

Sept. 1965



WATER DEPARTMENT NEWS

PHILADELPHIA, PA.

BELMONT DEDICATION EDITION

MAYOR TO FILL BASINS AT BELMONT DEDICATION

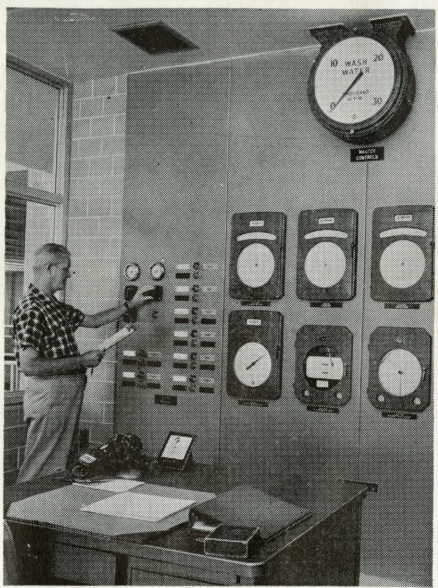
September 20—Mayor James H. J. Tate will throw a switch to let water into several big outside basins today at the new Belmont Water Treatment Plant.

The Mayor's act will climax the official dedication of the new plant, which will take place at 11:00 a.m. Several hundred guests, including public officials, business and civic leaders, engineers, and out-of-town water utility managers, will be welcomed by the Mayor.

Water Commissioner Samuel S. Baxter will be master of ceremonies.

Following the ceremony, guests will be taken on guided tours of the plant. A buffet luncheon will be served at 12:30

MODERN BELMONT PLANT TO SUPPLY FINE WATER TO 400,000 CUSTOMERS



A sparkling jewel along Philadelphia's "golden mile" is the new Belmont Water Treatment Plant, the third "push-button" plant to be completed by the city in six years.

With its light brick buildings and concrete basins, the new plant is the last major facility in a \$500 million water improvement program (1946-70). This program, now 80% finished, has given Philadelphia one of the most up-to-date water supplies in the country. (See page 8)

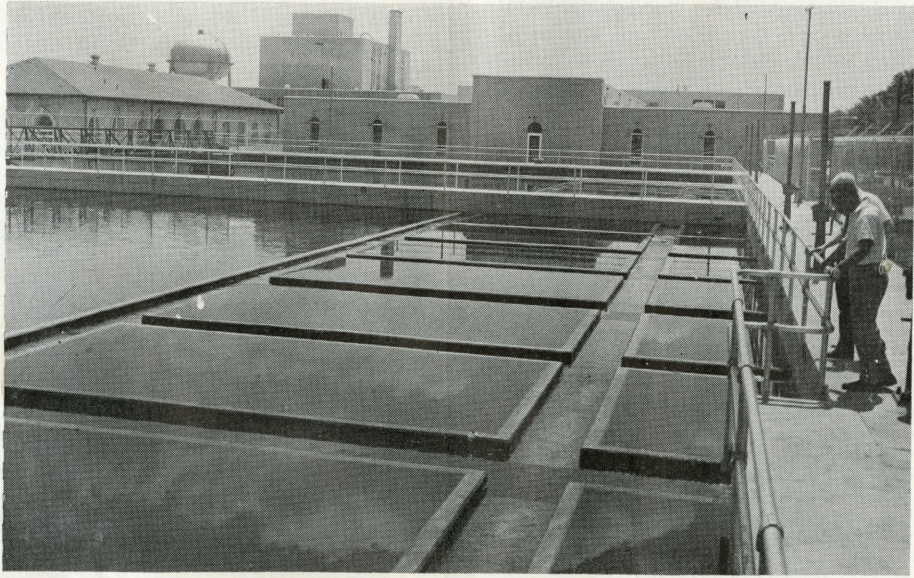
Built at a cost of \$10.4 million, the new Belmont Plant will supply 400,000 Philadelphians living west of the Schuylkill River. Because of its modern facilities, including extensive automatic and semi-automatic controls, the new plant will provide its customers with water of fine quality.

