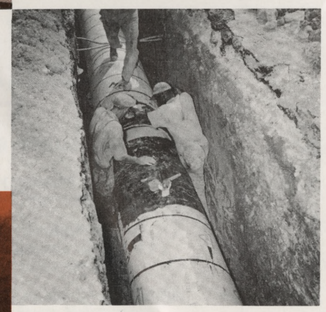
JOSEPH RADZIUL
Research and Development

†Sub Chiefs: John Dillener, Delaware Filters; Robert J. Waters (died June 7, 1966), Schuylkill Filters; Charles Pierce, Quality Control, Schuylkill; Sylvester J. Campbell, Quality Control, Delaware.

contents







highlights of 1965

That Philadelphia has created a strong, modern water supply, more than one event underlined in 1965.

Not the least of these events was an unprecedented drought that swept across the Northeastern states, limiting the water supplies of many communities. Though the drought bore down heavily, Philadelphia suffered no shortage of water. Not only was its water supply abundant and unrationed, but the quality of its treated water continued to be good.

One reason for the city's good fortune was the fact that it had planned ahead. In less than two decades, Philadelphia had replaced the most important elements in its old water system and it had done much to clean up the streams from which it draws its water.

More than $148 million of local funds had been invested in new plants and pipelines for the purification, pumping, storage, and distribution of water. The new plants were transforming the river water into a pure and palatable product, sped to consumers with increased efficiency.

At the same time, the city had invested $247 million in new facilities for the collection and treatment of wastes. By the end of 1965, it was treating virtually all its own wastewater, plus huge quantities from outlying communities.

This wastewater treatment — joined to the clean-up efforts of other Delaware Basin communities and public agencies — had greatly improved the Delaware and Schuylkill Rivers. Thus despite dwindling stream flows in 1965, Philadelphia experienced few problems. The river water bore few of the tastes and odors that might have been expected.

Yet, as the year wore on, the drought cast a lengthening shadow toward Philadelphia. Because of the fresh water drop in the Delaware River, tidal salt water moved slowly up the Delaware estuary, distantly threatening the city's intake on that stream. Timely fresh water releases from upriver reservoirs (ordered by the Delaware River Basin Commission) stopped this forward advance.

Though the salt water advance was aggravated by upriver diversions, the threat to the city's supply was viewed as a passing and controllable phenomenon. It did not affect the essential strength of that supply.

Other events, besides the drought, underlined the growing modernity and strength of Philadel-

phia's water and wastewater systems. The self-supporting Water Department, which operates these systems, continued its $516 million improvement program (1946-71). Notable among the new facilities which it built in 1965 were the following:

1. *The city's third new water treatment plant* went into full service west of the Schuylkill River. This $10.4 million, rapid-sand plant, located at Belmont Avenue and Ford Road, will provide improved water for 400,000 consumers. It is operated by automatic and semi-automatic controls.

2. *A $2.3 million intake facility* for Delaware River water was ready for manual operation December 1 and scheduled for "push-button" operation in the following spring. Intended to supply the Torresdale Water Treatment Plant, the intake will have many advanced "efficiency" features.

3. *Modernization of water pumping stations* was almost finished, giving the city 15 new or improved stations. In 1965, improvements were made principally at two stations that serve the Torresdale Plant.

4. *Storage capacity for filtered water* was increased by 143 million gallons as four new underground basins were put into service near the Torresdale Plant. Work started on other underground basins at the abandoned Upper Roxborough water works.

5. *The Water Pollution Control Plants* were further expanded to protect the rivers from untreated wastes. At the Northeast plant, a new wing for the blower building was largely finished, while five new settling and aeration tanks (completed in December, 1964) operated throughout the year. At the Southwest Plant, new sludge concentration tanks were almost ready.

6. *The large program of storm flood relief* continued. As part of this, a big relief sewer went into service, construction was done on two other relief sewers, and digging began for a new surge basin in Mingo Creek to reduce future storm loads on a new storm water pumping station.

7. *More than 34 miles of water mains and 30 miles of sewers* were built. By the end of the year, the water main network had grown to 3,176 miles and the sewer network to 2,463 miles. Most of the pipelines built in 1965 were for the replacement of old lines or for the servicing of new homes.

Construction as a whole was valued at $18.5 million, or $14.4 million less than the year before. The drop resulted from the completion of several major facilities and a temporary decline in sewer extensions.

From the accountant's viewpoint, the Water Department actually paid out $22.5 million for capital projects in 1965, while total "net capital activity" — the book value of projects started, under way, or completed — amounted to $37.8 million. At the close of the year, the department had $15.3 million of encumbrances on its books. Almost $16 million of contracts were awarded.

Many of the physical facilities built in 1965 did not simply reinforce the municipal water supply. One of their most obvious effects was to increase general operating efficiencies and to reduce certain operating costs. This was in line with a trend of several years. Accentuating this trend were the many new "push-button" facilities, of which the Belmont Water Treatment Plant in West Philadelphia was the latest example.

By the end of 1965, automatic and semi-automatic controls had been extended to all water treatment plants and water pumping stations, as well as to some storage facilities and pipelines. At the same time, the department was experimenting with such controls at one of its water pollution control plants. The new controls required complex electronic systems. To maintain and operate these systems, the department gave increasing attention to the training of personnel.

New methods were also pursued in other directions in 1965, and the department further extended its river research and its long standing "good neighbor" policy. Thus it —

1. Set up an engineering computer center, with a newly arrived computer, to begin special engineering studies in 1966.

2. Experimented with a new rock boring machine to eliminate underground blasting and drilling.

3. Studied salt water movements, sludge deposits, and other conditions in the Delaware River.

4. Placed steel locking devices on fire hydrants in certain neighborhoods to prevent illegal openings and to preserve water pressures.

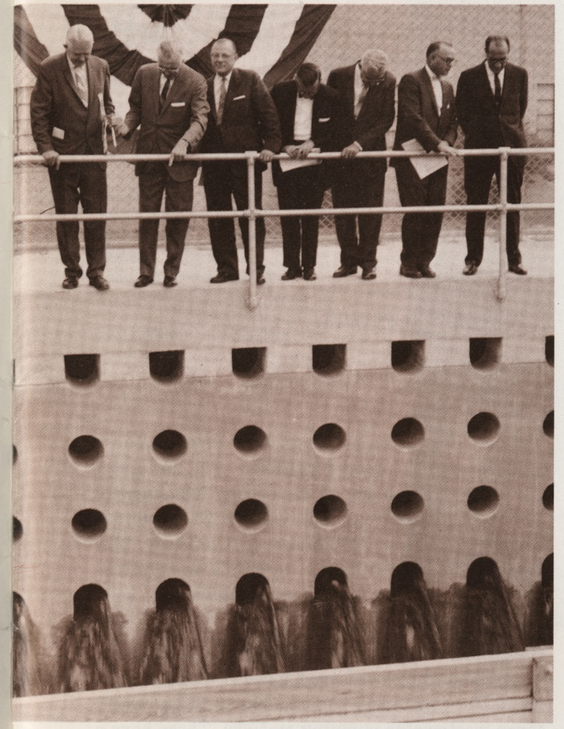
5. Agreed on behalf of the city to supply 25 million gallons of water daily to Bucks County for its water-short southern areas. Though Philadelphia treats wastes from many neighboring communities, this will be its first *sizable* sale of water outside its own borders.

The sale of water to Bucks County would not have been possible 15 years ago. It is another symbol of Philadelphia's new self-sufficiency in water supply.

In this self-sufficiency, Philadelphia's citizens have had a decisive role. Their generous and repeated support for planned improvements in water supply, administered by a single utility, has given our city an abundance of fine water to share.

So evident was this self-sufficiency in the drought of 1965 that it evoked this comment from the Hon. Stewart L. Udall, Secretary of the Interior: "The problem is to get cities to organize like Philadelphia. Then you won't have to have the federal government come in and take over."*

*Quoted from World-Telegram Sun, New York City, September 9, 1965.



SUMMARY OF WATER SUPPLY IMPROVEMENTS 1946-65

Many modern facilities help to assure cleaner water sources and a more plentiful water supply for Philadelphians. Because of extensive construction, the city's water and wastewater systems are today among the most advanced in America. Most of this work has been done since 1953.

WATER SYSTEM

Water Treatment Plants—Large treatment capacity is assured by the three modern, rapid-sand plants which Philadelphia has put into service since 1959. These plants have a rated capacity of 480 million gallons of water daily — 100 M.G.D. more than the half-century old, slow-sand plants which they replaced. For emergencies, when water demand is high, they can turn out water at the fast pace of 681 million gallons daily. Equipped with automatic and semi-automatic controls, they purify and improve the city's water with scientific precision.

Water Pumping Stations—Supporting the water treatment plants is a network of modern pumping stations that is largely automated. These stations, most of which are now operated by microwave from a distant control center, assure more capacious and reliable water delivery than Philadelphia enjoyed 15 years ago. The pumping

WATER DEPARTMENT MODERNIZATION — 1946 - 1971

WATER SYSTEM

	Encumbered - Expended 1946-1965	Scheduled 1966-1971
Load Control Center	$ 867,756	$ 327,000
Torresdale Plant	25,976,012	191,000
Queen Lane Plant	11,460,524	677,000
Belmont Plant	12,200,400	767,000
Water Pumping Stations	10,290,542	1,161,000
Water Mains — Built, Replaced, Cleaned, Lined	67,750,100	35,997,000
Filtered Water Storage	8,137,983	4,579,000
Universal Metering	4,788,064	0
Miscellaneous	3,946,653	0
High Pressure Fire System	2,717,841	3,270,000
Water System Capital Improvements	$148,135,875	$46,969,000

WASTEWATER SYSTEM

	Encumbered - Expended 1946-1965	Scheduled 1966-1971
Northeast Water Pollution Control Works	$ 15,329,328	$ 2,278,000
Southeast Water Pollution Control Works	6,605,851	371,000
Southwest Water Pollution Control Works	9,088,699	1,085,000
Water Pollution Control Pumping Stations	2,611,122	55,000
Water Pollution Control Interceptors	54,502,472	5,243,000
Sewers — Built, Replaced	128,665,618	60,337,000
Miscellaneous	3,092,238	168,500
Storm Flood Relief	26,850,298	5,111,000
Water Pollution Control Capital Improvements	$246,745,626	$74,648,500

capacity of 13 stations that serve the public has risen by 275 million gallons daily to 1,500 M.G.D. Two stations that fight fires have also been modernized.

Water Storage—To assure good water pressures and a protected supply, the city has been expanding its storage capacity for purified water. To date, five water tanks and four underground reservoirs have been built. Other underground reservoirs are planned. It is expected that by 1968, storage capacity for purified water will rise to one and one-eighth billion gallons—an increase of 234 million gallons.

Microwave Network—Increased efficiency in the distribution of water has resulted from a growing microwave network. This network of towers and electronic sensing devices flashes second-by-second information from pumping stations, reservoirs, large valves, and some pipelines to a control center. Microwave signal, sent out by the center, operates a dozen distant, unmanned pumping stations.

Water Mains—About 550 miles of new water mains have been built since 1952. These mains extend service to new homes and industries, replace old mains, or strengthen water pressures. Many miles of old mains have been cleaned and cement lined.

Water Meters—Water meters have been placed in nearly every property in the city. There are 526,000 such meters in service.

WASTEWATER SYSTEM

Water Pollution Control Plants—To protect its water sources—the Delaware and Schuylkill Rivers—Philadelphia completed three modern pollution control plants between 1951 and 1955. Since then, these plants have been expanded or improved in various degrees. With combined rated capacities of 447 million gallons daily, they are currently treating all the city's wastewater, plus huge quantities from neighboring communities.

Wastewater Pumping Stations—To collect wastewater from the sewers and speed it to the control plants for treatment, the city has built or rebuilt seven wastewater pumping stations. These have a combined pumping capacity of one billion gallons daily.

Intercepting Sewers—Of the 140 miles of big intercepting sewers which divert wastewater from branch sewers to the water pollution control plants, 78 miles have been built since the late 1940's as part of Philadelphia's stream clean-up program.

Sanitary and Small Storm Sewers—To meet growing needs, more than 450 miles of sanitary and small storm sewers have been constructed since 1953. These bring service to new neighborhoods, replace old sewers, or clean up insanitary conditions.

Storm Flood Relief—Many millions of dollars have gone into big projects to control storm flooding. These have included both tunnel and box sewers of mammoth size in Northeast, North Central, West and South Philadelphia. Frankford Creek was straightened out by means of a new channel. Various storm water pumping stations have been constructed, including a $1 million station on Mingo Creek.

the rivers

THE CHALLENGE OF THE DROUGHT

The past improvement of the Delaware and Schuylkill Rivers proved of value to Philadelphia in 1965. It helped to assure usable water sources for the city in the face of a great drought.

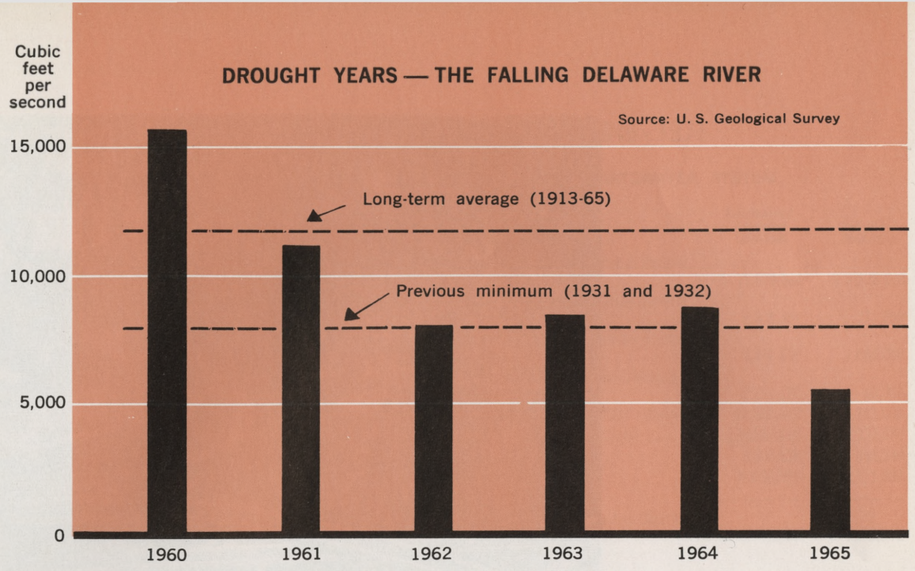
In this stream clean-up Philadelphia had played an important role (see page 27), but other communities, as well as federal, state and interstate agencies, had also done their share.

Regional cooperation for the improvement and protection of water sources had been growing, indeed, for many years. In 1965 this cooperation found its finest expression in action by the Delaware River Basin Commission to protect the quality of the Delaware River waters.

Drought made this action urgent.

Drought struck the Delaware River Basin for the fifth consecutive year. Measured at Trenton, the average flow of the Delaware from October 1, 1964 to September 30, 1965 was 5,400 cubic feet per second, or less than half of normal.* In July, 1965, the flow fell to a record low of 1,346 C.F.S.

*U. S. Geological Survey adjusted figure. Average discharge for the period 1913-65 was 11,551 C.F.S., while for the base period 1931-60 it was 12,200 C.F.S.



Annual average discharge for Delaware River at Trenton, N. J., adjusted to natural conditions.

Flow in the Schuylkill River also fell markedly. It averaged only 992 cubic feet per second at Fairmount Dam, or 36% of normal, for the water year.**

The effects of the drought in 1965 were so widespread and so severe that Philadelphia was quickly caught up in a regional water crisis.

This was not a crisis of quantity for Philadelphia. At lowest level, the flow in the Delaware was four to five times the city's withdrawal rate, and in the Schuylkill the low flows met the city's needs. Philadelphia experienced no water shortage.

It was faced, however, with a grave problem. This was the northward movement of salt water in the Delaware estuary. Because of the lowered flows of fresh water in the river, there was danger that higher concentrations of salt might reach the city's river intake at Torresdale. Through this intake passes at least half of Philadelphia's supply.

Such higher concentrations of chlorides could make the city's water objectionable to many consumers and industries, and—at certain levels—even unusable.

Unhappily, Philadelphia's problem was aggravated by the critical water needs of New York City . . . needs resulting from the lowering of that city's reservoirs in the upper Delaware Basin. Siphoning off water that a dozen years earlier would have entered the Delaware River, New York City feared to make releases from its reservoirs required by a 1954 decree of the U. S. Supreme Court. This decree stipulated that sufficient water be released from New York reservoirs to maintain a Delaware flow of 1,525 cubic feet per second at Montague, New Jersey.

Failure of New York City to make these releases threatened not only Philadelphia but also Camden and other New Jersey communities. For a brief time, New York interrupted its releases completely.

In this crisis, the Delaware River Basin Commission acted . . . Meeting on July 7, the Commission invoked the extensive powers conferred upon it by the interstate compact which binds Pennsylvania, New Jersey, New York, Delaware and the Federal Government.

The Commission declared a water emergency in the basin. At the July 7 and subsequent meetings, it adopted a series of measures agreed to by the interested public entities, including New York City and Philadelphia.

New York City was initially required to resume its releases at a reduced rate, with its releases being supplemented by water from reservoirs of certain private utility companies. Later, on September 7, New York was permitted to stop releases temporarily, but was required to "bank" in its reservoirs for future use by the Commission such water as would have been released. At the same time, releases from private dams were increased.*

As a result of these measures (and occasional rain**), the downstream flow remained

**Average yearly flow in period 1933-62 was 2,725 C.F.S

*The Federal Government maintained a keen interest in this crisis. The Hon. Stewart L. Udall, Secretary of the Interior and member of the Delaware River Basin Commission, headed a federal study team. Later the Federal Government provided emergency funds for some communities, including Philadelphia.
**Precipitation in 1965 (as measured at Philadelphia International Airport) was 29.34 inches, compared with a 1931-60 norm of 42.48 inches.

sufficient to hold the critical "salt line"—250 parts of chloride per million parts of water—well away from Philadelphia's river intake. Moving twice to the Benjamin Franklin Bridge (about 10 miles from the intake), the salt line generally hovered 18 to 20 miles away.

Salt readings at the Torresdale intake measured from 20 to 35 parts per million during most of the summer and autumn, but by December they were back to a normal 12 P.P.M. The higher readings had no noticeable effect on water quality, and they resulted from less dilution by the stream rather than tidal intrusion.

There was no salt problem in the Schuylkill River, because Fairmount Dam protects the city's water intakes there from tidal flow.

Other River Conditions—Apart from the threatened salt advance in the Delaware, Philadelphia experienced no serious water quality problem in either river. Though the rivers were low and their capacity for diluting wastes was therefore reduced, many of the untreated wastes of former years no longer entered them.

The past stream clean-up, together with low turbidities in both rivers in 1965, helped to keep the dissolved oxygen in the river water higher than what might have been expected during a severe drought. Low turbidities, which permitted the sunlight to penetrate the water, encouraged dense growths of algae in the summer and autumn. The algae in turn released oxygen into the streams.

Partly because of this, the dissolved oxygen level at all the city's river intakes was generally satisfactory. Opposite the Torresdale intake on the Delaware the monthly average was 7.8 parts per million, with an average monthly range of 4.4 to 11.9 P.P.M.

In some parts of the Delaware, however, where industrial pollution still occurs and heavy sludge blankets lie on the bottom, dissolved oxygen plummeted to critical lows. Between the southern tip of Philadelphia and Marcus Hook, Del., 200,000 fish suffocated. Fish also died below Fairmount Dam.

Because of low flows, the hardness of the river water increased somewhat. The moderately hard Schuylkill River water had a hardness range of 7.1 to 12.5 grains per gallon (monthly average), with an annual average of 10 grains. Delaware water, which is normally soft, ranged from 2.4 to 5.2 grains. Its annual average was 4 grains.

A few oil spills occurred in both streams, but in most instances these created no taste and odor problems for Philadelphia's water treatment plants. Changes in chemical characteristics of the streams were too small to be of significance. Radioactivity was so negligible as to be barely more than that which normally occurs in nature.

THE CONTINUING RESEARCH ON THE RIVERS

Throughout the severest months of drought—from July to December—the Water Department kept a close watch on the Delaware River. Its laboratory-equipped cabin cruiser collected water samples almost daily from Poquessing Creek to Marcus Hook, to determine the extent of salt water intrusion.

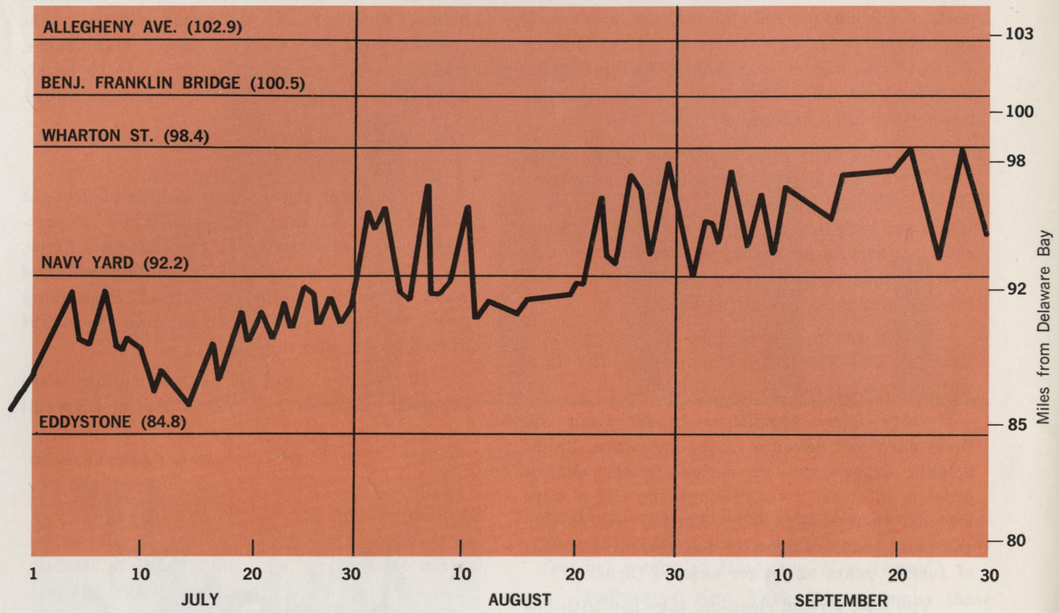
During the autumn, these samplings were extended as far as Trenton, as part of a special

Photo: Philadelphia Inquirer

River Study: Personnel of the Water Department and U. S. Public Health Service collect core samples from the bottom sludge in the Delaware River. Purpose: To determine how the extensive sludge blanket on the river bottom affects water quality.

Drought Action: Exploring the need for Federal aid to meet the drought, Secretary of the Interior Stewart L. Udall (left) visited Northeastern U. S. communities. Press interview above followed conference with Philadelphia officials.

*MOVEMENT OF SALT FRONT IN DELAWARE RIVER — 1965



salt study financed in part by the Delaware River Basin Commission. To the regular midstream samples, the department added numerous cross-sectional samples of the river at high and low water slack.

Philadelphia was well prepared to keep a watchful eye on its rivers. In past years, it had set up an extensive system for monitoring and patrolling these streams.

In cooperation with the U. S. Geological Survey, the Water Department was operating a half-dozen automatic monitoring stations, equipped with electronic devices for measuring and recording conditions in the Delaware River. Such conditions included dissolved oxygen, salinity, temperature, "pH", and turbidity. In addition, there were lesser stations to report on water levels and rates of stream flow. Regular midstream sampling by the cabin cruiser supplemented this data.

In 1965, an automatic station was set up at the city's Belmont intake on the Schuylkill to record river conditions. Monitoring devices at the water treatment plants recorded radioactivity in both streams.

This extensive river research had two basic purposes: to alert the city to changing stream conditions and to build up a long range picture of the rivers. A new computer acquired by the Water Department in 1965 (see page 37) will aid in processing the river data.

The department continued a number of special studies along the Delaware. These included (1) the effects of photosynthesis in restoring dissolved oxygen to the river, (2) the ultimate oxygen demands of effluent from the Northeast Water Pollution Control Plant, and (3) the effects of pesticides on river life.

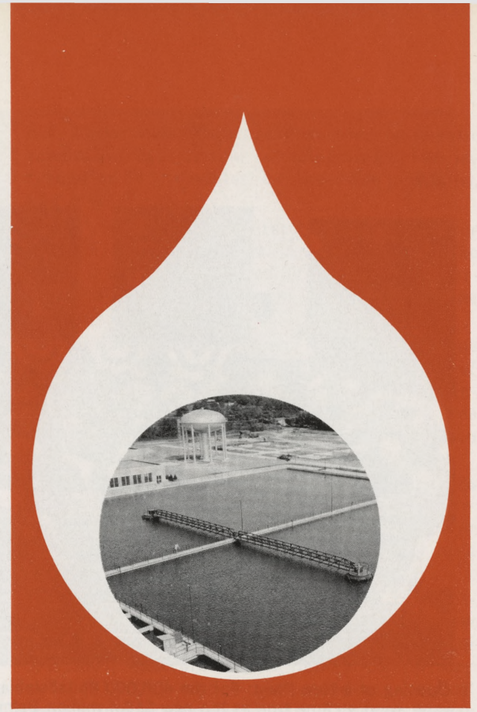
In addition, the Water Department and the U. S. Public Health Service began a study of the "Benthal" sludge blanket which covers much of the Delaware estuary bottom. The purpose of the study was to determine the effect of the sludge (largely organic in origin) on the amount of dissolved oxygen in the stream.

Using the department's cabin cruiser, personnel of the two agencies ranged the river, mapping and sampling the bottom. A sonic type of electronic device was used to bounce echoes off the bottom to determine its composition. Numerous core samples were collected from the sludge.

After several months of study, there were preliminary indications that the sludge might be using up to 25% of the dissolved oxygen in some parts of the river and lowering oxygen throughout the estuary. Still to be determined is whether some portions of the sludge blanket should be removed in future years.

*The salt front is defined as 250 parts of salt per million parts of water. When salt reaches this concentration, the U. S. Public Health Service recommends that another source of water be used for human consumption.

the water system



WATER ABUNDANCE FROM AUTOMATED FACILITIES

If Philadelphia had plenty of good water in 1965, one reason was its increasingly modern and automated water system.

This system, with its numerous electronic and microwave controls, stood in marked contrast to the antiquated system of the early 1950's. New plants, pumping stations, reservoirs, and pipelines* gave the system a strength and efficiency unknown before.

By the end of 1965, the Water Department had completed about 76% of a $195 million master improvement plan (1946-71) for the water system. During the year, an additional $6 million of construction was performed.**

Though the tempo of construction in 1965 was below that of 1964, it included the completion of several major facilities.

Finally emergent was the last of three new treatment plants that formed the heart of the automated water system. Built with enlarged capacity, these plants had many advanced features. Modern equipment, "push-button" controls, and operational flexibility enabled them to regulate the varied water treatment processes with speed and precision.

*See page 7 for summary of water system improvements.

**Based on partial and final estimates. This figure was about $4 million below the level of construction in 1964. It included $2.5 million for water mains and $2.5 million for plants and pumping stations. Work was completed on 112 contracts, with a combined limit of $17.6 million, while 80 contracts with a limit of $7.4 million were awarded during the year. On December 31, the value of water system contracts in force was $9 million.

Opening of a New Plant: For the 400,000 Philadelphians living west of the Schuylkill River, the dream of improved water service came true as the new $10.4 million Belmont Water Treatment Plant went into service on September 20. About 450 community leaders and public officials attended the dedication.

Thanks to these advantages, the new plants were converting the mediocre, and sometimes degraded, river water into an acceptable, high quality product. Thus drought, low river flows, and changing river conditions did not affect the constancy, or materially reduce the excellence, of the water that flowed to consumers.

BELMONT: THE OPENING OF A NEW WATER PLANT

A sparkling symbol of Philadelphia's improved water supply was the new Belmont Water Treatment Plant. Located at Ford Road and Belmont Avenue, its light brick buildings and open concrete basins graced one of the city's fastest growing areas.

The third semi-automatic, rapid-sand plant to be opened by the city in six years, Belmont went officially into service on September 20. About 450 civic leaders, businessmen, and public officials, headed by the Mayor, attended the dedication, and in the ensuing weeks 2,000 other Philadelphians visited the plant.

Built at a cost of $10.4 million, the new plant replaced a 62-year old water works that was largely underground. Though part of the new plant had gone quietly into service in mid-1964, it was not until June of 1965 that the rest of it could be given a trial run. Other construction details were completed during the summer.

Offering finer water to 400,000 Philadelphians living west of the Schuylkill River, the new Belmont Plant has a rated capacity of 78 million gallons daily. In emergencies or hours of high demand, it will be able to purify water at a peak rate of 108 million gallons a day. Peak rate capacity was almost non-existent in the old 70 M.G.D. plant which the new plant replaces.

Built into the new plant are many advanced features.

1. Chemicals will be applied automatically to the incoming river water at a new five-story chemical building. Here a variety of chemicals (chlorine, alum, carbon, metaphosphates, fluoride, etc.) will be stored by automatic equipment and then weighed, measured, and applied in precise dosages to the river water. Operators will monitor and regulate these devices from electronic control panels.

2. Mixing of chemicals and water will take place in six "rapid mixing" and 32 "slow mixing" basins, with the water being continuously stirred by steel paddles. Water levels will be automatically regulated in these basins, as well as in a 150,000-gal. tank used for the washing of the filter beds.

3. Four open concrete basins will provide for settling of impurities. These sedimentation basins, with a combined capacity of 14.2 million gallons, will have an average depth of 17 feet. Steel clarifier arms, 70 feet long, will sweep sludge from the basin bottoms continuously.

4. Various operations will be regulated from electronic control panels in the one-story filter building, where 26 rapid-sand filter beds line the sides of a long gallery. Filtration rates, as well as the periodic washing of the sand and gravel beds, will be done with the press of a button. Because the 26 filter beds cover just one acre, operations will be more compact and efficient than they were in the old plant, which had 13 acres of underground slow-sand beds and a half-acre of rapid-sand beds.

5. The new plant will have much flexibility. Thus in emergencies one-half of the plant can be operated while the other half is shut down. Chemical feed points can be switched about the plant for better control of water quality. Laboratory technicians can draw water samples inside the laboratory from numerous points around the plant.

Because of the features noted, the new plant will be able to operate with fewer personnel and to hold down other operating costs. Plant capacity will be used more fully.

Besides the facilities listed, the new plant includes a new clear well for 1.8 million gallons of filtered water and a renovated "general utility" building for storage and meetings. Retained from the old plant is a storage basin for filtered water (16.8 million gallons) and a large reservoir (72 million gallons). The latter will be used for free residual chlorination of the Schuylkill River water before it reaches the new plant.

In 1965, about $818,000 of final construction was done at Belmont under $10.4 million of contracts. This included mostly work on the north wing of the filter building, the two north sedimentation basins, and landscaping.

TORRESDALE: AN AUTOMATED INTAKE FOR DELAWARE RIVER

To avert future salt water intrusion into the city's supply, the Water Department sped up the construction of an automated river intake for its Torresdale Water Treatment Plant.

Work on the $2.3 million intake had begun in 1964 as part of the city's normal improvement plans. By September, 1965, however, the new intake loomed as an increasingly desirable anti-drought measure. This was because of a special design feature: Though designed to receive river water at various tide levels, the new intake will have the special advantage of being able to pass such water (if necessary) solely at low tide when salt content is least. This will give the city an added margin of safety against tidal salt.

*With Federal emergency funds suddenly available, the Water Department put on two shifts of workmen, seven days a week, to make the intake operative by December 1.

By the target date, the contractor had finished 16 sluice gates, various underwater screens and rakes, 16 large butterfly valves, and the walls of a control building that will surmount the intake. More important, the intake could be operated manually, and thus was ready for emergencies. Automatic controls will take over the operation when the contracts are finally completed in June, 1966.

Located on the riverward dike of a riverside sedimentation basin, the new intake will replace an old and inefficient intake that will be dismantled. It will have several advantages over the old. These include water-tight gates, automatic removal of debris from incoming water, less ice formation in the winter, less need for personnel, and greater capacity.

Water will flow directly from the river through the intake gates. As it flows into the basin, it will be chlorinated by automatic measuring and feeding equipment inside the intake building.

In 1965, about $274,000 of work was done on the intake under contracts with a limit of $2,338,700. Electrical work was one-quarter finished, but only a small percentage of work was still to be done under the general construction contract.

Other Construction at Torresdale: The $25 million Torresdale Plant, when it went into service in 1959, was the largest *"push-button"* water plant in America; today it is exceeded only by a new plant in Chicago.

Only minor improvements have been required since 1959. In 1965 these included new lime slakers for the pre-treatment building ($41,500), waterproofing of influent-conduit dry wells ($14,000), and a new stand-by electrical transformer system ($165,000). The transformer system was nearly completed and the other contracts were well along.

The Queen Lane Water Plant: At the Queen Lane Plant, where $11.4 million of improvements were completed in 1960, only minor changes were made in 1965. These included the planting of trees, the cleaning of a settling basin, the installation of new chlorinators in the pre-treatment building, and the erection of a small building with three pumps for caustic soda treatment. Much of this work was done by the department's own personnel.

THE REFINEMENT OF WATER QUALITY

From the treatment plants in 1965 flowed a daily average of 335 million gallons of purified water. Of this, about 326 million gallons daily reached consumers.*

Though consumption was little changed from immediately preceding years, the city's finished water had greatly improved in the course of a decade. Judged from the point of view of most householders, it met all the essential tests for satisfactory quality.

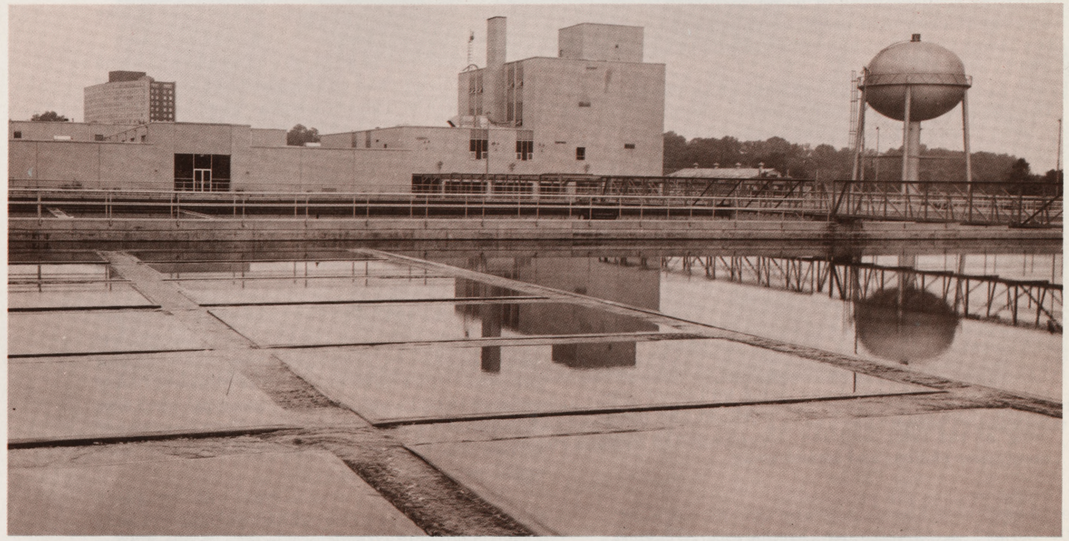
Purity: Philadelphia water continued to be one of the purest treated waters in the country. Its coliform organism count when distributed was only 3.5% of what is permitted under the drinking water standards of the U. S. Public Health Service for interstate carriers.

Clarity: Though water issuing from the treatment plants had a high degree of clarity in past years, it was often discolored by old and corroded water mains. By 1965, this problem had been overcome in most parts of the city. The

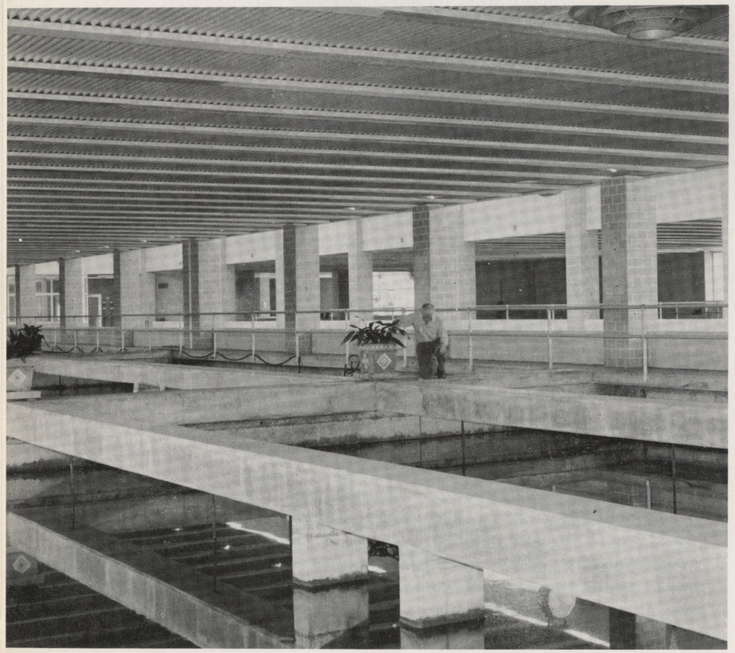
*Through the U. S. Army Corps of Engineers, the Federal Government paid $125,000 of the $2.3 million cost of the intake.

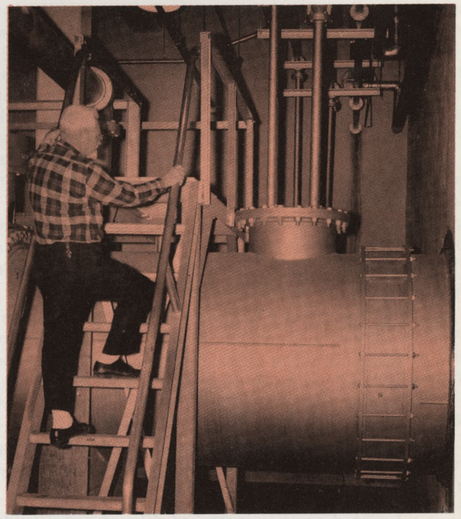
*The difference between plant output and consumption was used in washing filter beds.

BELMONT: The Opening of a New Water Plant

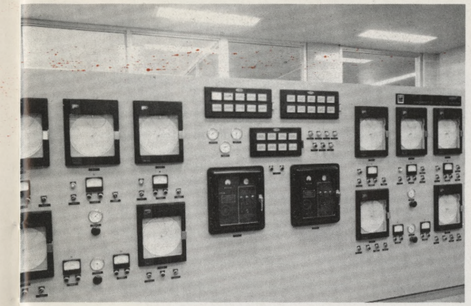


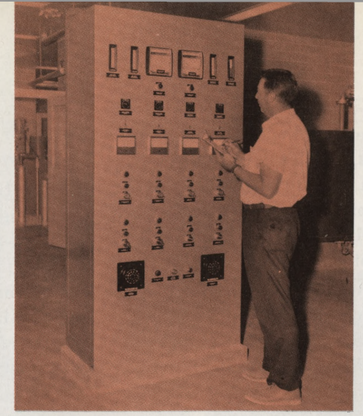
Abundant Water: Third of the city's new "push-button" water treatment plants, Belmont will help to assure an unfailing supply of good water for Philadelphians. It has a rated daily capacity of 78 million gallons and can operate at a peak rate of 108 million gallons a day. Basins (above) and rapid sand filters (below left) are controlled by most modern equipment.

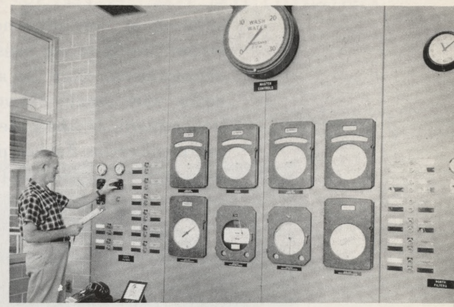




Man-size Piping: Purified water on its way to consumers is automatically chlorinated at this point as it leaves the new Belmont Water Plant. The big 5-ft. diameter conduit (above) is part of an extensive maze of piping that serves the plant.

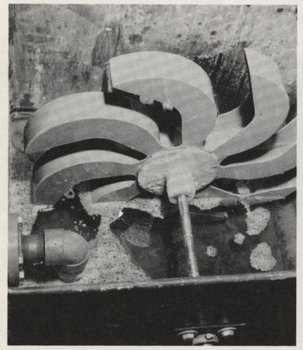


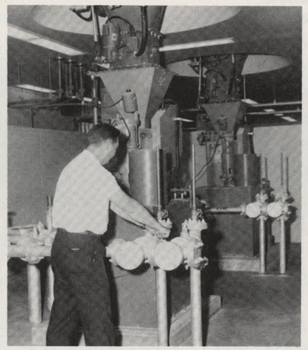




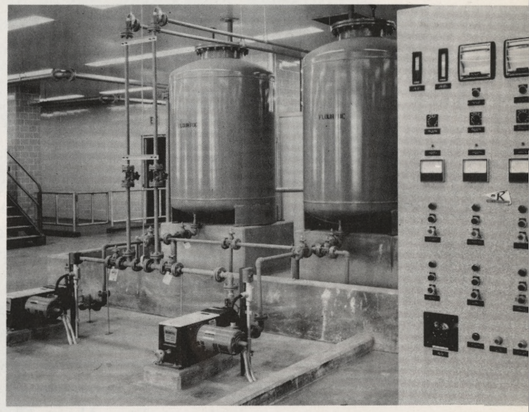
An Automated Plant: Monitored and controlled by automatic or semi-automatic devices, the operations at the new Belmont Plant will be much more efficient than were those in the plant it replaced. Panels at left and center record and regulate chemical feed; panel at right controls filters.