Advantages of New Plant

The new plant replaces a 60-year old plant, which was largely underground. Though its rated capacity of 78 million gallons daily is only eight million gallons more than that of the old plant, the new plant will have many advantages over the old:

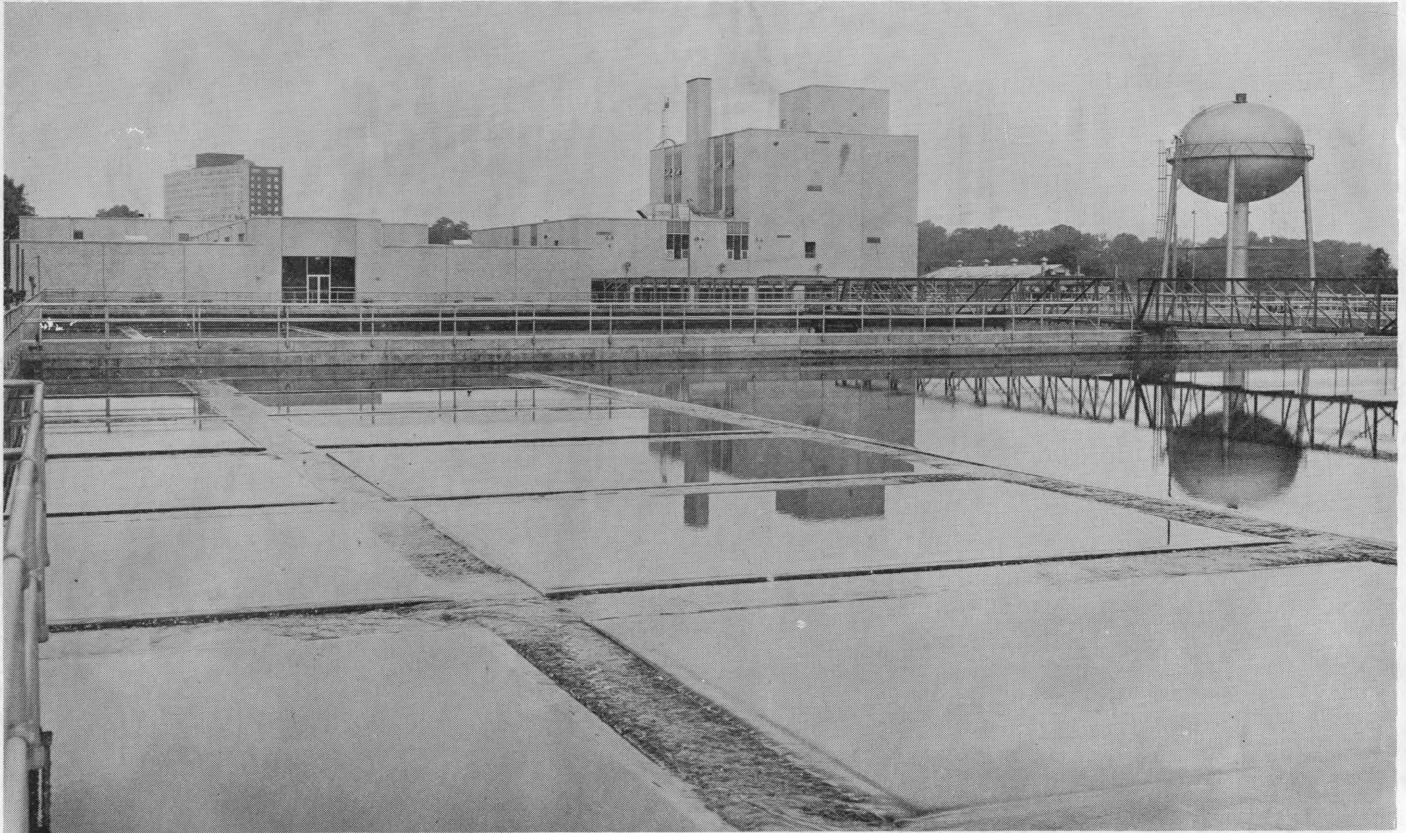
1. The new plant will have a peak rate capacity of 108 million gallons daily, thus enabling it to meet more easily the needs of consumers during emergencies and hours of high demand. Peak rate capacity was almost non-existent in the old plant.