AT BELMONT MODERN CHEMICAL DEVICES ASSURE BETTER WATER



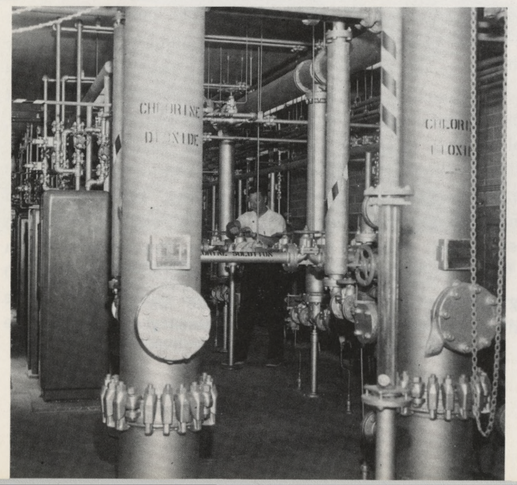


Alum and Lime: The revolving wheel turns unceasingly to scoop up measured amounts of alum and apply them to incoming river water in order to settle out impurities. The funnel-like device at right automatically applies lime to improve water quality.



Fluoride: A measured dosage of fluoride from tanks (in photo) is precisely applied by the control console at right. About one part of fluoride is added to each million parts of water to protect children's teeth.

Hexametaphosphate: Automatic equipment unloads hexametaphosphate into storage bins. This chemical helps to control corrosion of mains in the distribution system, thus reducing water discoloration.



Chlorine: Few operations at Belmont are so automated as chlorine feed. Liquid chlorine is flashed into gas by evaporators and then applied by chlorinators to water. Chlorine destroys bacteria and taste and odor causing materials.

building of new pipelines, or the cleaning and cement lining of old ones, had largely eliminated discoloration. Only in a few limited neighborhoods with small, outworn grids did discoloration remain. In these neighborhoods, Water Department crews flushed pipelines frequently, thus reducing discoloration. Cleaning and lining continued city wide.

At the same time, the water treatment plants continued to apply metaphosphates to the finished water in order to control pipeline corrosion. At the Queen Lane Plant, caustic soda was introduced for this purpose.

Tastes and Odors: The obnoxious tastes and odors that plagued the city's water in the early 1950's were only a memory in 1965. The new treatment plants, with their advanced equipment, assured increasingly expert control of tastes and odors.

Though tastes and odors increased in the river water because of low flows, these were less serious than they would have been in earlier years. Stream clean-up had made a difference.

The predominant odor of the river water was "musty," while the water leaving the plants was slightly "musty chlorinous." The latter odor, however, was largely dissipated in the distribution system. Except at a few systemic deadends, it was not detectible by the consumer

Because of the low river flows, the treatment plants used larger quantities of chemicals to improve water quality. About 53.2 million pounds of chemicals were used in the treatment plants and reservoirs, compared with 44.59 million pounds the year before. Chemical costs rose from the $1,177,844 of 1964 to $1,349,260 in 1965.* Since water output was almost unchanged, chemical costs per million gallons of water also climbed.

More carbon was used at all the plants to improve water taste, while chlorine dosages were increased to destroy bacteria as well as taste-and-odor causing organic materials. As in past years, alum was the principal coagulant, but the Torresdale and Belmont Plants also experimented with coagulant clays.

Better tap water also resulted in 1965 from the installation of automatic equipment to control the injection of chlorine into the raw water at the Queen Lane Plant pre-sedimentation basin. Such automatic control for chlorine had been effectuated at the pre-sedimentation basins of the other plants earlier.

Despite the improvement in water issuing from the plants, the Water Department formed plans for additional controls over water quality. These included—

1. Installation of ammonia feed at all the treatment plants to (a) improve the carry of chlorine residuals through the distribution system, (b) reduce corrosion of pipes, (c) eliminate the formation of taste when water is placed in glasses that contain traces of detergents, and (d) eliminate chlorine fumes in the filter buildings. Such ammonia feed will be started at the Belmont Plant in 1966 and at the other two plants later.

2. Certain changes (by 1968) at the Queen Lane Plant, including improved storage and application of chlorine, carbon, alum, metaphosphates, and lime in pre-treatment, and the automatic control of fluoride, chlorine and caustic soda in post treatment.

3. Use of a new lime feed system to provide a more consistent and acceptable "pH" (measure of alkalinity) in the Torresdale Plant water. Though improvements have been made in this in past years, further improvement will be made to aid industrial plants that use city water to process their products.

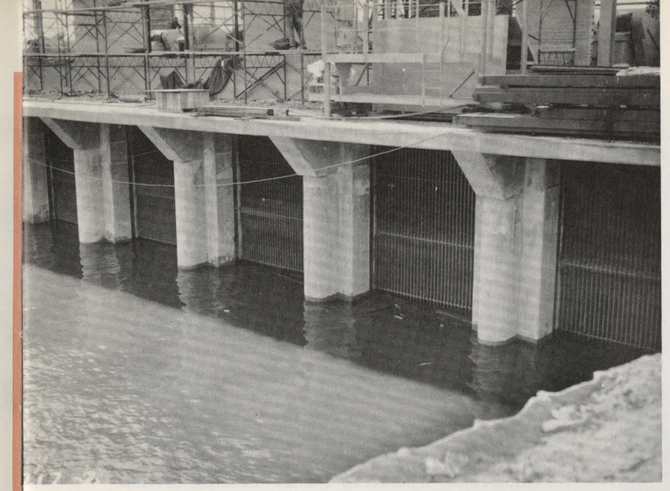
At its two open reservoirs, East Park and Oak Lane, the Water Department resumed its annual summer battle against algae. These microscopic plants grow in the clear water, stimulated by bright sunlight. Though useful in restoring rivers, algae are a nuisance in open reservoirs, since they give the purified water a greenish tint and sometimes impart taste and odor to it.

Though the department easily controlled algae growth with sodium chlorite and chlorine in the smaller Oak Lane Reservoir, it was less fortunate at East Park. From East Park, algae and crustacea moved into the distribution pipelines. Because of this, East Park water was used as little as possible and it was generally diluted with water directly from the Queen Lane Plant. There were plans for radically improving both reservoirs (see Water Storage, below).

Consumer complaints about water quality were fewer than they had been several years earlier. Despite this, the Water Department laboratories kept a close watch on water quality, all the way from the river to the consumer. Chemists and sanitary engineers collected 16,000 water samples from pipelines, reservoirs, and treatment plants for coliform testing alone. In all, about 1.5 million tests were made for a variety of purposes. At the same time, 300,000 feet of newly laid or cleaned water mains were chlorinated and given sanitary checks before being put into service.

*An increase in price also contributed to this rise.

TORRESDALE: An Automated Intake for Delaware Water



Torresdale Intake: Taking shape along the Delaware River was a $2.3 million intake facility that will improve the supply of river water to the Torresdale Water Treatment Plant. Above, the river laps against bar screens through which it will flow to enter a big riverside reservoir on the other side of the new control building. At right, an engineer stands under a large gate valve located beneath the building.

Photo: Evening Bulletin

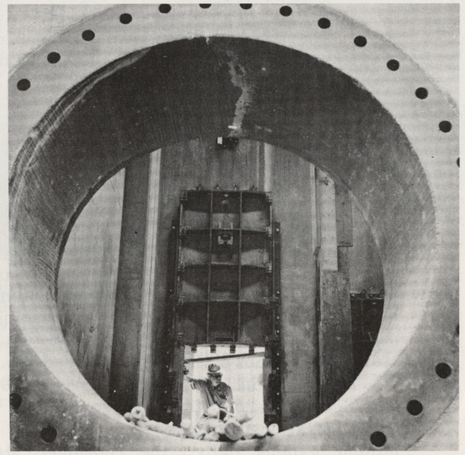


Photo: Evening Bulletin

For Capacity: To meet the needs of half the City of Philadelphia, 16 huge flow nozzles were readied for placement beneath the new Torresdale intake. The specially shaped nozzles will permit the use of automatic equipment to measure water volume.

Ready for Emergencies: To cope with the drought, work on the intake was sped up with Federal funds. By December 1, it was ready for manual operation (above). When fully completed in June, 1966, it will be operated by automatic controls.

FINISHED! FOURTEEN MODERN PUMPING STATIONS

Not only did Philadelphia turn out better water in 1965, but it also sped this water to consumers more efficiently. The city had developed the strongest water pumping network in its history. Of its 15 water pumping stations, 14 had been newly built or completely modernized.

Since the late 1940's, the city had invested $10.8 million in pumping station modernization, and it planned to invest another million dollars through 1971. Thanks to this investment, Philadelphians were enjoying more reliable water delivery at better pressures than ever before. Modernization improved pumping efficiency in a number of ways:

Greater Capacities: Pumping capacities had greatly increased. By the end of 1965, the three "raw water" stations were equipped to pump 700 million gallons of river water to the treatment plants each day, while the 10 consumer stations had the capacity to pump and repump 800 million gallons of filtered water daily. The combined capacities of the 13 stations were 275 M.G.D. more than what they were a dozen years before.

Actual pumpage by the stations in 1965 was considerably below their capacity. The "raw water" stations pumped an average of 343.4 million gallons daily; the consumer stations pumped or repumped about 60% of the 335 million gallons* of purified water leaving the treatment plants each day. The rest of the treated water flowed by gravity.

Although pumping station capacities exceeded average water demand, the extra capacity helped to assure a sound water supply. It enabled the stations to pump at a faster rate during hours or days of huge demand; it provided pumpage when some pumps were out of service; it was a guarantee of adequate water if consumer demand increases as expected in future years.

Automated Stations: A high-speed "intelligence" network gave added strength to water distribution. Since 1960, eleven water pumping stations had been linked to this network. Mostly unmanned, the stations were monitored and operated by microwave from a central control point.

Into the microwave center pours a continuous stream of data on the levels, flow rates, and pressures of water throughout the distribution system. This data is picked up by sensing devices from pumping stations, large valves, reservoirs, plants, and a few big mains, and then sped to microwave towers from which it is flashed to the center.

Because of the continuous and wide ranging flow of data, the center operators are able to respond rapidly to the needs of consumers. Distant pumps are started or stopped to adjust water pressures; breaks in big pipelines are often known immediately; reservoir levels can be watched around the clock; emergency crews can be promptly dispatched.

*Evaporation from treatment plant basins accounts largely for the difference between raw water pumped and filtered water leaving the plants.

In 1965, the Water Department proceeded with plans to link two more stations to the microwave center. Equipment for this purpose was installed in the Torresdale Filtered Water Station, and the station was scheduled to be operated from the center in January, 1966. The work, which was done under a $36,000 contract, provided for control of both high and low service pumps.

Microwave controls will also be installed in the Torresdale Raw Water Station in 1966. By the end of that year, only two "high pressure" stations will remain outside microwave.

Partially transistorized at present, the microwave system will be converted almost completely to solid state equipment in the next two years. This, it is believed, will increase efficiency and flexibility further.

Lowering Operating Costs: Because of new pumps and microwave controls, some operating costs in the pumping stations were lower.

One of the savings was on labor. Distant microwave operation had made it possible to move personnel out of most stations.

Another important saving was in the cost of power. The electric power cost for pumping one million gallons of water to consumers in 1965 was $10.85. This compared with $13.79 in the early 1950's when the electric pumps in use were obsolescent and some steam pumps were still in operation.

These savings were underlined by a departmental study of three pumping stations which use the most electric power. The costs at these stations for pumping one million gallons of water to consumers over six-year* periods were as follows:

Station	*1954-59*	*1960-65*
Belmont Raw Water.....	$ 11.49	$ 10.24
Queen Lane Raw Water.....	9.13	8.59
Lardner's Point Filtered Water	8.71	7.88

Improvements in these stations during both periods, followed by microwave control in 1964-65, contributed largely to the reduction. A lowering of the price of electric power in 1963 and 1965 also contributed.

The total cost of power for various water operations during the six years before 1960* was $9,752,000; in the six-year period since 1960 it was $9,141,000. The $611,000 saving was achieved mainly in the water pumping stations.

Construction in 1965: Because modernization of the pumping stations was largely finished, the scale of construction in them was much less than in previous years. Only a half-million dollars of work was done, compared with $1.2 million in 1964.

More than half of this work took place at the big raw water station which supplies the Torresdale Plant. The $953,000 modernization of this station, begun in 1964, was 95% finished. Work valued at $274,000 was performed during the year.

*Because microwave was introduced in 1960, that year is used as a dividing line for the two periods.

Five new pumps had gone into operation, and a sixth was expected to begin functioning in January, 1966. The six new pumps will raise station capacity from 300 millions gallons daily to 360 M.G.D. They replace six obsolescent pumps.

The completed work included plumbing, lighting, a new ceiling, discharge mains, ventilators, and a crane. Only flooring and some lesser items remained to be done.

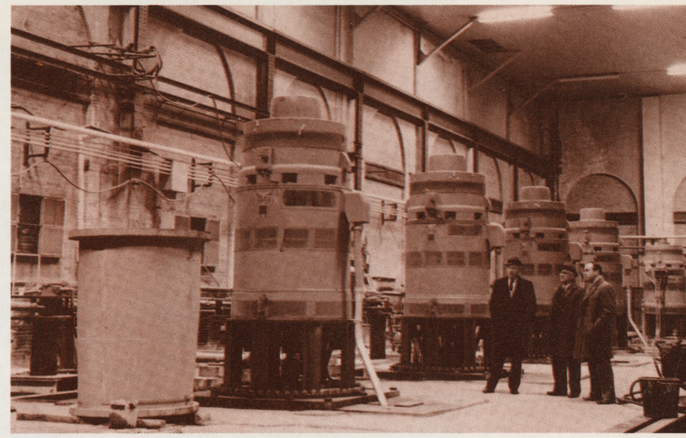
During the year, three new pumps went into operation at the Torresdale Filtered Water Station. The pumps, which replaced three old ones, increased the station's "high service" capacity from 21 million gallons of water daily to 42 million. This will make possible improved supply in the far northeastern reaches of the city. The cost of the job was $145,000, with more than half of the work being performed in 1965.

The Torresdale Filtered Water Station also has pumps on "low service" with a capacity of 200 million gallons a day.

Improvements at other pumping stations were very minor. They totaled about $66,000.

The two high pressure stations pumped 29.7 million gallons of water for multiple alarm fires during the year, besides 35.3 million gallons for stand-by and test purposes. On five occasions, one or the other station was in service for more than 20 hours. The biggest run was for 44 hours at the Fairhill Station, which pumped 5.3 million gallons of water to fight a fire at American and Cambria Streets.

Both high pressure stations were fully modernized in past years.



Torresdale Raw Water Pumping Station: Along with the construction of a new river intake, the Water Department was modernizing a pumping station that pumps Delaware River water to the Torresdale Plant. Five new pumps were in service by the end of the year and the sixth would soon be ready under the $953,000 modernization.

EXPANSION OF PROTECTED WATER STORAGE

More underground reservoirs for purified water were still another Water Department goal. It was planned to create such reservoirs at all the treatment plants.

Although most of the city's water flows directly from the plants to consumers, the department maintains storage at strategic points in order to meet emergency water demands and to stabilize pressures in distribution pipelines.

To meet the needs of its customers more efficiently, the department planned to increase storage capacity for filtered water by 234 million gallons. It also hoped to cover as much of its supply as possible in order to protect this supply from future radioactive fallout, prevent the growth of taste-and-odor causing algae, reduce the use of chemicals at reservoirs, and assure greater sanitary protection.

Basic to this plan was the conversion of abandoned filter beds into underground basins. Such abandoned filters of the slow-sand type were to be found at all the treatment plants, where modern rapid-sand filters had replaced them.

1. Four such basins went into service at the Torresdale Plant in June, 1965. Formed from 65 old filter beds, they had a combined capacity of 143 million gallons.* They will supplement an existing underground reservoir of 50 million gallons capacity.

The new Torresdale basins will be monitored by electronic signal, telemetered to and from the filter building. Filter plant operators will receive second-by-second data on water levels and flow rates in the basins; in turn, they will be able to operate basin valves with the push of a button.

The cost of the new basins was $4.2 million. About $455,000 of final work was done in 1965.

2. Work started in the summer on the conversion of eight filter beds at the abandoned Upper Roxborough Plant. The new reservoir** to be formed from them will hold 17.6 million gallons of water. Supplied by the Queen Lane Plant, it will service the Roxborough-Manayunk area.

As part of the conversion, 34,000 cubic yards of sand and gravel were removed from the filter beds. In addition, work started on the tearing out of old valves and piping, demolition of four brick control houses, and repair (as well as sealing up) of the beds. Hundreds of feet of old cast iron piping will be cleaned, and 125 feet of new steel piping will be installed. Ten new valves, ranging from 20 inches to four feet in diameter, will be inserted.

Water in the new reservoir will be chlorinated automatically. For this purpose, chlorinators, a booster pump, an analyzer and recorder, electronic controls, instrument panels, and scales will be installed.

*Described fully in 1963 and 1964 Annual Reports.

**Actually three small basins formed by interconnecting groups of filter beds (beds 1, 2, 3, 4; beds 5, 6; beds 7, 8).

Future Water Storage: Sand pours from one of the abandoned filter beds at the former Upper Roxborough Water Plant as work starts on the conversion of eight beds into an underground reservoir for purified water. More than 34,000 cubic yards of sand and gravel were removed.

Although most reservoir valves will be operated manually and automatic equipment will be "set" at the site, the department's microwave center will receive some data by microwave. The center will also operate by signal a large valve that will regulate the water level in the reservoir.

Scheduled for completion by the late summer of 1966, the new reservoir will cost $667,850. Its 17.6 million gallons of water will supplement the 11 million gallons of existing underground storage at Upper and Lower Roxborough.

3. Plans were being made for the creation of additional storage at the Belmont Plant in 1966. The remaining, and now abandoned, slow-sand filter beds will be converted to hold 21.4 million gallons of filtered water. This will supplement present storage, which totals 18.6 million gallons.

Conversion of old filter beds at the Queen Lane Plant will occur in 1967 or 1968. About 50 million gallons capacity will be added to the existing storage of 40 million gallons.

Under study in 1965 were plans for the eventual covering of portions of the two big open reservoirs—East Park and Oak Lane. Such plans, if carried out, would improve the summertime water in both reservoirs. East Park holds 677 million gallons; Oak Lane, 70 million.

NEW PIPELINES FOR IMPROVED WATER DELIVERY

Better pipelines to deliver water to consumers will be one of the Water Department's major goals in future years. With the completion of plants and pumping stations, water revenue dollars will be invested increasingly in new or rehabilitated pipelines.

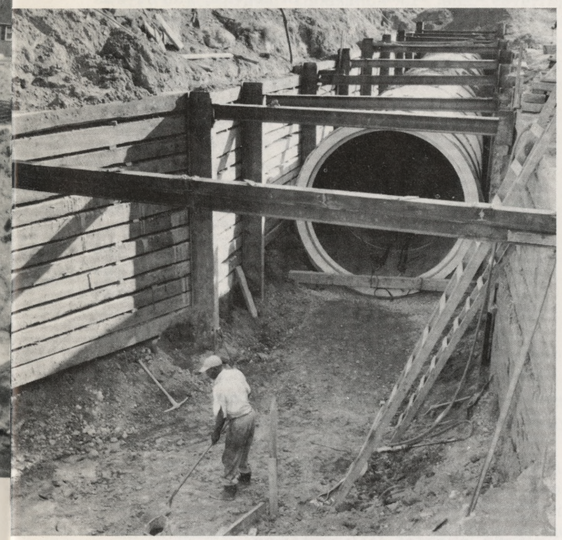
Much has already been done to improve the water main network. Since 1952, close to 550 miles of new water mains have been built to supply new homes and industries, reinforce water pressures, reduce water discoloration, and replace worn out pipelines. By the end of 1965, the city had 3,176 miles* of mains.

Old Mains: In this program, the replacement or revitalization of *old* mains will become steadily more important. This is because the city still has 635 miles of cast iron pipelines that antedate the year 1890. Worn with time and set at shallow depths, these pipelines often break under vibrations from overhead traffic. Unlined and often corroded, they frequently discolor the water that flows through them.

Replacement was given heavy emphasis by the department in 1965. Of the 34 miles of new mains built, 17 miles were replacements.

*This mileage was overwhelmingly cast iron. It included only 78 miles of steel mains and six miles of concrete lines.

Completed Water Storage: One of the last big pipelines moves toward completion at the new Torresdale underground basins. Four basins holding 143 million gallons of filtered water went into service in June.



Some of these mains dated back to the beginnings of the public water system. They included two small cast iron pipelines that were laid in front of Independence Hall in 1821-23. To replace them, new mains were put down in Chestnut Street, between 3rd and 8th Streets, under a $184,000 contract.

Of more impact, perhaps, was a big replacement job close to the Queen Lane Water Treatment Plant. Four steel supply mains were laid parallel in McMichael Street between Roberts and Abbottsford Avenues. The new mains, replacing four cast iron mains, will carry 100 million gallons of water daily to consumers. Started early in 1964, the 4-ft. diameter mains went into service in May, 1965. More than 3,600 feet of pipes were laid under the $485,000 contract.

While replacing some old mains, the department cleaned and cement lined 22 miles of others. In all, it has cleaned and lined 240 miles of old mains since 1947. This work removes sediment and corrosion particles and then provides a smooth, non-corrosive interior. As a result, full flow is restored to pipelines, water pressures are improved, and water discoloration is greatly lessened. Equally important, the mains are saved for many more years of service.

In 1965, cleaning and lining were performed under five contracts with a limit of more than $2 million. About $1.5 million of work was done on mains ranging from six inches to five feet in diameter.

New Services: To meet the needs of new homes and industries, 13 miles of new pipelines were laid during the year. Much of this work was done in Northeast Philadelphia and Eastwick, where neighborhood growth is taking place.

Completed was a mile long main in Roosevelt Boulevard between Red Lion and Comly Roads. This $49,000 project will service new industrial plants.

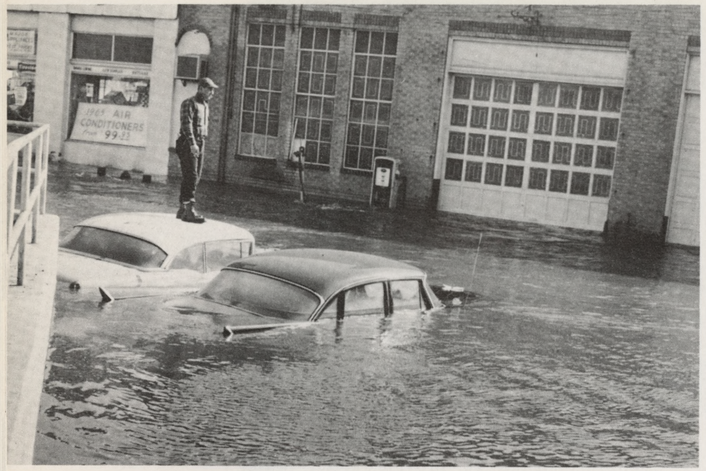
Reinforcement: To provide better water pressures in some neighborhoods, the department built nearly three miles of reinforcing mains. Among these was a new 30-inch steel main in Greenway Avenue between 52nd and 56th Streets ($117,000), and a 24-inch cast iron main in Byberry Road between Bustleton and Audubon Avenues and in neighboring streets ($147,000).

Main Breaks: Water main breaks in Philadelphia normally number from 700 to 950 a year, depending upon the weather. In 1965 as in 1964, the pendulum swung downward. Breaks numbered 718.

True to past patterns, most of these breaks were in small lines of eight inches diameter or less, and at least 75% of the mains affected had been built before 1900.

Of the eight breaks in mains two feet or larger in diameter, only two caused much trouble. A ruptured 4-ft. supply main in Frankford caused high flooding in one street and a severe drop in water pressures in many riverside neighborhoods. Elsewhere, a break in a 30-inch main at Livezey Lane near Wissahickon Creek resulted in heavy soil erosion that required 350 truck loads of dirt for restoration. In each case, however, water service was quickly restored to residents, thanks to recent water system improvements that made it easier to switch to alternate pipelines.

Valves: With great numbers of old and often corroded valves in its distribution mains, the Water Department has accelerated their replacement. In 1965, it installed 1,208 such valves, the highest number in many years. The new valves improve control over water flow.



Ruptured Main: With 635 miles of water mains built before 1890, Philadelphia had numerous breaks in older mains in 1965. Though most of these breaks were in small pipelines and produced little effect on water service, one of the more spectacular breaks occurred in Frankford. The block above was flooded.

A SOUND WATER METER IN EVERY PROPERTY

Water, though abundant, was used more wisely in Philadelphia in 1965 than it had been a generation before. One reason for this was the almost complete metering of private and public properties.

By the close of 1965, the water system had 526,632 water meters in service, and there were only 1,741 unmetered accounts. Starting with 180,000 unmetered accounts in 1952, the Water Department had cut them down to a small hard core.

Universal metering, however, was only one aspect of the department's program. Along with this had gone a great increase in metering efficiency. By 1965, nearly every meter in service was either new or had been thoroughly reconditioned.

In the course of 10 years, 1955-64, every small meter (⅝-inch and ¾-inch) in the system had been "rotated" at least once, while larger meters (one inch or more) had been overhauled and replaced two or three times.

In 1965, the department's Meter Repair Shop extended these efficiency efforts:

1. More than 38,000 small meters were rotated as part of a new, 12-year overhaul and replacement program. At the same time, 2,700 large meters were reconditioned as part of continuing three-year rotation plans. Large meters will continue to be rotated frequently, because they account for 56% of water-sewer revenues attributable to *measured* water consumption, and 38% of *all* water-sewer income.

2. Reflecting the improved state of all meters, only 8,500 non-registering or otherwise malfunctioning meters were reported. This was about 1.6% of all meters in service, and it was the low point of an almost steady decline from the 21,000 malfunctioning meters of 1958.

3. Though the Meter Repair Shop performed 88,000 jobs of all kinds—a level close to that of previous years—it was operating with fewer employees than ever before. Its 68 employees were less than half the 144 employees needed to staff universal metering and overcome a great meter repair backlog in the mid-1950's. They were 17 fewer than the staff in 1952, before universal metering began.

New, more efficient methods enabled the Meter Shop to keep its work current despite the large increase in meters in service and the continuing rotation programs.

4. The Meter Shop continued to check the size of meters in municipal properties to determine their suitability for needs. As a result of this study, it reduced meter sizes in 47 playgrounds and recreation centers, and installed 82 meters in Fairmount Park. This resulted in some monetary savings for municipal departments.

Meter personnel installed 3,350 meters in new homes and industries.

WATER SYSTEM MAINTENANCE

Other maintenance activities included the following:

Distribution: For the first time, the Water Department came to grips with a recurring summer problem. It placed a new steel locking device on frequently abused fire hydrants.

The new device was badly needed. Summer after summer, the city had been plagued with thousands of illegal fire hydrant openings. As a result, water pressures had dropped in some neighborhoods; householders had suffered much inconvenience; the risks from fire had increased.

In July, 1965, maintenance crews placed 900 (of 1,500) newly purchased locking devices or "harnesses" on hydrants in those neighborhoods where abuses were most flagrant. For the first summer in years, water pressures and supply were maintained at adequate levels in such neighborhoods.

It was planned to have a total of 1,700 locking devices on fire hydrants in 1966, and to increase this number in subsequent years.

The new device, which consists essentially of two steel bands, was used originally in New York City. Improved in design by the Philadelphia Water and Fire Departments, it is difficult for the average citizen to remove. It can be taken off in seconds, however, by municipal personnel, using special equipment.

Though the initial cost of the new locking devices was $24,507 and the department has budgeted $70,000 for future purchases, there will be substantial savings. About $240,000 will be saved annually in electric power, chemicals, salaries, and overhead, represented by wasted water. Fewer policemen too will have to be diverted from their normal duties to shut off hydrants or arrest hydrant openers.

The placement of new locking devices was only one of many projects undertaken by the Water Department's 60 street crews. These crews performed thousands of jobs, covering maintenance of water mains, valves, ferrules, fire hydrants, and other distribution facilities. They pumped out flooded cellars, regulated water flow, flushed out pipelines, made new service connections, and performed numerous inspections.

Among the jobs done were the following:

	1964	*1965*
Broken Mains Repaired.....	736	718
Joints Recaulked or Repaired..	213	149
Valves Repaired	2,783	3,050
New Valves Installed in Mains	1,261	1,284
Valves Inspected	32,966	38,842
Fire Hydrants Repaired.....	11,816	13,922
Fire Hydrants Installed.....	341	344
Fire Hydrant Inspections.....	70,400	76,064
Fire Hydrants Painted.....	13,469	15,592
Ferrules Installed	4,712	4,600
Ferrules Shut off or Drawn...	2,324	2,442

Maintenance crews also laid about two miles of water mains independently of those built by contractors.

Building Maintenance: Department personnel did 1,600 building maintenance jobs, compared with 988 the year before. These included an extension to the post chlorine building at the Queen Lane Plant, electrical work at Distribution Headquarters, walls for storage sheds, and several driveways.

Contractors completed five small projects totaling $109,000 at Distribution Headquarters. They included fluorescent lighting, new glass block windows, air conditioning, heating, and insulated aluminum ceilings.

Logan Garage: More than 20,000 repairs, inspections and other jobs were performed at the Logan Garage. These covered 1,130 vehicles and pieces of "off the road" equipment belonging to the Water Department, plus some vehicles of the Department of Public Property.

Numerous jobs were done by the Machine Repair Shop for plants and pumping stations.

PHILADELPHIA WATER FOR BUCKS COUNTY

Philadelphia had such an abundance of good water that it was able to offer a helping hand to a neighbor.

In a gesture of intercounty cooperation, the city negotiated an agreement with Bucks County for the supply of 25 million gallons of Philadelphia water daily to the water-short lower Bucks area. An ordinance approving the agreement was passed by the City Council, and at the end of the year only a few formal procedures remained to be completed by the Bucks County Water and Sewer Authority.

Because Philadelphia and the surrounding counties have become increasingly an economic and social unit, it is believed that this sale will benefit the region as a whole.

At present, only two tiny areas outside the city receive Philadelphia water.

New Water Mains: More than 34 miles of water mains were built in 1965, thus continuing the steady expansion of the pipeline network. Since 1952, close to 550 miles of new mains have been laid to supply new homes, reinforce water pressures, serve new industries, and replace old mains.

Sound Metering: One of Philadelphia's assets was a new or thoroughly reconditioned water meter in nearly every property. Thanks to 526,000 meters periodically overhauled or replaced, water was being used more wisely by the average householder than it was a generation ago.

WATER TREATMENT PLANTS: OPERATING DATA

	Filtered Water Output (in millions of gallons daily)		Electric Power Consumption (in millions of kilowatt hours)	
	1964	1965	1964	1965
Torresdale	167.2	167.0	5.60	5.71
Queen Lane	108.6	108.4	2.06	2.07
Belmont	60.8	60.0	2.29	2.87

	Chemical Costs for Treatment (per million gallons)		Electric Power Costs (per million gallons)	
	1964	1965	1964	1965
Torresdale	$ 8.53	$10.14	$0.870	$0.870
Queen Lane	10.66	11.06	0.470	0.489
Belmont	8.52	11.15	0.987	1.213

Amount of Chemicals Used in Treatment
(in millions of pounds—includes reservoirs)

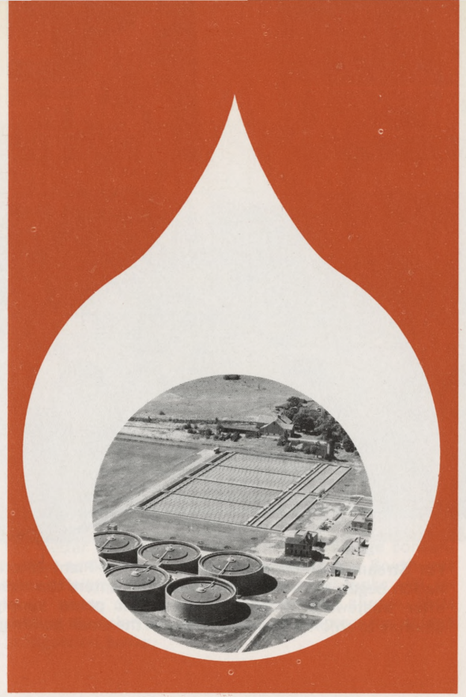
	1964	1965
Alum	19.25	21.41
Chlorine	12.04	14.52
Lime	9.33	11.63
Sodium Hexametaphosphate	.78	.91
Fluoride	.71	.65
Carbon	1.57	2.14
Sulphur Dioxide	.06	.05
Sodium Chlorite	.06	.08
Caustic Soda	...	1.14
Experimental Chemicals	.79	.67
Total	44.59	53.20

METERED ACCOUNTS AND WATER CONSUMPTION
1944 - 65

Year	Number of Water Meters	Number of Unmetered Accounts	Average Daily Consumption (Million Gal.)	Total Annual Consumption (Billion Gal.)
1965	526,632	1,741	326	118.9
1964	525,984	1,796	327.2	119.8
1963	525,299	2,435	326	119
1962	522,632	2,599	327.8	119.6
1961	520,786	7,265	333	121.6
1960	519,644	8,350	329.7	120.7
1959	513,660	9,558	343.5	125.4
1958	509,180	11,298	336.6	122.9
1957	486,553	26,513	352	128.5
1956	485,000	34,000	351.7	128.7
1955	429,000	84,000	369.8	135
1954	361,000	138,000	368.2	134.4
1953	341,000	160,000	370	135.1
1952	315,316	179,914	356.2	130
1951	(Figures Unavailable)		348.5	127.2
1950	266,045	200,527	341.1	124.5
1949	255,285	217,507	351.2	128.2
1948	241,729	215,579	357.7	130.9
1947	236,833	231,303	353.3	128.9
1946	234,196	232,547	334.6	122.1
1945	234,515	233,529	317.8	116
1944	226,307	234,687	323.7	118.5

Note: Figures based on annual reports of the Philadelphia Water Department and (before 1952) of the old Water Bureau.

the wastewater system



STREAM PROTECTION — A VISION ATTAINED

A vision that dated back a half-century was attained in 1965. This was the treatment of all the city's wastes in order to protect the Delaware and Schuylkill Rivers.

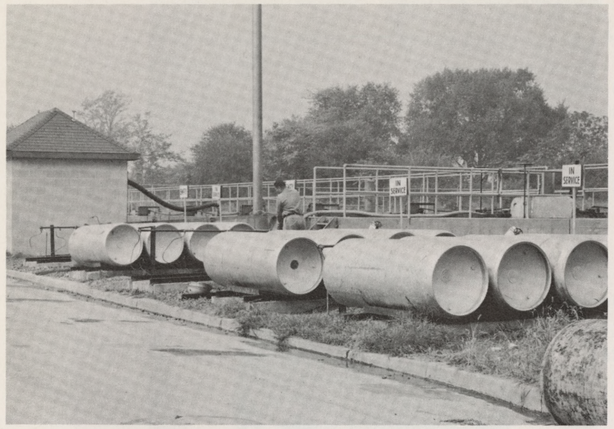
Stream clean-up by Philadelphia had begun in 1912, when the city initiated a comprehensive plan. Setting up three vast drainage areas, it planned to construct a network of plants, pumping stations, and intercepting sewers to collect and treat its wastes.

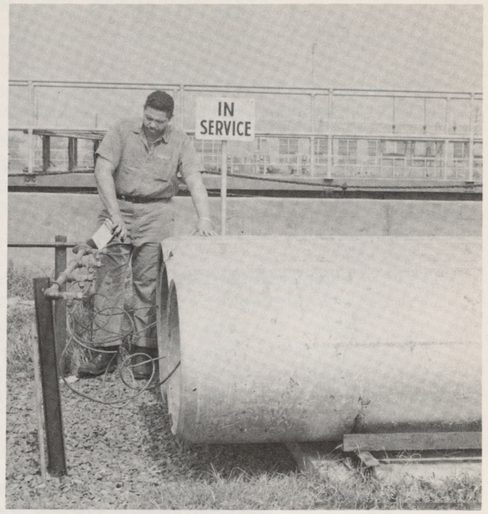
By the 1920's, the plan had been only partly carried out, and the Great Depression followed by World War II halted it. Resumed in the mid-1940's, the program gave birth to many important public works in the 1950's. From 1946 through 1965, Philadelphia invested $247 million in water pollution control plants,* wastewater pumping stations, and sewers of every kind.**

By 1965, indeed, Philadelphia was treating 99% of its wastewater, plus huge quantities from neighboring communities. By the close of the year, it had built its last significant intercepting sewer and this would pick up the final 1% of untreated wastewater, diverting the flow to a control plant in January, 1966.

So great was the wastewater flow in 1965, that the city treated an average of 386 million gallons daily. This was the highest flow in its history. From this flow its plants removed 545,000 lbs. of suspended solids and 342,000 lbs. of bio-

*Terminology Change: In line wtih progressive nation-wide practice, the Water Department dropped the term "sewage" in January, 1966. "Sewage" became "wastewater," and the sewage treatment plants were renamed "water pollution control plants."
**Another $75 million will be invested during 1966-71.





For Stream Protection: At the Southwest Plant chlorination began of the liquid effluent that enters the river after wastewater treatment. Tanks in photo supply chlorine to chlorination equipment in the small building.

chemical oxygen demand (B.O.D.) each day.† Only 15 years before, most of this pollution went directly into the rivers.

Philadelphia was not alone in cleaning up the rivers. Many communities, industries, and public agencies had contributed to this effort since the 1940's. Thanks to these programs—and despite the continued growth of population and industry along the streams—the rivers have steadily improved. By 1958, the last year included in a comprehensive study by the U. S. Army Corps of Engineers, the improvement was marked. Since that date, the rivers, it is believed, have more than held the 1958 level.

The better stream conditions, indeed, have bolstered the growth of the Port of Philadelphia, spurred waterfront redevelopment, and fostered boating and fishing.

In 1965, the city took further steps to protect its streams. It invested almost $12.6 million in expansion or improvement of plants, pumping stations, and sewers.*

EXPANSION OF THE WATER POLLUTION CONTROL PLANTS

With the continued growth of population and industries in Southeastern Pennsylvania, the flow of wastewater will rise further in future years. To meet this flow from within and outside the city, the Water Department has been expanding its water pollution control plants.

Northeast Plant: A $5.3 million program was in its final stage at the Northeast Plant, where new facilities had raised treatment capacity from 125 million gallons of wastewater daily to 175 million. As part of this program, four new final settling tanks and an aeration tank had gone into service in December, 1964, and these operated throughout 1965.

Because of increasing inflow of wastes at the Northeast Plant, the extra capacity was badly needed.

During 1965, a new wing for the blower building was erected to reinforce this capacity. Housing two new air blowers and related equipment, the wing will back up existing blowers which supply air to the aeration tanks. By the end of the year, only an electrical substation was still to be built under contracts for the wing totaling $1,260,000.

Vital to improved plant capacity too was a plan to replace the sludge heaters with new heaters of superior design. Work for this purpose began in November under a $121,000 contract.

Designed jointly by the Water Department and the supplier, the seven new heaters will each have a capacity of 4.2 million B.T.U.'s per hour. Although this is almost double the 2.3 million B.T.U.'s of the old heaters, the new will occupy the same space.

Blowing sludge gases across the sludge, both old and new heaters are the largest of their type in the world. The new, however, will heat more efficiently—an important advantage in breeding billions of bacteria to decompose the sludge in digestion tanks.

Many minor improvements were made at the Northeast Plant during the year. These included various electrical installations, an extension to an existing outdoor electrical substation, and new flow tubes and dual Penn meters for measurement of gas from the digestion tanks. In all, about $347,000 of work was done under 15 contracts with a limit of $4.7 million.

†Biochemical oxygen demand is a measure of pollution.
*Based on partial and final estimates. This figure was about $10.1 million below 1964 construction. It included $2.4 million for plants and intercepting sewers, plus $10.2 million for sanitary and storm sewers. Work was completed on 148 contracts, with a combined limit of $21.2 million, while 96 contracts with a limit of $8.6 million were awarded during the year. On December 31, the value of wastewater system contracts in force was $12.1 million.

Southwest Plant: New efficiencies were being built into the Southwest Plant:

1. Most notable were two "concentration" tanks, which will remove some of the water from settled sludge. The sludge, which will be received by the new concentration tanks from primary tanks where it is settled out of wastewater, will be concentrated and then passed on to digestion tanks for decomposition by bacteria. It is expected that the less watery sludge will improve this bacterial breakdown. The new concentration tanks, built of concrete, were almost finished.

2. With most of its open lagoons filled up, the plant completed the digging of a new lagoon to receive digested sludge, which is the final product of wastewater treatment. There were plans, however, for the barging of digested sludge to the Atlantic Ocean (see below).

3. Completing a plan started in 1964, eight new sludge pumps of a non-clogging type were installed. These, with four similar pumps put into service earlier, will keep the plant operating with fewer interruptions.

4. Several minor improvements in the digestion tanks were well along. These included the installation of a sludge pipeline, roller guides on tank covers, and (in one tank) a gas recirculating system.

Total construction at the plant was valued at $554,000 under 15 contracts with a limit of $805,000.

Southeast Plant: Only minor improvements occurred at the Southeast Plant, under contracts totaling $46,000.

TOWARD MORE EFFICIENT TREATMENT OF WASTES

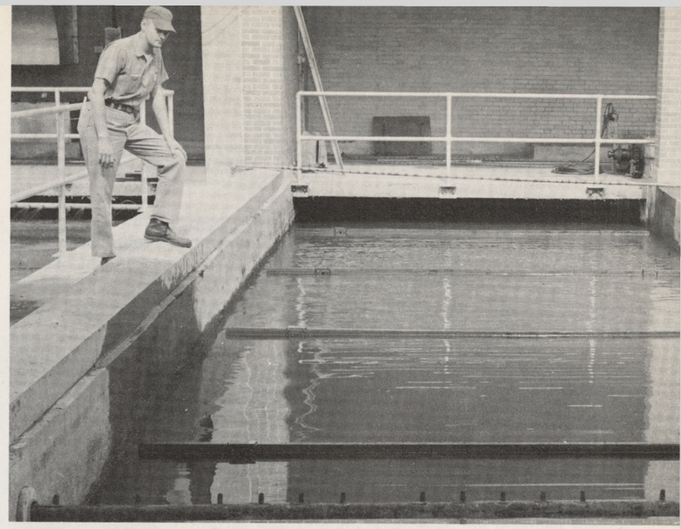
Physical improvements and enlarged capacity were only two of the city's goals for its water pollution control plants. During 1965, the Water Department took steps to improve wastewater treatment, lower costs, and increase operating efficiency.