2. Housed in a one-story building, the new rapid-sand filter beds cover just one acre. They will replace 13 acres of old slow-sand beds dating from 1903-04 and a half-acre of old rapid-sand beds built in 1926. The greater compactness of the new plant will permit more efficiency and better control.



THE NEW BELMONT PLANT will be able to treat 78 million gallons of water daily at regular operating rates. Push-button controls (as in top photo) are a common feature of the new plant.

(Continued on page 2)



A THING OF BEAUTY is the new Belmont Plant with its light brick buildings and great concrete basins. The great sedimentation basin (foreground) will permit impurities to settle to the bottom of its 17-ft. depths, while filtration and chemical treatment will take place in the buildings to the rear.

MODERN BELMONT PLANT

(Continued from page 1)

3. Water filtration in the new plant will be more efficient, because filtration rates will be set entirely by semi-automatic controls. Moreover, the 26 new filter beds, all of the rapid-sand type, can be kept in operation almost continuously, with only brief half-hour intervals for cleansing them of accumulated debris. Washing of the filter beds will be done with the press of a button by the operator. By contrast, the slow-sand beds in the old

plant had to be taken out of service for 10 days to two weeks while they were washed by a crew of men with a special machine.

4. Semi-automatic controls will be used extensively throughout the new plant. They will be used to regulate the rate of water flow and the application of chemicals at various points in the treatment process. Controls will be more centralized than at the city's other two "push-button" plants. Filter beds, for example, will be regulated from a central panel only, without need for individual control consoles.

HISTORY OF THE NEW PLANT

January, 1962 — Construction began.

May, 1964 — South basins, chemical building, and south wing of filter building went into service.

June, 1965 — North basins and north wing of the filter building went into service.

September 20, 1965 — The new plant was completed and dedicated.

WATER DEPARTMENT NEWS

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THE WATER DEPARTMENT

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Mayor, James H. J. Tate

Commissioner, Samuel S. Baxter

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VISITORS WELCOME AT NEW WATER PLANT

Your family or friends may wish to see the new Belmont Plant. Why not bring them or urge them to visit it?

An open house will be held for the public on Saturday, September 25, and Sunday, September 26, from 12:00 p.m. to 5:00 p.m. Families, organizations, and individuals will be welcome. Parking and guided tours are free.

After September 26, visiting hours will be as follows:

Monday through Friday each week, 10:00 a.m. to 5:00 p.m., organized groups only, by appointment. Telephone MU 6-3803.

Saturdays and Sundays, 2:00 p.m. to 5:00 p.m., families, individuals, and organizations. No appointment necessary.

BELMONT HAS EVERYTHING FROM MIXERS TO FILTERS

Facilities of the new Belmont Plant provide for every aspect of water treatment. They include:

1. A new five-story chemical building for pre-treatment and post treatment of water with chemicals.
2. Six chambers for rapid mixing and eight chambers for slow mixing of water with chemicals.
3. Four open sedimentation basins holding a combined 14.2 million gallons of water at any given time.
4. A new one-story filter building housing 26 new rapid-sand filter beds.
5. A 72-ft. high steel tank holding 150,000 gallons of filtered water for washing of filter beds.
6. A new underground clear well holding 1.8 million gallons of filtered water.

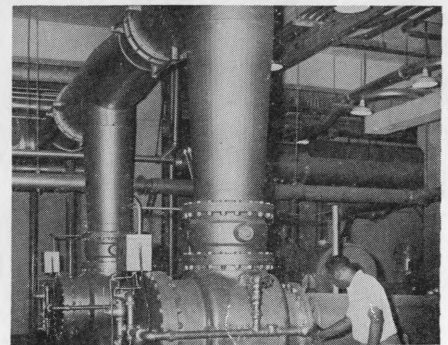
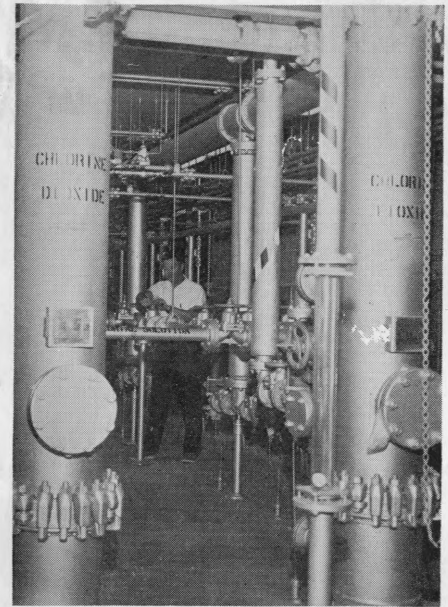
7. A renovated administration building with new storage and conference rooms at one end and the old high service pumping station at the other.