Improved Treatment: New facilities and new methods were helping to improve wastewater treatment at all the plants. This occurred despite higher wastewater flows.

Thus with additional tanks in service at the Northeast Plant, the removal of suspended solids rose to 78%, compared with 71% in 1964. At the same time, the removal of biochemical oxygen demand (B.O.D.) climbed from 68% to 74%. Incoming flow at Northeast averaged 149 million gallons daily, or eight million gallons more each day than in 1964.

The flow reaching the plant continued to be split for treatment purposes. Half of it underwent "contact stabilization," the other half "modified aeration." A cross-over conduit, built to exchange flows, was used during the latter part of the year for experimental study. The Northeast Plant provides secondary treatment.

Bolder experiments were carried out at the Southwest Plant, where the 129 million gallons of wastewater received daily pushed that plant



For Better Wastewater Treatment: Two sludge concentration tanks were almost finished at the Southwest Water Pollution Control Plant. The new tanks will remove some of the water from settled sludge, thus making it easier for bacteria to decompose the sludge in digestion tanks.

Barging of Sludge to Sea: A new loading dock takes shape on the Schuylkill River. The dock will serve barges that will haul digested sludge to sea from the Southwest Water Pollution Control Plant. Digested sludge is the innocuous residue of wastewater treatment.

closer to its 136-M.G.D. design limit. Thanks to these experiments, treatment removals were higher than the year before. The removal of suspended solids from wastewater averaged 55% (a 1% increase) while B.O.D. removals jumped from 31% to 39%.

The higher B.O.D. removal rate at Southwest stemmed largely from the chlorination of that plant's effluent for the first time. Since this effluent, or separated water, is emptied into the lower Delaware estuary, chlorination will provide greater protection for that stream.

Looking toward the future, when federal and state authorities may require higher degrees of wastewater by communities along the Delaware and Schuylkill Rivers, the Water Department also experimented with polyelectrolytes (a chemical) at the Southwest Plant. The polyelectrolytes, when added to the raw wastewater, raised removal rates to 81% of suspended solids and 57% of B.O.D. These interrupted studies will be resumed in 1966.

The Southwest and Southeast Plants provide primary treatment only.

Plans for Automating: With a view to the future automating of some operations in the water pollution control plants, the department began two pilot studies.

At the Southwest Plant, it started to install a device ($39,000) to control the flow of settled sludge from the primary tanks to the new concentration tanks. The device will function by measuring the density of the sludge.

Study was also being made of how air flow to the aeration tanks at the Northeast Plant could be automatically controlled. This and other automation questions were explored by department sanitary engineers and a private consulting firm.

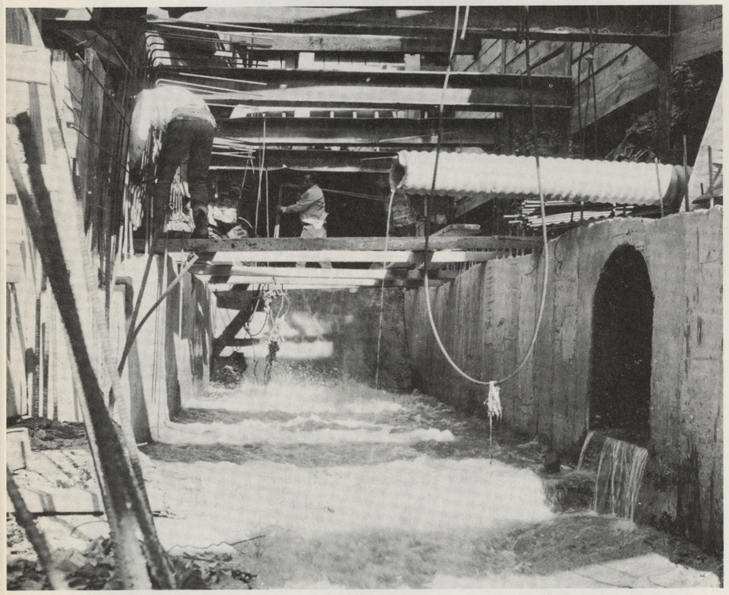
Although automatic devices are used in water pollution control plants in several cities, Philadelphia's plants are more complex. Some of the new equipment needed for "push-button" control will have to be designed or suggested by Water Department engineers.

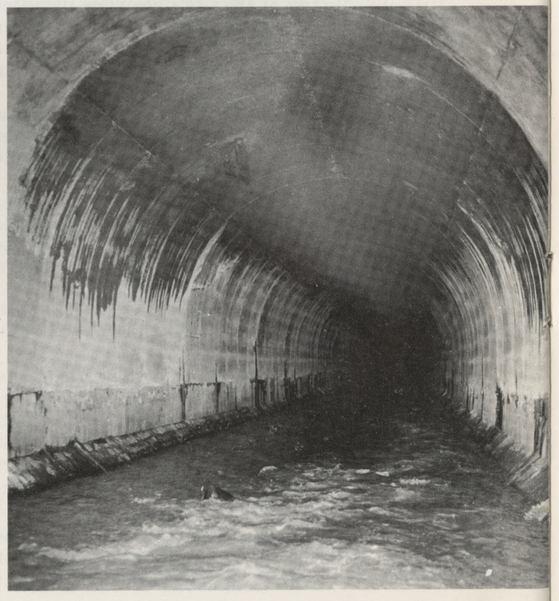
Though still in the future, the automating of some wastewater treatment processes will result, it is believed, in substantial operating economies and increased treatment efficiencies.

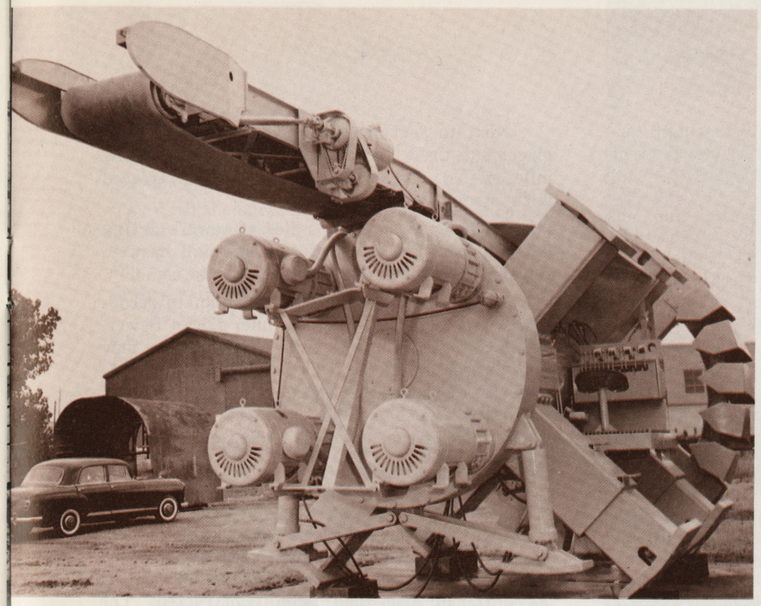
Barging of Sludge to Sea: To save plant space and reduce costs, the department planned to haul to sea nearly all the digested sludge left over from wastewater treatment.

The time honored practice of dumping such sludge into plant lagoons was becoming increasingly impractical. At the Northeast Plant nearly all lagoons were full and there was no more space for lagoon construction, while at the Southwest Plant the building of new lagoons was becoming a costly annual requirement.

For Storm Relief: Mill Creek, which has frequently overflowed the old brick sewer built in the 1880's to contain it, may soon be tamed. Another segment of the old sewer was being replaced in 1965 with a reinforced concrete line. Work in progress at left; a completed section at right.







A Look Toward the Future: Equipped with a rotating cutter head, a new type machine was used for the first time in Philadelphia to bore out 900 feet of 14-ft. diameter tunnel for the Main Relief Sewer. Able to chew its way through hard rock, the machine tunnels faster than is possible through drilling and blasting.

Barging of sludge to the Atlantic Ocean had been tried for several years at the Northeast Plant, and in 1965 about 43.9 million gallons were thus disposed of. A new contract, which went into effect September 1, extended barging to all plants. It provided for hauling of 50 million gallons of digested sludge the first year and 90 million gallons in each of two succeeding years.

Under the $883,000 contract, construction of a loading dock began on the Schuylkill River just north of the Penrose Avenue Bridge. There the digested sludge from the Southwest and Southeast Plants will be loaded into barges. The dock will cost about $30,000.

Costs for barging averaged $6.40 per thousand gallons up to August 1, but under the new, longer-term contract they fell to $3.73 per thousand gallons.

With the termination of lagoon construction at the Southwest Plant, about 200 acres of ground will become available for development, sale or other use.

NEW SEWERS FOR WASTEWATER COLLECTION

Of the 30 miles of sewers built in 1965, the most meaningful was a short intercepting sewer in South Philadelphia. This interceptor marked the completion of the city's half-century old stream clean-up program.

The new interceptor, built in tunnel beneath 26th Street between Shunk and Hartranft Streets, was to pick up the last 1% of untreated wastewater still entering the lower Schuylkill River. Amounting to five million gallons daily, the flow would enter the 4-ft. diameter, concrete pipeline in January, 1966, and be diverted to the Southwest Water Pollution Control Plant. Cost of the interceptor: $809,000.

The 26th Street interceptor, however, was only one item in an expanding collection system that included 140 miles of intercepting sewers, 2,323 miles of main sewers and branch sewers, seven wastewater pumping stations, several storm water pumping stations, and 173 intercepting chambers.

An increasing proportion of this system was new. More than half of the intercepting sewer mileage, several hundred miles of other sewers, most of the intercepting chambers, and all the pumping stations had been built or rebuilt since 1946. Of the $247 million invested in the wastewater system since that year, about $212 million went into the collection network.

Intercepting Sewers: One of the biggest investments had gone into intercepting sewers. Spreading into many parts of the city, the big interceptors collected wastewater from tributary sewers and carried it to the plants for treatment.

By 1965 the interceptor construction program was practically finished.

1. A new interceptor, extending for 3.4 miles along East River Drive, went into service in February. Replacing an old brick pipeline that dated back to the 1880's, the new line was a reinforced concrete box measuring 6½ ft. x 6½ ft. About $164,000 of final work was done on the $2,865,000 sewer.

2. A half-mile extension to an existing intercepting sewer was completed on the west bank of the Schuylkill River. Though most of the construction had been done in 1964, about 400 feet of pipe plus an intercepting chamber and tide gate took shape in 1965. The new pipeline, running partly through Bartram Park, picked up the last untreated wastewater entering the Schuylkill from the west bank and diverted this to the Southwest Plant. Only some untreated flow from the east bank, which will go through the 26th Street interceptor, remained. Cost of the new line: $616,000.

3. To collect wastewater from some Chestnut Hill homes not presently connected to the city sewer system, the Water Department extended an existing interceptor eastward from Wissahickon Creek. The big sewer was carried for 3,700 feet through Fairmount Park to a point just north of Glengarry Road to Rex Avenue and neighboring streets. Cost: $154,000.

Tributary Sewers: Sanitary and small storm sewers will probably be built in growing numbers in future years. This will stem in part from changing urban needs, and it will be made possible by the impending completion of major facilities for stream clean-up. Barring new federal or state requirements for stream protection, more and more capital funds will go into sewers.

This shifting emphasis was already apparent in 1965. About $8.7 million was invested in tributary sewers.

Most of this investment went into sanitary and small storm sewers built parallel to each other and designed to carry separate flows. In older sections of the city, however, some old "combined" pipelines, which carry both sanitary and storm flow, were replaced with new combined sewers because of the impracticability of installing separate systems.

The new sewers were built for many purposes. By far the greatest mileage (16) was laid for new homes, while another mile was put down for new industries. Such "new services" occurred largely in Northeast Philadelphia and Eastwick, where fresh neighborhoods are springing up.

The Northeast pipelines included 6,600 feet in Audubon Avenue, Woodhaven Road, and neighboring streets under a $296,000 contract. Completed too were 4,900 feet of sewer in Stevenson Street from Poquessing Creek to Hegerman Street ($130,000), and 5,500 feet of sewer in various portions of Susquehanna Road ($159,000).

To improve drainage and to provide sewer service for homes without it, the Water Department laid 2.4 miles of special sewers. These included a sanitary pipeline in Prospect and Evergreen Avenues in Chestnut Hill ($79,000); a storm water line in Welsh Road ($118,000); and a new sanitary sewer in Geary Street between 10th and 13th Streets ($150,000).

Next to services for new homes, sewer replacement drew the heaviest investment. Nine miles of old, deteriorating sewers were replaced with strong new pipelines.

With more than 800 miles of sewers dating back to the 19th century, the city will have to replace such sewers for many years to come.

Of special importance was a plan to reconstruct portions of the big Gunner's Run Sewer, which collects sanitary and storm water flow from large areas of North Philadelphia. This 10½ ft. diameter brick sewer is more than 70 years old and has been deteriorating. In past years some segments of it collapsed and were rebuilt.

In 1965 replacement started on 1,760 feet of the old sewer, running along Lippincott Street between "A" and American Streets. By December 31, more than 800 feet of the new line—a reinforced concrete box ranging up to 12½ x 11½ ft. in size—had been constructed. The $1,150,000 job is scheduled to be finished by the autumn of 1966.

Replacement of another part of the Gunner's Run Sewer is also scheduled for 1966 under a $750,000 contract. The contractor will build an 11-ft. diameter, concrete tube in tunnel, reaching southwest from American and Lippincott Streets to Clearfield Street and westward beneath Clearfield to 5th Street. The old brick sewer, located to the north, will be salvaged for limited use through the insertion of a small diameter concrete tube, with a mixture of cement and sand filling the surrounding space.

During the year, several old sewers were replaced in the center city. These included sewers in 2nd Street between Market and Walnut Streets ($330,000); in Race Street from 5th Street to a point 150 feet east of Lawrence Street ($212,000); in portions of Pine Street, as 8th to 10th, Broad to 17th, etc. ($302,000); in 10th Street between Market and Filbert Streets and between Arch and Vine Streets ($365,000); and in Poplar Street between Front and 4th Streets ($155,000).

Wastewater Pumping Stations: Equipped with modern pumps, the pumping stations moved the huge daily flow of wastes with few incidents. Only minor maintenance was required at most stations. Several pumps were overhauled at the Central Schuylkill and Southeast Stations under a $21,000 contract.

Intercepting and Metering Chambers: The intercepting chambers required only normal maintenance, but a ventilating system was installed in five chambers that meter wastewater flow from neighboring communities. The latter work was done under a $22,000 contract.

STORM FLOOD RELIEF FOR OLD NEIGHBORHOODS

Relief was in sight for some neighborhoods periodically flooded by storm water run-off.

With the spread of paved surfaces, such run-off has increased in recent decades, and some sewers built in the 19th century are no longer able to cope with it. Swollen by heavy rains, the sewers spill over into streets and cellars.

To meet this problem the Water Department put into service a big relief sewer in South Philadelphia during 1965, and it pushed the construction of two other large storm conduits. Along Mingo Creek it was digging a mile long surge basin.

The new public works were part of a $40 million program that had already relieved some storm harrassed sections. In the course of 15 years, a number of large relief conduits, several storm water pumping stations, and vital stream channel improvements had taken shape. About $27 million had been spent for these purposes.

New excavation methods have made the construction of large storm sewers more efficient, and in 1965 further advances took place in Philadelphia.

Main Relief Sewer: Use of a new type of rock boring machine (still in the experimental stage) hastened the construction of a big storm relief tube beneath 22nd Street. The new machine chewed its way through hard rock formations at far greater speed than would have been possible by drilling and blasting.

Cutting an average of three or four feet of tunnel per hour, the machine ground the rock into a fine powder, which was automatically conveyed to waiting mine cars. The pouring of concrete also moved faster and more efficiently, because of a smoother tunnel bore. Surface vibrations, a cause of unhappiness for many home owners, disappeared.

Using the machine, the contractor bored 900 feet of 14-ft. diameter tunnel, and he had only 700 feet more to go at the end of the year. The new tunnel was being dug 55 feet below 22nd Street from Sedgley Avenue to Dauphin Street. About 500 feet of tunnel had been drilled and blasted in Sedgley Avenue the year before, and this was concreted in 1965.

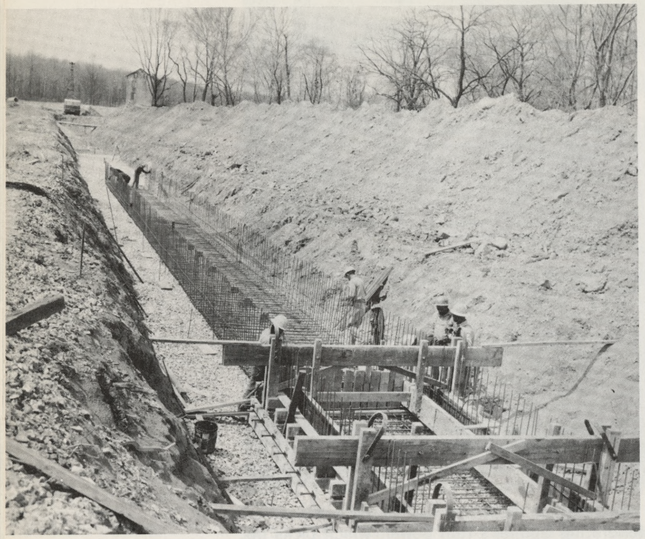
An 11-ft. diameter concrete tube when finished, the new pipeline will collect storm flow from North Central Philadelphia west of Broad Street. This flow will be funneled into that part of the Main Relief Sewer built under 22nd Street in other years and which runs southward to the Schuylkill River.

The $915,000 contract was scheduled to be finished in 1966.

Completed under another contract was a short extension which will form the northern terminus of the Main Relief Sewer. This was a

Sewer Replacement: Work started on replacement of the deteriorating Gunner's Run Sewer, which picks up storm and sanitary flow from large areas in North Philadelphia. In all, about nine miles of old sewers were replaced throughout the city.

Storm Flood Control: To carry off storm flow, the long Main Relief Sewer was further extended to 16th Street and Allegheny Avenue in North Philadelphia while Mingo Creek was deepened and widened in Eastwick. The creek was being transformed into a mile long surge basin to support a new storm water pumping station.



Sewers for New Development: More sewers were built in 1965 to service new homes and industries than for any other purpose. Photos show big storm water pipelines taking shape in the Northeast (left) and Eastwick (right), two of the city's most important new areas. Many sanitary pipelines were also laid.

small diameter pipe in 16th Street, reaching from a point 25 feet north of Clearfield Street to a point 95 feet south of Allegheny Avenue. The job cost $189,000.

Mill Creek Sewer: More storm relief was also imminent for West Philadelphians living north of Market Street. There the Water Department was busily taming a longer stretch of old Mill Creek than ever before. By the end of the year it had largely constructed a huge pipeline that would carry the old creek safely to the Schuylkill River in time of storm.

The new box sewer, formed of reinforced concrete and measuring 16 ft. x 18 ft. will extend from 50th and Brown Streets to 55th and Master Streets. It will replace a crumbling brick sewer that dates back to the 1880's.

Almost $830,000 of work was done in 1965 under two contracts that totaled $2.83 million. Only a small part of the job was still to be done.

Other portions of the Mill Creek Sewer were replaced in earlier years. The new sections are stronger and of greater capacity than the old brick pipeline.

Passyunk Avenue Sewer: A hope fulfilled for South Philadelphians was the new Passyunk Avenue Sewer, which was put into service in March. Built at a cost of nealy $3 million, the 1.4-mile sewer is expected to reduce storm flooding in the large neighborhood bounded by Mifflin, 16th, Shunk, and 22nd Streets.

A rectangular box for half its length and a tube in tunnel for the other half, the concrete pipeline extends generally along Passyunk Avenue from 16th Street to the Schuylkill River. Finishing work in 1965 was valued at $180,000.

Mingo Creek Surge Basin: Along Mingo Creek workmen were digging a huge surge basin to relieve future loading on the new Mingo Creek Storm Water Pumping Station. The basin was being formed by the deepening and widening of the creek for more than a mile, all the way from the Schuylkill River to 77th Street and Ashwood Avenue.

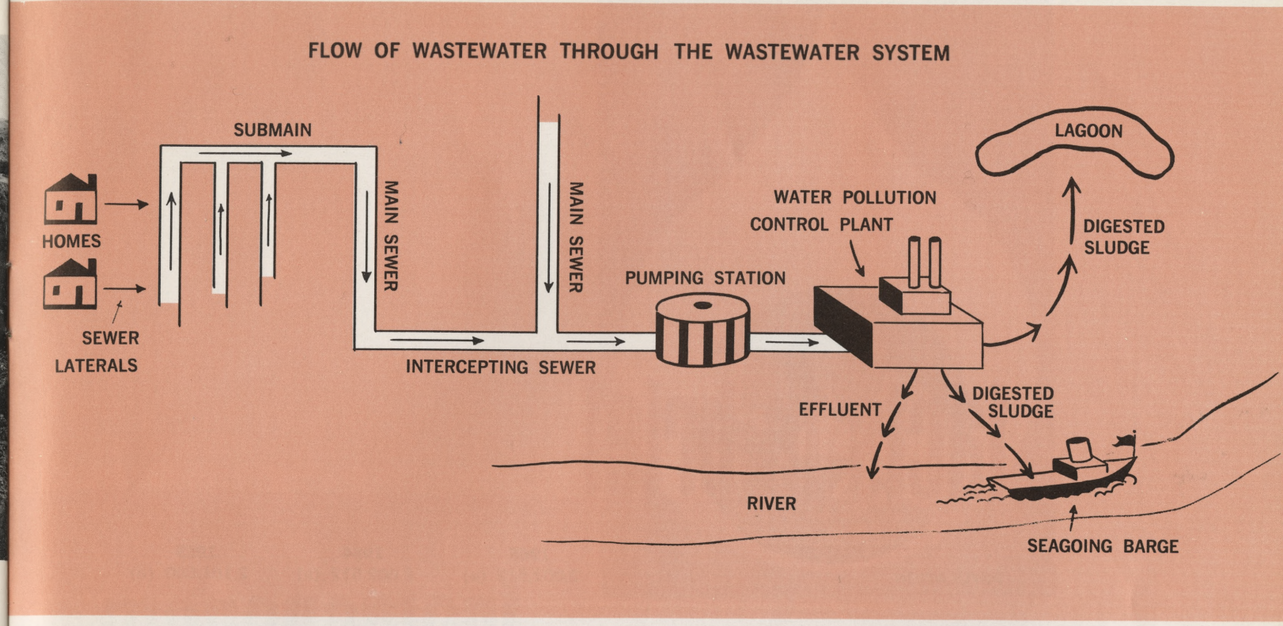
The basin will receive storm run-off from Eastwick and will convey this run-off to the station, where it will be pumped into the Schuylkill. Cost of the basin: $454,000.

Although finished, the new Mingo Creek Station remained on standby throughout the year. This was because of heavy sediment in Mingo Creek, caused by extensive land-fill operations in the area. Pending corrective action to reduce the load on the creek, the old station continued in service.

CONTROL OF INDUSTRIAL WASTES

Working closely with local industry, the department stepped up its perennial campaign to protect local streams and sewers from untreated industrial wastes.

In the past dozen years, this effort has met with increasing success. More and more industries have installed their own treatment units to recapture or bottle up such wastes. In many instances, wastes have been reused and industrial firms have netted sizable monetary savings.



Because of the willing cooperation of industry, the discharge of untreated industrial wastes into streams has been much reduced.

Population and industry along the Delaware River continue to grow, however, and thus the control of industrial wastes will remain a problem for many years to come.

To meet this problem, the department's small staff of industrial wastes experts made more inspections of industrial and commercial establishments in 1965 than ever before. They made 2,335 inspections covering 156 large manufacturing and processing industries, 735 restaurants (seating 50 or more persons), and numerous other enterprises such as laundromats and service stations. Of the total inspections, more than 1,000 covered newly installed waste interception or treatment devices.

Larger industries visited represented many different products, including paints, chemicals, textiles, dyes, ships, sugar, metals, rubber, wool, coal, baked goods, paper, leather goods, drugs, alcoholic beverages, salt, pickles, milk, hats, and dental tools.

Department representatives did not confine themselves to inspection alone. They freely offered technical advice, when this was requested by local industries.

Pollution of small creeks was also investigated. In one such instance, sewer laterals from 668 homes were dye tested, resulting in the discovery of 25 cross connections with storm sewers.

SEWER MAINTENANCE

Despite aging sewers, clogged stream beds, and varying weather, fourteen maintenance crews kept the sewer system functioning. The crews did more jobs and worked more man days, indeed, than in a number of years.

Man days worked totaled over 28,000, or almost 5,000 more than the year before. At the same time, the department performed 24,000 inspection, repair, or cleaning jobs on sewers, inlets, manholes, laterals, and drainage rights-of-way.

To determine the need for sewer replacement, the crews inspected 130 miles of old sewers. This was more mileage inspected than at any time in recent years. About eight miles of sewers were recommended for reconstruction under a continuing improvement program.

Sewer breaks occurred at 32 locations during the year, and emergency crews inserted 300 feet of new pipeline into these breaks. Only eight of the breaks were major, and most of the latter were in old brick lines.

To open choked sewers, the department rodded or flushed out 5.3 miles of lines and cleaned another 2.8 miles.

Drainage rights-of-way received increasing attention, because more and more of these have become clogged as a result of the growth of new neighborhoods. Maintenance crews inspected 300 drainage rights-of-way and cleaned 200 of them, cutting away trees and bushes, removing debris, and often reshaping stream banks.

The department designed a new inlet cover to make inlet cleaning easier and new inlet grates to reduce storm flooding.

facts in brief

	1965	1964	1955
POPULATION	2,002,512 (a)	2,002,512 (a)	2,161,000 (b)
WATER SYSTEM:			
Meters in system: Dec. 31	526,632	525,984	429,000
Unmetered accounts: Dec. 31	1,741	1,796	84,000
Total services: Dec. 31	528,373	527,780	513,000
Consumption per person average day (gallons)	162.8	163.4	171
Consumption average day (million gallons)	326	327.2	369.8
Consumption maximum day (million gallons)	455.2 (c)	473.5	477.2
Total annual consumption of filtered water (billion gallons)	118.9	119.8	135
Total annual raw water pumped (billion gallons)	125.3	126.5	142.4
Pipelines in filtered water system (miles)	3,176.2	3,158.3	2,868.5
Valves in filtered water system	72,850	71,559	60,733
Fire hydrants in filtered water system	24,740	24,729	23,399
WASTEWATER SYSTEM:			
Wastewater treated, average day (million gallons)	386.3	364.2	157
Total wastewater treated in year (billion gallons)	141	133.3	54.4
Sewers in system (miles)	2,463.4	2,442.4	2,167.2
HIGH PRESSURE FIRE SYSTEM:			
Pipelines in system (miles)	63.3	63.3	62.9
Valves in system	1,868	1,870	1,872
Fire hydrants	1,050	1,044	1,069

NOTE: (a) U. S. Census, 1960
(b) Philadelphia Chamber of Commerce estimate
(c) Tuesday, June 29, 1965—temperature 90 degrees F.

management & engineering services

THE STREAMLINING OF MANAGEMENT

Along with plant modernization, the department continued to streamline management. It sought new methods and machines to improve its fiscal, personnel, customer service, engineering, administrative, and "line" supervisory operations.

Much had already been done toward this end. In past years, such improvements had tended to hold operating costs to reasonable levels and to make management tasks faster, easier and more reliable.

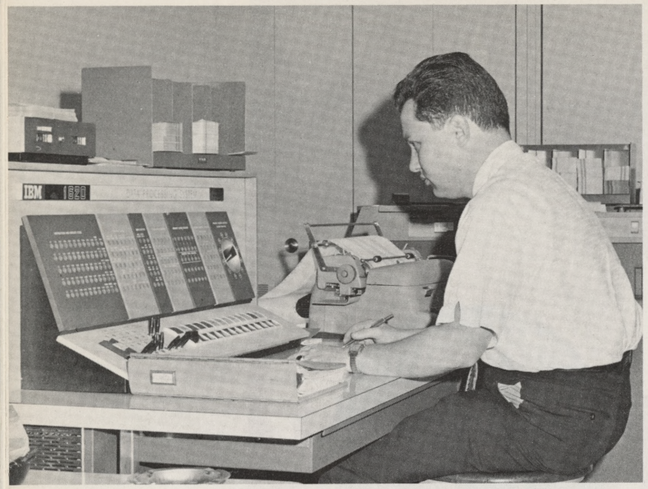
To achieve these purposes, employee skills had been updated, new reporting procedures devised, work operations rationalized, incentives provided, and modern office machines extensively introduced.

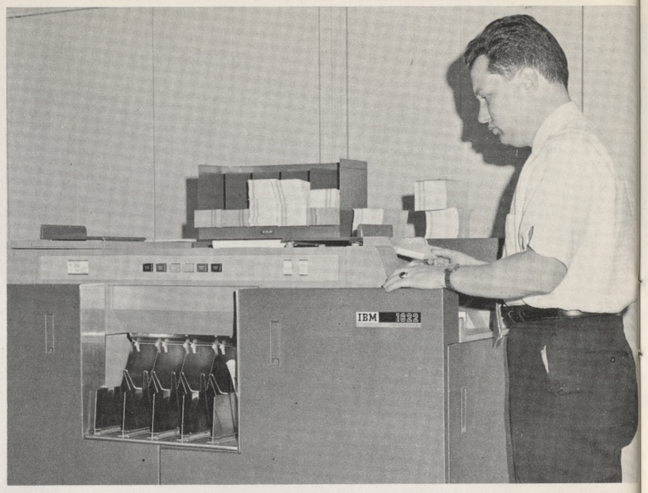
Though modern plants contributed to growing efficiency, they in turn demanded wiser, more skilled management. Mounting debt service too, occasioned by a $516 million improvement program, required increasing efficiency.

In 1965, the streamlining of management was sharply accentuated. The Water Department set up a new engineering computer center, which promised to revolutionize some departmental operations.

New Computer Center: Scheduled to begin functioning in January, 1966, the new computer center will unravel in minutes some engineering problems that used to consume weeks or months. Besides solving such problems, it will do complex statistical analysis and research.

Typical problems will include the more efficient design of water mains and sewers, the





Engineering Computer Center: Ready to begin operation was a new office equipped with a computer capable of doing 100,000 calculations a minute. The computer, operated by the Water Department, will be used to solve quickly a variety of intricate engineering and planning problems that confront the department and other municipal agencies. Calculating unit at left; card read punch unit at right.

evaluation of data for better wastewater treatment, more accurate determination of chemical dosages for purification of water, and the solution of land survey problems involving unusual or complex questions of area, angle or shape. The computer will also be used for many repetitive operations.

Storing 20,000 digits in its memory, the computer will be able to make 100,000 calculations a minute. It will also read or punch out up to 10,000 characters a minute on cards. The cards will be fed into a unit that will translate their punched language into coded electrical impulses. The impulses in turn will inform the calculating unit or operate an electric typewriter.

The new center will serve not only the Water Department, which will provide the bulk of the work, but also other municipal departments. It will have three full time employees. Rented by the Water Department, the computer is expected to pay for itself many times over.

Management Studies: Continually surveying itself, the department made a number of management studies during the year. Its small study group suggested procedural changes for the Materials Testing Laboratory and set up a microfilm records system for the Water Main Records Section. Attention was also paid to the improvement of various production, fiscal, safety and personnel reports. A departmental library was established.

Fiscal Operations: Extensively reorganized in previous years, the various budgetary, accounting, and rate analysis activities underwent little change in 1965. The Fiscal Division, which embraces all these activities, processed contracts valued at $17.6 million. The contracts included 269 for public works and 16 for professional services.

Fiscal reports were made more useful by keying them to fuller program reports, required from the department's operating units.

Complete inventories of real property, materials and supplies were made, and the division prepared the annual "projections" required by the courts when excluding water and sewer debt from the municipality's tax supported debt.

PERSONNEL PROGRAMS THAT UPGRADE

Because qualified and dedicated employees are essential to a well operated utility, the Water Department has laid much stress on sound employee programs. In 1965, it continued to provide a variety of advanced training, safety education, incentive awards, and recreational outlets.

As a result of these programs and the opening of new "push-button" plants, the department was able to provide better service with fewer employees than ever before. Departmental strength fell to 1,552 . . . a decline of 122 since 1958. Twelve positions were abolished during the year, most of them because of technical improvements.

Turnover and Sick Leave: The employee turnover rate was more favorable than it had been in many years. At 7.6% it compared well with the rates of private industries and was almost 1% less than the year before.

Contributing to the 1965 decline, as well as to past favorable turnover rates, were generally acceptable working conditions. These included sound civil service policies and fringe benefits. In 1965, the conditions were further improved by the transfer of center city personnel to the new Municipal Services Building and by the prospect of a January, 1966, pay increase.

Building for the Future: Behind Water Department improvements were numerous engineers, representing a variety of specialties. Construction engineers alone supervised 357 field projects valued at more than $52 million.

Turnover during the year included 217 new appointments (including 61 promotions) and 188 separations. Most of the latter were resignations or transfers.

While turnover fell, sick leave rose. Days used per employee were 11.7, compared with 11.2 in 1964.

Training: To improve the skills of its employees, the department arranged for a variety of training courses. Many of these courses were of a technical nature, intended to upgrade the knowledge of laboratory personnel and the operators of new, automated facilities. Seventy-seven such employees attended technical courses at colleges, engineering schools, industrial plants and other centers.

As in past years, some courses were given at the department's own plants by representatives of Pennsylvania State University, with personnel from neighboring counties attending.

Under municipal sponsorship, some employees secured other types of training. Thus 12 employees enrolled in high school equivalency courses; 30 completed courses in the Philadelphia Government Training Institute; and 10 took graduate courses in governmental administration at the University of Pennsylvania.

Incentive Awards: Employees were encouraged to offer suggestions for the improvement of departmental operations, as part of the municipality's suggestion program. Eighteen Water Department employees submitted "money-saving" suggestions, and three of them won cash awards.

Safety program: A well organized program continued to make employees safety conscious. This was evident in the moderate rate of disabling injuries in the department.

The number of such injuries per million man hours worked was only 16.3 in 1965. Though 2.5 points above the year before, this was yet one of the lowest disabling accident frequency rates achieved in recent years. It was also below industry-wide averages for water utilities.

Disabling injuries numbered 58 or nine more than in 1964; medical treatment cases dropped, however, from 171 to 159. Working days lost because of disabling injuries numbered 1,307, or 86 more than in the previous year. Injuries, whether disabling or not, stemmed mainly from human error or inattention.

Thanks in part to continued driver education, motor vehicle accidents fell to 176—a decline of 34 from the year before. Eighty-four of these accidents were listed as unpreventable.

To encourage improved driving, the National Safety Council presented "safe driver" awards to

PERSONNEL CHANGES

Among the more significant personnel changes in 1965 were the following:

Promotions

Elwood L. Bean (Chief of Water Treatment), from Sanitary Engineer IV to V; Kenneth J. Zitomer (Chief of Construction), from Civil Engineer IV to V; Ervin L. Davis (Executive Assistant to the Commissioner), from Personnel Officer III to Administrative Assistant III; Charles Pierce, from Sanitary Engineer II to III; Sylvester J. Campbell, from Sanitary Engineer II to III; Floyd H. Platton, from Personnel Officer II to III; Robert Wenzinger, from Civil Engineer II to III.

Separations

Alexander Gibson, Civil Engineer III, retired January 14, 1965; William Shelton, Civil Engineer IV, transferred to Department of Public Property on September 12, 1965.

Deceased

Everett Logan, Civil Engineer II, on August 17, 1965.

211 Water Department employees, who had driven department vehicles for an entire year without a preventable accident. Thirty-one of these employees received the award for the eighth consecutive year. Collectively, the 211 safe drivers had driven more than a thousand "safe years" since 1957, when the award program was started.

Other Programs: Many after-hours activities were sponsored by the Water Department Employees' Recreation Association. These included softball, bowling, chess, basketball, tennis and other sports, many of them played by organized teams. They also included fishing trips and reduced price tickets for theaters. The association has more than half of the department's employees in its membership.

ENGINEERING SERVICES IN BRIEF

As in past years, engineers played an important role in 1965, planning, designing, constructing, and operating the many water and wastewater facilities.

Among the larger auxiliary services provided by engineers were the following:

Planning: Some of the initial planning for new water mains and sewers was done by the small Water and Sewer Systems Planning Unit. The unit studied several large sewer systems in depth, with the intention of replacing important portions of them. The systems, which individually receive sanitary or storm flow (or both) from hundreds of acres, were located mainly in North, Northwest, and Southwest Philadelphia.

There was much planning too for the replacement of many older sewers of lesser importance. Thus final hydraulic designs were made for more than 41,000 feet of sewers in 99 locations, and preliminary designs were drawn for sewers in 146 other locations.

The unit also made various feasibility studies for water supply to new areas or for the improvement of supply to areas already served. Programs were written for the new engineering computer.

Design: The work of design engineers and draftsmen is rarely of special interest to the public, but their work is the basis of all serious construction programs. In 1965, the Water Department's Design Branch prepared "plans, specifications and estimates" for 238 contracts valued at $15.4 million.

New Library: Along with other municipal departments, the Water Department moved into the new Municipal Services Building. For the first time it was able to set up a working library for its staff, combined with a comfortable reception room for visitors.

These contracts included the construction or cleaning of 70 miles of water mains at several hundred locations; the construction of 13 miles of sewers (some of which will serve more than 3,000 proposed housing units); the making of more than 40 basic improvements at water pollution control plants; and numerous plant, pumping station and storage improvements in the water system.

The branch also prepared 144 reports on drainage, flooding, underground utilities, and other matters.

Construction: The 170 engineers, inspectors, and aides who form the Construction Branch kept 357 field projects moving. These were jobs valued at more than $52 million.

Engineers and inspectors visited the jobs daily, while the branch as a whole made 99 contract surveys and prepared 217 return plans.

Much of the Construction Branch's work is evident in the projects described in preceding sections of this report.

Materials Testing Laboratory: To assure full value for each public dollar spent, the Materials Testing Laboratory did nearly 35,000 physical and chemical tests on purchases by municipal departments. This compared with 25,000 the year before.

Modern quarters (occupied in 1964) and newly acquired equipment enabled the laboratory to increase its output. It received and tested over 3,100 samples, or 700 more than in the previous year.

Although operated by the Water Department, the laboratory services a half-dozen municipal departments, including the central Procurement Department. Besides testing newly purchased products for quality, it checks materials used in municipal construction jobs.

Of the total samples received and tests made during the year, the Water Department accounted for 54%. Increased chemical samples submitted by water treatment plants were largely responsible for the increased activity.

Besides the normal physical and chemical tests, numerous tests were made with infra-red and ultra-violet equipment to obtain "profiles" for a number of new organic compounds. This work will increase the accuracy and speed with which complex new products can be identified.

Among the many products tested were coal, gasoline, oil, metals, instruments, roofing materials, paints, driers, asphalt, concrete, paper, wood, pump packing, ink, food, chemicals, seeds, fertilizers, soils, soaps, detergents, and brick.

AROUND-THE-CLOCK ATTENTION TO CUSTOMER NEEDS

To meet the varying needs of two million water customers, the department provided fast, individualized service. All incoming customer calls were received and acted upon by a central unit, 24 hours daily.

In 1965, this unit responded to 117,000 telephone calls from customers seeking information or emergency help. Many of the calls related to flooded cellars, leaking water meters, broken water mains, clogged sewer inlets, discolored or odd tasting water, flowing fire hydrants, and swollen sewers.

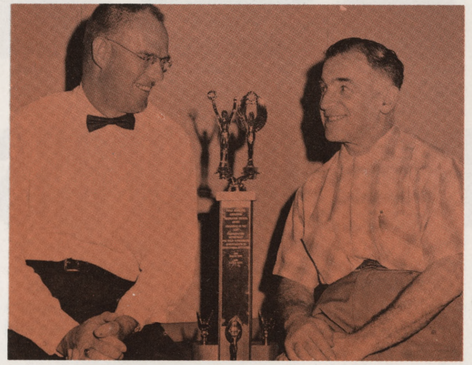
The unit dispatched field representatives or emergency crews to answer these telephoned calls. Response was also made to more than 10,000 appeals radioed by municipal personnel.

Cruising the city in radio equipped cars, Customer Service representatives made nearly 71,000 inspections—about 4,300 more than in 1964 and double the number of a decade before. These inspections covered billing problems, settlement readings, charity applications, permits, new services, water leaks, water shut off, and many other items. More than 3,500 monitory notices were served.

Customer Service personnel also arranged for departmental correction of 116 plumbing violations in outside private drains, drainage lines, and water service pipes. These were violations which owners would not or could not correct.

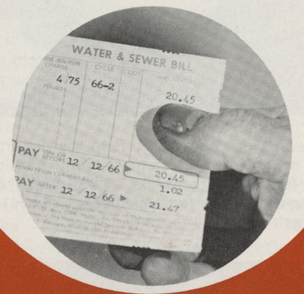
During winter months, field representatives doubled as a weather patrol for the city's emergency headquarters.

The Rewards of Thought: To help the department save money or improve efficiency, many employees submitted formal suggestions. Two employees whose ideas were adopted receive checks (above) under the City's cash awards program.