Retained from the old plant are:

1. The two basins of the old raw water reservoir. Combined retention capacity, 72 million gallons.
2. An underground filtered water basin of 16.8 million gallons capacity.

Although not technically part of the new plant, the Water Quality and Research Unit occupies new laboratories in the old ozone building.

Within the coming year, the old underground slow-sand filters will be converted into reservoirs for storage of 21.4 million gallons of filtered water.



BUILDERS OF BELMONT

Many men and firms worked on the Belmont Plant. Some of them follow:

Engineering Architects

Morris Knowles, Inc., consulting engineers, Pittsburgh, Pa.

Principal Contractors

General construction: Malan Construction Corporation, New York, N. Y., \$7,500,000.

Filter equipment: Pitt Construction Company, Pittsburgh, Pa. \$1,235,000.

Electrical system: Ace Electric Company, Philadelphia, Pa., \$770,000.

Heating and ventilating system: The Welsbach Corporation, Philadelphia, Pa., \$490,000.

Plumbing system: Williard Inc., Philadelphia, Pa., \$124,000.

Landscaping: Warner S. Hamilton and Son, Chester, Pa., \$40,500.

Water Department Personnel

Overall direction: Samuel S. Baxter, commissioner and chief engineer; John Briggs, assistant chief engineer, planning arrangements.

General field direction: Kenneth Zitomer, division engineer and acting chief of Construction Branch; Samuel S. Wilson, former chief of Construction Branch, resigned.

Resident engineers: Fred Plegge, David Anderson, Thomas Hovanietz, Richard Wade, and Daniel McCusker; Joseph McKenna, field office engineer.

Field inspectors: John Calhoun, electrical; Jack Gibbons, structural.

INTRICATE MAZES of piping are to be seen in many places at Belmont. Above, piping for chlorinators and chlorine evaporators. Right, wash water piping and pumps.



CONSTRUCTION OF THE NEW BELMONT PLANT required much engineering talent. Among Water Department engineers were, l. to r., Joseph McKenna, Kenneth Zitomer, Samuel Wilson, Fred Plegge, E. L. Huber, John Calhoun, R. C. Harris, and Thomas Brady.

BELMONT TO TREAT RIVER WATER WITH SERIES OF SCIENTIFIC STEPS

West Philadelphians will receive high quality water . . . thanks to the new Belmont Water Treatment Plant. The plant will purify and improve Schuylkill River water through a series of scientifically controlled steps.

In sequence, these steps are the following:

1. *Intake:* Water for the plant is drawn from the pool formed by Fairmount Dam. The water enters intake gates just south of the Columbia Avenue Bridge and is pumped uphill by the neighboring Belmont Raw Water Pumping Station. The latter, which was modernized several years ago, is an automatic station with a pumping capacity of 140 million gallons daily.

2. *Pre-sedimentation:* Entering the two basins of the old raw water reservoir across the street from the plant, the river water receives free residual chlorination to destroy organic materials. It passes through the reservoir in approximately 22 hours. Some impurities settle out in the process.

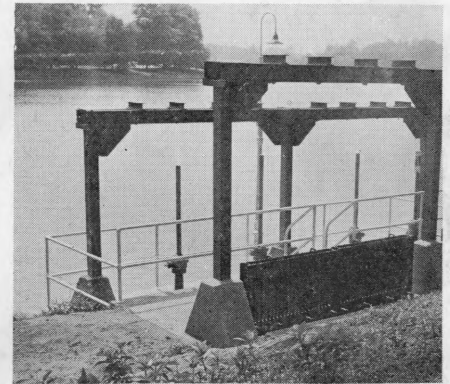
3. *Chemical Building:* Leaving the raw water reservoir, the water flows beneath the new chemical building.