Victory: The top trophy of the Philadelphia Municipal Employees' Recreation Council was won by the Water Department in 1965 because of the all around excellence of its recreational programs for employees. Officers of the department's busy recreational association seemed a mite proud.

Visitors from Abroad: Philadelphia's modern water plants and its comprehensively organized Water Department have attracted many officials and engineers from abroad in recent years. Among visiting officials in 1965 were several (photo) from Venezuela, Mauritius, Uganda and the World Bank.



financial progress

CURRENT FINANCE

So satisfactory was the Water Department's financial position in 1965 that current water and sewer rates were continued for another year—through 1966.

Since new and higher rates would not become effective until 1967, this was an extra bonus for water customers. Initiated in 1962, the current rates were originally planned to last only through 1965.

The extension of rates occurred despite the department's rising debt service and operating costs. Although outgo exceeded income during the year, substantial revenue surpluses from prior years kept the department "in the black."

The year long extension resulted in part from tight management. Operating costs had been held below the level originally planned; the new cyclical billing system had effected sizable savings; delinquent bills had been vigorously collected. In addition, there were increased amounts of state aid for the Sewer Fund. These factors had even offset an annual loss to the department of $1.5 million, resulting from an increase in the minimum allowance of water to many customers in 1963.

There were signs of financial change, however, during the year. Water and sewer revenues fell below their 1964 highs, while expenditures continued to climb. The $8,840,000 combined surplus in the Water and Sewer Funds was $1,786,000 below the previous year. With the continued rise in debt service costs, it was evident that this surplus would be almost completely wiped out in 1966.

Water Fund: The past success of the municipality* in collecting delinquent water and sewer bills was partly reflected in the size of Water Fund revenues in 1965. These revenues totaled $22,138,000—or $499,000 less than the all time high of 1964. Because of the past reduction of delinquent accounts, delinquent collections ($1,825,000) were $240,000 less than the year before.

Current water sales, which account for 90% of all Water Fund income, totaled $16,995,000—a drop of $127,000. Other revenues also fell off moderately.

By contrast, Water Fund outgo continued its steady rise to a new high. Totaling $22,235,000, it was $704,000 above 1964. Nearly every major item of expenditure showed some increase.

Thus debt service ($8,381,000), which represented 36% of all obligations, was $345,000 higher. This was nearly half of the total increase in Water Fund expenditures.

Other sizable outlays included: Purchase of services, $2,241,000; salaries and wages, $5,920,000; pension payments, $497,000. In addition, $500,000 was applied as "pay-as-you-go" financing for the capital budget.

As a result of increases, current Water Fund obligations exceeded current revenues in 1965 by $1,097,000. This was the first Water Fund deficiency under the existing water rates.

From the budgetary standpoint, however, the department's operations reflected conservative fiscal planning. Thus Water Fund income reached 103% of 1965 budgetary estimates, even though this income was below the 1964 receipts. The excess income (above budgetary estimates) totaled $710,000, of which $518,000 was in water sales. Only one major revenue fell: Payments from the Sewer Fund to the Water Fund for joint expenses dropped by $80,000.

Total Water Fund obligations were only $82,000 less than available appropriations. This occurred despite substantial lapses in appropriations ($166,000 in personal services, $66,000 in damages, $61,000 in materials and supplies, and $37,000 in refunds), which were more than offset by adjustments in other spending. The latter included $271,000 more in payments to the municipality's General Fund and $52,000 more in pension payments than originally appropriated. Operations were aided by the addition of $205,000 to surplus through the merger of encumbrances from prior years.

As a result, the Water Fund closed 1965 with a cumulative cash surplus of $3,158,000 or $892,000 below the previous year.

Sewer Fund: With difference in detail, the Sewer Fund followed the general pattern of the Water Fund, and with virtually the same result: There was a drop of $894,000 in available surplus during the year.

*Water-sewer billing and collecting are done by the municipal Department of Collections. The Water Department cooperates in enforcing the collection of unpaid bills.

CAPITAL ACTIVITY—1965

	Water Works	Water Pollution Works	Storm and Flood Works	Total
Capital contracts encumbered January 1, 1965	$10,730,275	$10,457,799	$1,375,951	$22,564,025
Add: Capital work put under way in 1965	7,494,855	7,786,508	(75,450)*	15,205,913
Total: Net capital activity in 1965	$18,225,130	$18,244,307	$1,300,501	$37,769,938
Less: Capital expenditures in 1965	10,656,094	11,247,853	575,373	22,479,320
Capital contracts still encumbered December 31, 1965	$ 7,569,036	$ 6,996,454	$ 725,128	$15,290,618

*The liquidation of outstanding encumbrances and the lapsing of balances gives a negative value to storm and flood activity "put under way" in the table.

Total sewer revenues reached $17,334,000, or $335,000 less than the high of 1964. These revenues included $14,623,000 in charges to general users, or about 84% of all the income of the Sewer Fund. Such charges were $447,000 below the previous year.

State aid, however, helped to bolster the Fund. This aid, amounting to $1,245,000, was $96,000 more than in 1964, because the Water Department had just completed a $5 million expansion of its water pollution control facilities. Based on a legally formulated percentage of the approved capital value of local water pollution control plants, annual state aid has been a welcome addition to the Sewer Fund.

Other Sewer Fund revenues largely offset one another; some were up, others down.

While total revenues fell, Sewer Fund obligations jumped $1,210,000 to a new high of $18,293,000. Most of the increase was in debt service, which climbed by $956,000 to $12,108,000. The latter represented 66% of all outgo.

Purchase of services, amounting to $1,329,000, showed a $194,000 increase—much of it for the barging of digested wastewater sludge to sea. Salaries and wages ($1,868,000) included an additional $85,000 for hiring of new personnel at the Northeast Water Pollution Control Plant. As with the Water Fund, "pay-as-you-go" financing for the capital budget totaled $500,000.

In budgetary terms, Sewer Fund income exceeded revised estimates by $575,000. This included $151,000 more in interest earnings, $147,000 more in charges to Philadelphia municipal departments, $96,000 more in state aid. and $91,000 more in charges to other municipalities, than originally estimated. Total collections of current sewer charges ran $219,000 under estimates, but past due collections ran $246,000 over.

Sewer Fund obligations, however, were $56,000 more than original appropriations, and the excess payments were made from surplus. They included $81,000 more for the General Fund and $36,000 more for the Municipal Pension Fund. These and other payments more than offset a number of lapses in appropriations. The latter included $80,000 paid to the Water Fund for joint fund expenses, $35,000 in capital payments, and $27,000 in refunds.

At the same time, $65,000 was added to surplus by the merging of encumbrances from prior years.

As a result, the Sewer Fund closed 1965 with a cumulative cash surplus of $1,351,000.

CAPITAL FINANCE

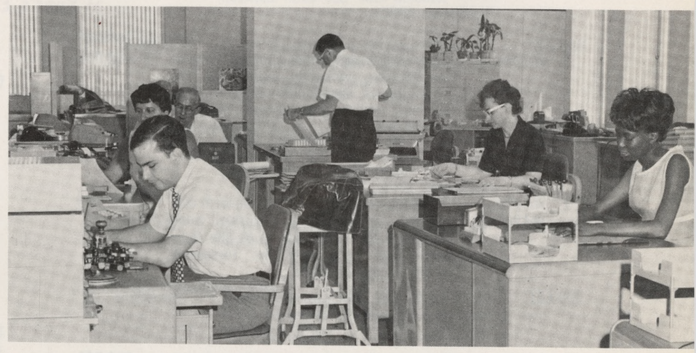
After two peak construction years, the department's "capital activity" (which includes expenditures and new commitments) entered upon an inevitable decline in 1965. This resulted from the completion of several major projects, as well as a fall-off of Federal Accelerated Public Works funds.

During the year, the department paid out less than $22.5 million, compared with $33.1 million in 1964. New commitments—or capital work "put under way"—totaled $15.2 million. These commitments were $7.8 million less than in 1964 and $13.1 million below 1963.

Included in the new commitments were sums for both water ($7.5 million) and wastewater ($7.8 million) system improvements.

Most of the water system improvements involved replacement of old water mains and valves, creation of additional water storage ($584,000), work on the new Torresdale river water intake ($266,000), and expansion of the microwave system ($295,000).

In the wastewater system, there was emphasis ($308,000) on the construction of sewers and the expansion of water pollution control plants. Although hardly any new commitments were made for storm flood control, expenditures for this purpose totaled $575,000.



Fiscal Operations: Housed in new quarters, the Fiscal Division processed 285 contracts, valued at $17.6 million, and handled a variety of bookkeeping, reporting, and other functions.

capital projects–1965

WATER PLANTS AND DISTRIBUTION SYSTEMS

Major Projects Completed During 1965

		Cost
1.	Belmont Water Treatment Plant: General construction including structures, equipment and piping in the filter and chemical buildings; automatic controls and wash water pumping facilities; also electrical work, heating, ventilating and plumbing systems.	$9,582,745
2.	Torresdale Water Storage: Conversion of remaining 44 abandoned slow-sand filter beds into underground storage basins for filtered water (general construction including piping).	2,305,235
3.	Torresdale Water Treatment Plant: Minor improvements including alterations to three lime storage bins, air conditioning of laboratory and offices, installation of new aluminum windows, electrical work, and zinc coating of wash water piping in filter beds.	104,666
4.	Torresdale Filtered Water Pumping Station: Installation of three new high service pumps, including electrical work.	145,110
5.	Distribution Headquarters: Various improvements including electrical work and lighting, new glass block windows, air conditioning, aluminum ceilings, and heating system changes.	109,060
6.	Relay of four 4-ft. steel water mains in McMichael Street between Roberts and Abbottsford Avenues; also installation of four 4-ft. cast iron vertical gate valves in Fox Street between Queen Lane and Abbottsford Avenue.	484,622
7.	Replacement of valves in chambers 1, 2, 3 at Lardner's Point Pumping Station.	194,206
8.	Cleaning and cement mortar lining of water mains under four separate contracts, with pipelines ranging from six inches to four feet in diameter; also replacement of line valves.	1,033,690
9.	Laying of water mains in Eastwick Avenue from Island Avenue to 70th Street and in neighboring locations.	162,324

Some of the Larger Projects under Construction at Year's End

			Limit of Contract
1.	W-1091	Upper Roxborough Water Storage: General construction, including piping, for the conversion of abandoned slow-sand filter beds into underground storage basins for filtered water. 36% completed	$ 650,000
2.	W-1200 W-1201	Torresdale Raw Water Intake: General construction together with electrical work, for a new raw water intake on the Delaware River to supply the Torresdale Water Treatment Plant. 80% completed	2,338,700
3.	W-1360 W-1366 W-1375	Torresdale Water Treatment Plant: Installation of lime slakers with grit removers in the pre-treatment building; waterproofing of dry wells of central conduits in flocculator basins; erection of stand-by transformer, with connections, etc.	210,500
4.	W-988 W-1059 W-1139	Torresdale Raw Water Pumping Station: Installation of six new pumps and related piping; new plumbing and steam heating; electrical work for pump motors, control valves, etc.; overhead crane modifications. 95% completed	953,000
5.	W-1393-CD	Laying of water main in Indiana Avenue between 23rd and 24th Streets, in Judson Street from Indiana Avenue to Cambria Street, and in neighboring locations. 92% completed	195,000
6.	W-1040-D	Relay of 16-inch cast iron water main in Chestnut Street between 3rd and 6th Streets; also relay of two-inch cast iron main in Chestnut Street (both footways) from 6th Street to 8th Street. 95% completed	204,000
7.	W-1327-D W-1379D W-1392-D W-1424-D W-1378-DM	Cleaning and cement lining of cast iron water mains ranging from six inches to five feet in diameter; also replacement of line valves. 70% completed	2,065,000

WATER POLLUTION CONTROL PLANTS AND SEWERS

Major Projects Completed During 1965

		Cost
1.	Southwest Water Pollution Control Plant: Construction of new sludge lagoon ("G"); also various minor work at plant, including floodlighting, a sanitary drainage line, and steel steps.	$ 182,331
2.	Completion of an intercepting sewer through Bartram Park, etc., on west bank of the Schuylkill River.	615,792
3.	Construction of an intercepting sewer, including intercepting chamber, in 26th Street from Shunk Street to a point 334 feet south of Hartranft Street.	808,610
4.	Completion of a new intercepting sewer to replace an old one in East River Drive from a point near Boathouse Row to a point 1,790 feet north of Nicetown Lane (four separate contracts).	2,865,473
5.	Construction of an intercepting sewer from Wissahickon Creek (near Glengarry Road) northward to Rex Avenue, etc.	154,175
6.	Sewer: Audubon Avenue from Byberry Road to Woodhaven Road, and in neighboring locations.	296,537
7.	Sewer: Susquehanna Road from Verree Road to Ferndale Street, etc.	156,779
8.	Eastwick Redevelopment: Various sewers to serve the new Eastwick area in Southwest Philadelphia.	1,264,851
9.	Sewer Replacement: 13th Street from Green Street to Poplar Street, etc., including construction of a 4-ft. steel water main.	833,645
10.	Sewer Replacement: Poplar Street from Front Street to 4th Street, including relay of water main.	154,896
11.	Sewer Replacement: 2nd Street from a point 84 feet south of Market Street to Walnut Street, including relay of water mains.	315,306
12.	Sewer Replacement: Race Street from 5th Street to a point 150 feet east.	193,166

Some of the Larger Projects under Construction at Year's End

			Limit of Contract
1.	SD-340-NE SD-341-NE SD-347-NE SD-348-NE	Northeast Water Pollution Control Plant: Various work on new wing for the blower building, including general construction, installation of a 5000 KVA outdoor substation, and various electrical work. 90% completed	$1,260,000
2.	SD-361-NE SD-366-NE SD-367-NE SD-369-NE SD-374-NE SD-383-NE SD-384-NE	Northeast Water Pollution Control Plant: Various improvements including an extension to an existing 4000 KVA outdoor substation, eight new flow tubes in gallery piping plus four dual Penn meters for measurement of gas from digestion tanks, an auxiliary 12-inch discharge sludge pipeline, electrical work, replacement of a chain link fence, replacement of sludge heaters, etc.	316,600
3.	SD-303-SW	Southwest Water Pollution Control Plant: Construction of two sludge concentration tanks, together with related piping and mechanical equipment. 97% completed	265,000
4.	SD-309-SW-O SD-310-SW SD-312-SW SD-313-SW-O SD-317-SW-O SD-319-SW SD-321-SW SD-322-SW-O SD-323-SW-O SD-327-SW	Replacement of 64 digester cover roller guides with 88 new roller guides; installation of a gas digester recirculation system in digester tank No. 2; various electrical work for sludge handling equipment, new pump motors, and a gas recirculation system; installation of a 10-M.G.D. vertical motor driven magnetic-drive wastewater pump with piping and valves; installation of a pumping system for the primary tank effluent conduit, and of instrument and control devices for automatic programming of the primary sludge tanks.	358,350
5.	SD-152-G-O	Sludge Disposal: Transportation and disposal in Atlantic Ocean of digested sludge from Northeast and Southwest Water Pollution Control Plants; also construction of a barge loading dock for digested sludge near the Penrose Avenue Bridge.	883,343 (of this $211,943 in 1965)
6.	S-3533-A	Sewers: Audubon Avenue from Woodhaven Road to Hendrix Street, and in neighboring locations. 75% completed	166,767
7.	S-2588-BR	Sewers: Geary Street from 10th Street to Juniper Street. 82% completed	150,000
8.	S-3414-E	Sewers: 74th Street from Eastwick Avenue to Drainage Street. 70% completed	400,000
9.	S-3465-RD	Sewer Replacement: Lippincott Street from a point 104 feet west of "A" Street to American Street, together with relay of water mains. 40% completed	1,150,000
10.	S-3476-R	Sewer Replacement: Woodland Avenue between 42nd and 46th Streets. 90% completed	150,000
11.	S-3256-RD	Sewer Replacement: Greene Street between Logan and Manheim Streets, including relay of water mains. 65% completed	215,000
12.	S-3324-RD	Sewer Replacement: Pine Street between 16th and 17th Streets, etc., including relay of water main. 99% completed	200,000
13.	S-3333-RD	Sewer Replacement: Brown Street between Franklin and 11th Streets. 17% completed	214,000
14.	S-3441-RD	Sewer Replacement: 3rd Street from Poplar Street to a point 240 feet north of George Street. 68% completed	153,000
15.	S-3326-RDH	Sewer Replacement: 10th Street between Market and Filbert Streets and between Arch and Vine Streets, including relay of water main. 70% completed	365,000

STORM FLOOD RELIEF

Major Projects Completed During 1965

		Cost
1.	Mingo Creek Storm Water Pumping Station: Finishing touches under contract for general construction, mechanical equipment and piping. Work in 1965 valued at $36,000.	$ 724,021
2.	Mill Creek Sewer: Replacement of Mill Creek Sewer from 53rd and Poplar Streets to 55th and Master Streets.	1,102,990
3.	Passyunk Storm Relief Sewer: Finishing touches under three general construction contracts for the Passyunk Relief Sewer extending generally along Passyunk Avenue from 16th Street to the Schuylkill River. About $180,000 of completion work in 1965.	2,847,138
4.	Main Relief Sewer: New line in 16th Street from a point 25 feet north of Clearfield Street to a point 95 feet south of Allegheny Avenue.	188,651

Some of the Larger Projects under Construction at Year's End

			Limit of Contract
1.	S-3419-E	Mingo Creek Surge Basin: Deepening and widening of Mingo Creek from Mingo Creek Storm Water Pumping Station to 77th Street and Ashwood Avenue, etc. 78% completed	$ 413,000
2.	S-2922-F	Main Relief Sewer: Construction of Main Relief Sewer extension in tunnel in 22nd Street from Dauphin Street to Sedgley Avenue and in Sedgley Avenue from 22nd Street to a point 230 feet west of Margie Street. 35% completed	915,000
3.	S-2956-R	Mill Creek Sewer: Replacement of Mill Creek Sewer from 50th and Brown Streets to 53rd and Poplar Streets. 85% completed	1,700,000

brief financial statement – water fund

BALANCE SHEET

ASSETS AND OTHER DEBITS

	December 31 1965	1964
Utility Plant		
Utility Plant in Service	$257,181,152	$247,143,286
Construction Work in Progress	7,224,356	6,689,457
Unexpended Construction Authorizations	13,172,316	14,810,880
	$277,577,824	**$268,643,623**
Current Assets		
Cash	$ 4,048,947	$ 5,341,053
Accounts Receivable:		
Customers, for Utility Service	5,209,041	5,632,572
Other	174,329	156,666
Estimated Uncollectible Receivables	(1,724,799)	(1,848,466)
Materials and Supplies at Standard Cost	1,742,710	1,749,923
Advances to Other Municipal Funds	1,341,313	413,998
Prepaid Expenses	3,935	27,834
	$ 10,795,476	$ 11,473,600
	$288,373,300	**$280,117,223**

LIABILITIES AND OTHER CREDITS

Long Term Debt and Other Credits		
Bonds Payable	$111,583,427	$103,917,885
Sinking Fund Assets	(2,230,197)	(2,801,213)
Bond Authorizations Unissued	8,250,000	13,320,000
	$117,603,230	**$114,436,672**
Excess of Utility Plant and Fund Accounts over Long Term Bond Commitments	159,974,594	154,206,951
	$277,577,824	**$268,643,623**
Current Liabilities		
Accounts Payable	$ 435,250	$ 458,713
Payroll Accrued	212,168	204,465
Overpayment of Revenues	29,910	66,496
Advances from Other Municipal Funds	405,132	97,450
	$ 1,082,460	**$ 827,124**
Surplus and Surplus Reserves		
Reserves for Commitments	$ 1,108,789	$ 913,659
Surplus:		
Invested in Materials and Supplies	1,742,710	1,749,923
Estimated Collectible Receivables	3,658,572	3,940,791
Available for Appropriation	3,202,945	4,042,103
	$ 8,604,227	$ 9,732,817
Total Surplus and Surplus Reserves	$ 9,713,016	$ 10,646,476
	$ 10,795,476	**$ 11,473,600**
	$288,373,300	**$280,117,223**

STATEMENT OF INCOME AND SURPLUS

	For the Year Ending December 31 1965	1964
Operating Revenue:		
Metered Sales	$18,484,301	$18,817,697
Municipal and Other Metered Sales	706,729	708,960
Public Fire Protection	1,062,395	1,077,999
Other Operating Revenues	522,614	581,160
Total Operating Revenue	**$20,776,039**	**$21,185,816**
Operating Revenue Deductions:		
Operating Expenses, Other than Maintenance	$ 8,006,448	$ 7,146,481
Maintenance Expenses	3,926,721	3,708,084
Total Operating Expenses	$11,933,169	$10,854,565
Charges in Lieu of Depreciation	6,318,732	6,119,001
Total Operating Revenue Deductions	**$18,251,901**	**$16,973,566**
Operating Income	2,524,138	4,212,250
Other Income	394,579	312,639
Gross Income	**$ 2,918,717**	**$ 4,524,889**
Income Deductions:		
Interest on Long Term Debt	$ 3,453,836	$ 3,296,522
Net Income or (Loss)	**$ (535,119)**	**$ 1,228,367**
Surplus and Surplus Reserves at the Beginning of the Year	$10,646,477	$ 9,783,214
Other Adjustments to Surplus (Net)	(398,342)	(365,104)
Total Surplus and Surplus Reserves at the End of the Year	**$ 9,713,016**	**$10,646,477**

NOTES TO FINANCIAL STATEMENTS

1. Charges in Lieu of Depreciation. The City Charter provides that the rates and charges for supplying water and services shall yield at least an amount equal to operating expenses and debt service charges on any debt incurred or about to be incurred for water supply purposes.
2. Utility Plant in Service. Real property was valued herein at actual cost or engineering estimates where actual cost was not ascertainable. Equipment was valued at cost or replacement value.
3. Unexpended Construction Authorizations. This represents unexpended authorizations to complete projects in progress and projects not commenced, as well as unused financing, reimbursements, grants-in-aid, etc.
4. Bonds Payable. The bonds of the City of Philadelphia are all general obligations and, therefore, no bonds are issued by the water system per se. Similarly, a consolidated sinking fund is maintained for the retirement of such bonds. The amounts herein shown represent an apportionment of bonded indebtedness based on bonds issued for water system improvements.
5. Bond Authorizations Unissued. Commitments for capital projects authorized in the City's Capital Budget are made against available sources of financing, which include bond authorizations approved by the electorate or City Council and declared self-supporting by a Court of Common Pleas, and Water Fund operating pay-as-you-go appropriations. This item represents the amount of unissued bonds authorized for water system capital improvements.
6. Reserve for Commitments. Represents contractual obligations of the Fund for the future deliveries of services.
7. NOTE: The Statements are on the accrual basis as distinguished from the city budgetary basis of accounting.

WATER FUND — ANALYSIS OF 1965 BUDGETARY OPERATIONS AND COMPARISON WITH ACCRUAL BASIS STATEMENTS

	Budget Estimate(1)	Actual Receipts	Receipts Compared with Estimates	% of Estimate Realized	Accrual Basis Income(2)
INCOME (by major source)					
Water Sales:					
Collections on Current Billings (with penalties)	$16,850,000	$16,995,110	$ 145,000	100.9%	$18,484,301
Collections on Past Billings (with penalties and interest)	1,560,000	1,824,776	264,776	117.0	373,118(2)
Total Water Sales	**$18,410,000**	**$18,819,886**	**$ 409,886**	**102.2%**	**$18,857,419**
Meter Installations (Water Fund share—60%)	131,100	154,749	23,649	118.0	141,555
Miscellaneous Income	249,000	323,295	73,395	129.4	431,147
Interest Earnings	118,000	226,255	108,255	191.7	234,926
Payments from Other City Funds:					
General Fund:					
Water Sales to City Agencies	644,000	781,360	137,360	121.3	706,729(3)
Fire Protection Services	1,025,000	1,062,395	37,395	103.6	1,062,395(3)
Sewer Fund:					
Joint Fund Expenses	850,000	769,996	(80,004)	90.6	745,735(3)
TOTAL INCOME	**$21,428,000**	**$22,137,936**	**$ 709,936**	**103.3%**	**$22,179,906**

OUTGO (by major Object of Expenditure)	Final Appropriations	Final Obligations Amount	% of Total	Lapses Amount	Lapses %	Accrual Basis Expenses
Operations						
Water Operations:						
Salaries and Wages	$ 6,086,000	$ 5,920,411	25.5%	$165,589	2.7%	$ 5,661,061
Purchases of Services by Contract	2,255,000	2,241,331	9.6	13,669	.6	2,157,817
Materials and Supplies	3,287,000	3,226,241	13.9	60,759	1.8	2,521,122
Equipment	244,000	241,658	1.0	2,342	1.0	893,539
Miscellaneous	1,000	146	.0	854	85.4	136
Payments to General Fund:						
Financial services; reading meters, billing, etc.	946,764	1,064,875	4.6	(118,111)	—	1,064,875
Other services rendered	758,236	911,473	3.9	(153,237)	—	911,473
Contributions to Bond Fund	60,000	60,000	.3	0	.0	60,000
Total Water Operations	**$13,638,000**	**$13,666,135**	**58.8%**	**$(28,135)**	**—%**	**$13,270,023**
Employees' Welfare Plan Payments	170,000	146,752	.6	23,248	13.7	146,752
Claims and Awards	90,000	23,991	.1	66,009	73.3	37,292
Employees' Pension Fund Payments	445,000	497,300	2.2	(52,300)	—	497,300(3)
Refunds	50,000	13,291	.1	36,709	73.4	0(3)
Workmen's Compensation	15,000	6,370	.0	8,630	57.5	6,370
Provision for Estimated Uncollectible Receivables	—	—	—	—	—	(123,647)(6)
Total Operations	**$14,408,000**	**$14,353,839**	**61.8**	**$ 54,161**	**.4%**	**$13,834,090**
Capital Payments						
Debt Service:						
Amortization of Principal	$ 4,928,000	$ 4,927,100	21.2%	$ 900	.0%	$ 4,927,100
Interest	3,481,000	3,453,836	14.9	27,164	.8	3,453,836(3)
Capital Budget Financing	500,000	500,000	2.1	0	.0	500,000
Total Capital Payments	**$ 8,909,000**	**$ 8,880,936**	**38.2**	**$ 28,064**	**.3%**	**$ 8,880,936**
TOTAL OUTGO	**$23,317,000**	**$23,234,775**	**100.0%**	**$ 82,225**	**.4%**	**$22,715,026**

SUMMARY COMPARISON OF 1965 BUDGETARY OPERATIONS (Original and Actual Budgets)

	Encumbrance Basis Budget Estimate(1)	Actual	Change	Accrual Basis(5)
Surplus, December 31, 1964	**$ 3,035,000**	**$ 4,049,709**	**$ 1,014,709**	**$10,646,477**
Add or (Subtract): Adjustment of Prior Years' Operations	0	204,958	204,958	(398,341)
Add: 1965 Income	21,428,000	22,137,936	709,936	22,179,906
Total 1965 Resources	$24,463,000	$26,392,603	$ 1,929,603	$32,428,042
Less: 1965 Outgo	23,317,000	23,234,775	82,225	22,715,026
Surplus, December 31, 1965	**$ 1,146,000**	**$ 3,157,828**	**$ 2,011,828**	**$ 9,713,016**

NOTES:
(1) Budget as proposed by the Mayor and adopted by Council in November, 1964.
(2) On the accrual basis, income is considered as earned when billed, whereas the budgetary basis considers income as earned when collected. Thus collection of the prior years is not considered as income on the accrual basis statements.
(3) These figures reflect respective net adjustments to charges in interfund operations.
(4) Payments made by the Sewer Fund to the Water Fund for general management services is not considered as income on the accrual basis, but as a reduction of operating expenses.
(5) The net increase (or decrease) to the estimated uncollectible receivables is considered an expense on the accrual basis.
(6) Surplus on the accrual basis includes the amounts invested in:
Materials and Supplies
Estimated Collectible Receivables

brief financial statement – sewer fund

BALANCE SHEET

ASSETS AND OTHER DEBITS

	December 31 1965	1964
Utility Plant		
Utility Plant in Service	$360,769,758	$348,505,121
Construction Work in Progress	4,999,715	6,830,707
Unexpended Construction Authorizations	15,807,318	19,239,597
	$381,576,791	**$374,575,425**
Current Assets		
Cash	$ 6,567,290	$ 7,622,829
Accounts: Receivable:		
Customers, for Utility Service	4,320,788	4,542,628
Other	49,060	22,224
Estimated Uncollectible Receivables	(1,129,838)	(1,261,491)
Materials and Supplies, at Standard Cost	186,561	151,816
Advances to other Municipal Funds	456,825	85,617
Prepaid Expenses	471	1,471
	$ 10,451,157	**$ 11,165,094**
	$392,027,948	**$385,740,519**

LIABILITIES AND OTHER CREDITS

Long Term Debt and Other Credits		
Bonds Payable	**$179,877,231**	**$167,666,245**
Sinking Fund Assets	(3,900,521)	(4,777,233)
Bond Authorizations Unissued	8,310,000	20,190,000
	$184,286,710	**$183,079,012**
Excess of Utility Plant and Fund Accounts over Long Term Bond Commitments	197,290,081	191,496,413
	$381,576,791	**$374,575,425**
Current Liabilities		
Accounts Payable	$ 156,782	$ 120,871
Payroll Accrued	68,639	72,896
Overpayment of Revenues	26,111	57,326
Advances from Other Municipal Funds	117,948	98,740
	$ 369,480	**$ 349,833**
Surplus and Surplus Reserves		
Reserves for Commitments	$ 946,391	$ 782,893
Surplus:		
Invested in Materials and Supplies	186,561	151,816
Invested in Estimated Collectible Receivables	3,266,632	3,303,361
Available for Appropriation	5,682,093	6,577,191
	$ 9,135,286	$ 10,032,368
Total Surplus and Surplus Reserves	$ 10,081,677	$ 10,815,261
	$ 10,451,157	**$ 11,165,094**
	$392,027,948	**$385,740,519**

STATEMENT OF INCOME AND SURPLUS

	For the Year Ending December 31 1965	1964
Operating Revenues:		
Metered Sales	$ 14,465,863	$ 14,786,730
Municipal and Other Metered Sales	849,048	831,448
Other Operating Revenues	291,111	452,531
Total Operating Revenues	**$ 15,606,022**	**$ 16,070,709**
Operating Revenue Deductions:		
Operating Expenses, Other than Maintenance	$ 3,751,385	$ 3,879,803
Maintenance Expenses	1,300,649	1,327,219
Total Operating Expenses	**$ 5,052,034**	**$ 5,207,022**
Charges in Lieu of Depreciation	7,491,037	6,966,836
Total Operating Revenue Deductions	**$ 12,543,071**	**$ 12,173,858**
Operating Income	3,062,951	3,896,851
Other Income	1,774,995	1,592,444
Gross Income	**$ 4,837,946**	**$ 5,489,295**
Income Deductions:		
Interest on Long Term Debt	$ 5,249,472	$ 4,776,884
Net Income or (Loss)	**$ (411,526)**	**$ 712,411**
Surplus and Surplus Reserves at the Beginning of the Year	10,815,260	10,391,693
Other Adjustments (Net)	(322,057)	(288,844)
Total Reserves and Surplus Reserves at the End of the Year	**$ 10,081,677**	**$ 10,815,260**

NOTES TO FINANCIAL STATEMENTS

1. Charges in Lieu of Depreciation. The City Charter provides that the rates and charges for supplying sewer services shall yield at least an amount equal to operating expenses and debt service charges in any debt incurred or about to be incurred for sewer supply purposes.
2. Utility Plant in Service. Real Property was valued herein at actual cost or engineering estimates where actual cost was not ascertainable. Equipment was valued at cost or replacement value.
3. Unexpended Construction Authorization. This represents unexpended authorizations to complete projects in progress and in projects not commenced as well as unused financing, reimbursements, grants-in-aid, etc.
4. Bonds Payable. The bonds of the City of Philadelphia are all general obligations and, therefore, no bonds are issued by the sewer system per se. Similarly, a consolidated sinking fund is maintained for the retirement of such bonds. The amounts herein shown represent an apportionment of bonded indebtedness based on bonds for sewer system improvements.
5. Bond Authorizations Unissued. Commitments for capital projects authorized in the City's Capital Budget are made against available sources of financing, which include bond authorizations approved by the electorate or City Council and declared self-supporting by a Court of Common Pleas, and Sewer Fund operating pay-as-you-go appropriation. This item represents the amount of unissued bonds authorized for sewer system capital improvements.
6. Reserve for Commitments. Represents contractual obligations of the fund for the future deliveries of services.
7. NOTE: The Statements are on the accrual basis as distinguished from the city budgetary basis of accounting.

SEWER FUND — ANALYSIS OF 1965 BUDGETARY OPERATIONS AND COMPARISON WITH ACCRUAL BASIS STATEMENTS

	Budget Estimate(1)	Actual Receipts	Receipts Compared with Estimates	% of Estimate Realized	Accrual Basis Income(2)
INCOME (by major source)					
Sewer Charges:					
Collections on Current Billings (with penalties)	$13,256,000	$13,036,814	$(219,186)	98.3%	$14,465,863
Collection on Past Billings (with penalties and interest)	1,340,000	1,585,760	245,760	118.3	286,375(2)
Total Sewer Charges	**$14,596,000**	**$14,622,574**	**$ 26,574**	**100.2%**	**$14,752,238**
Sewer Charges to Other Municipalities	400,000	490,587	90,587	122.6	490,587
Meter Installations (Sewer Fund share—40%)	77,000	91,212	14,212	118.5	98,648
Miscellaneous Income	76,000	126,643	50,643	166.7	133,398
Interest Earnings	153,000	303,686	150,686	198.5	319,028
Payments from other City Funds:					
General Fund: Sewer services to City agencies	308,000	454,821	146,821	147.7	358,461(3)
State Reimbursement for Clean Streams Program	1,149,000	1,244,716	95,716	108.3	1,244,716(3)
TOTAL INCOME	**$16,759,000**	**$17,334,239**	**$ 575,239**	**103.4%**	**$17,397,076**

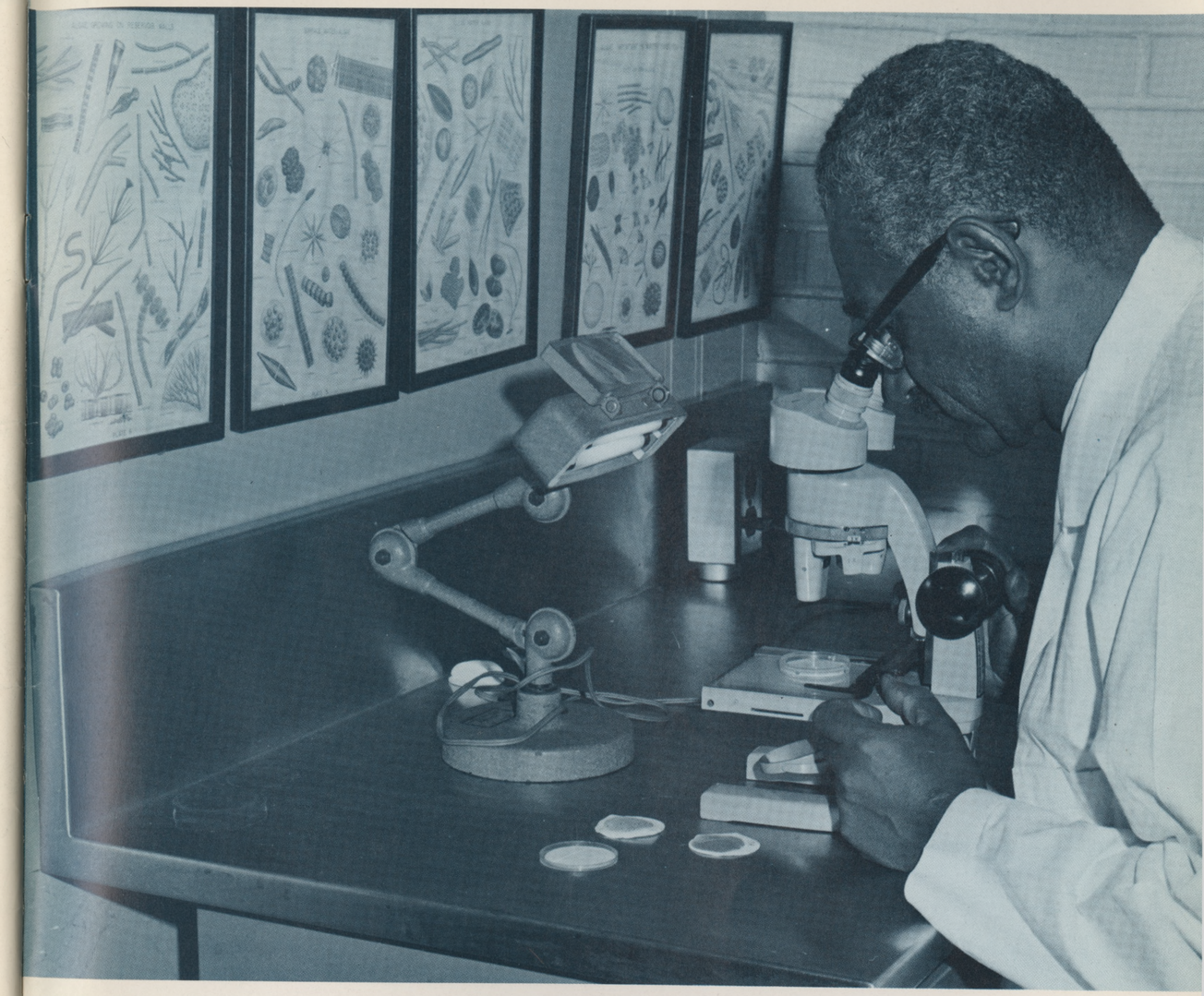
OUTGO (by major object of expenditure)

	Final Appropriations	Final Obligations Amount	% of Total	Lapses Amount	Lapses %	Accrual Basis Expenses
Operations						
Sewer Operations:						
Salaries and Wages	$ 1,871,900	$ 1,867,644	10.2%	$ 4,256	.2%	$ 1,836,273
Purchases of Services by Contract	1,337,000	1,329,421	7.3	7,579	.6	1,035,957
Materials and Supplies	186,000	177,265	1.0	8,735	4.7	176,591
Equipment	104,350	102,119	.5	2,231	2.1	132,460
Miscellaneous	250	86	.0	164	65.6	86
Payments to General Fund:						
Financial services; reading meters, billing, etc.	725,305	798,597	4.4	(73,292)	—	798,597(3)
Other services rendered	230,195	237,977	1.3	(7,782)	—	237,977(3)
Payments to Water Fund:						
Joint Fund Expenses	850,000	769,996	4.2	80,004	9.4	745,735(3)
Contributions to Bond Fund	40,000	40,000	.2	0	.0	40,000
Total Sewer Operations	**$ 5,345,000**	**$ 5,323,105**	**29.1%**	**$ 21,895**	**.4%**	**$ 5,003,676**
Employees' Welfare Plan Payments	69,000	64,854	.4	4,146	6.0	64,854
Claims and Awards	55,000	51,358	.3	3,642	6.6	33,077
Employees' Pension Fund Payments	195,000	230,600	1.3	(35,600)	—	230,600
Refunds	42,000	14,920	.0	27,080	64.5	0
Workmen's Compensation	0	0	—	0	.0	0
Provision for Estimated Uncollectible Receivables	—	—	—	—	—	(131,654)(4)
Total Operations	**$ 5,706,000**	**$ 5,684,837**	**31.1%**	**$ 21,163**	**.4%**	**$ 5,200,553**
Capital Payments						
Debt Service:						
Amortization of Principal	$ 6,860,000	$ 6,858,577	37.5%	$ 1,423	.0%	$ 6,858,577
Interest	5,283,000	5,249,471	28.7	33,529	.6	5,249,471
Capital Budget Financing	500,000	500,000	2.7	0	.0	500,000
Total Capital Payments	**$12,643,000**	**$12,608,048**	**68.9%**	**$ 34,952**	**.3%**	**$12,608,048**
TOTAL OUTGO	**$18,349,000**	**$18,292,885**	**100.0%**	**$ 56,115**	**.3%**	**$17,808,601**

SUMMARY COMPARISON OF 1965 BUDGETARY OPERATIONS (Original and Actual Budgets)

	Encumbrance Basis Budget(1)	Actual	Change	Accrual (Basis(5)
Surplus, December 31, 1964	**$ 5,921,000**	**$ 6,575,719**	**$ 654,719**	**$10,815,260**
Add or (Subtract): Adjustment of Prior Years' Operations	0	65,020	65,020	(322,057)
Add: 1965 Income	16,759,000	17,334,239	575,239	17,397,076
Total 1965 Resources	**$22,680,000**	**$23,974,978**	**$1,294,978**	**$27,890,279**
Less: 1965 Outgo	18,349,000	18,292,885	56,115	17,808,601
Surplus, December 31, 1965	**$ 4,331,000**	**$ 5,682,093**	**$1,351,093**	**$10,081,678**

NOTES:
(1) Budget as proposed by the Mayor and adopted by Council in November, 1964.
(2) On the accrual basis, income is considered as earned when billed, whereas the budgetary basis considers income as earned when collected. Thus collection of the prior years is not considered as income on the accrual basis statements.
(3) These figures reflect respective net adjustments to charges in interfund operations.
(4) The net increase (or decrease) to the estimated uncollectible receivables is considered an expense on the accrual basis.
(5) Surplus on the accrual basis includes the amounts invested in:
Materials and Supplies
Estimated Collectible Receivables



Keeping an Eye on Water Quality: Chemists and sanitary engineers collected 16,000 water samples from pipelines, reservoirs, and treatment plants for coliform testing alone in 1965. In all, about 1.5 million tests were made for a variety of purposes. These helped to assure water of high purity, free of tastes and odors.

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