As it passes, it receives precisely controlled dosages of chemicals, applied by automatic weighing and feeding equipment. The chemicals may include chlorine, or chlorine dioxide, carbon (for taste and odor control), lime (for the control of the ratio of acidity to alkalinity), and alum to promote "floc" formation.

4. *Rapid Mixing Basins:* The chemicals are initially mixed with the water in six "rapid mixing" basins located beneath the chemical building. Mixing requires 30 seconds and is performed by four-bladed paddles on single vertical shafts.

5. *Slow Mixing Basins:* From the "rapid mixing" basins, the water flows to small open basins on both sides of the plant. In these basins, mixing of water and chemicals takes place more gently, spread over 42 minutes. The water is slowly stirred by 80 paddles of the transverse type, driven by equipment set in dry wells. As the mixing proceeds, tiny snowflake-like granules (or "floc") form in the water. Many of the impurities adhere to this "floc." There are eight basins.

6. *Sedimentation Basins:* Passing from the slow mixing basins, the



SCHUYLKILL RIVER WATER enters these intake gates to be pumped by a neighboring pumping station to the new Belmont Plant.

water enters the large open sedimentation basins—two on each side of the plant. Here many of the suspended impurities in the water settle to the bottom, dragged down by their own weight as they cling to the "floc." At the bottom, the sludge is swept away by great clarifier arms measuring 70 feet in length. With an average water depth of 17 feet, the basins hold a combined 14.2 million gallons of water. The water passes through the basins in four to four and one-half hours.

7. *Filter Building:* Water is given its final polish in the filter building, where it passes downward through 28 inches of sand and 10 inches of gravel. There are 26 filter beds of the rapid sand type. Each is capable of filtering two gallons of water per square foot per minute, or about three million gallons daily. In a pinch, however, the rate per filter bed can be increased to four and one-half million gallons daily.

8. *Post Treatment:* Leaving the filter building, the purified water flows beneath the chemical building again for addition of final chemicals—lime for "pH" control, fluoride to reduce tooth decay in children, and phosphate for control of pipe corrosion.

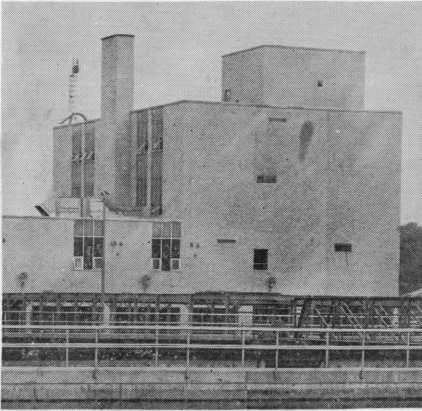
9. *Distribution:* Most of the treated water flows directly to consumers, some of it by gravity and some of it pumped by the high service station located at the plant. A small part of the filtered water is stored in underground basins for emergency use.

Water passing through the plant is tested by the plant laboratory at each step in the treatment process.

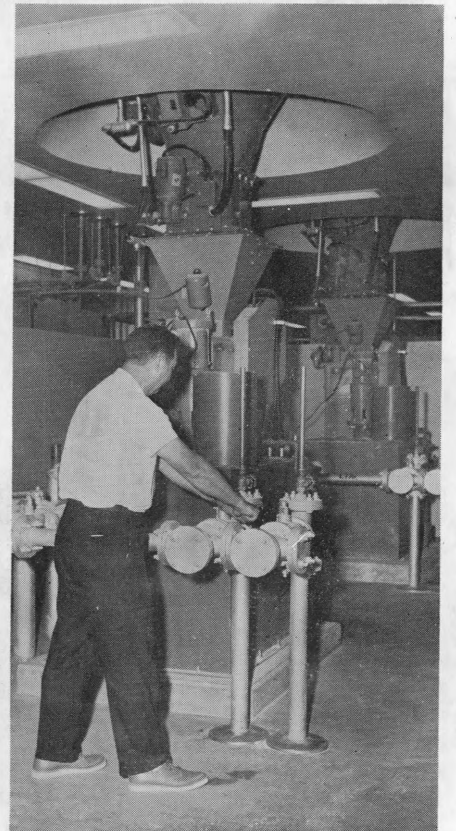
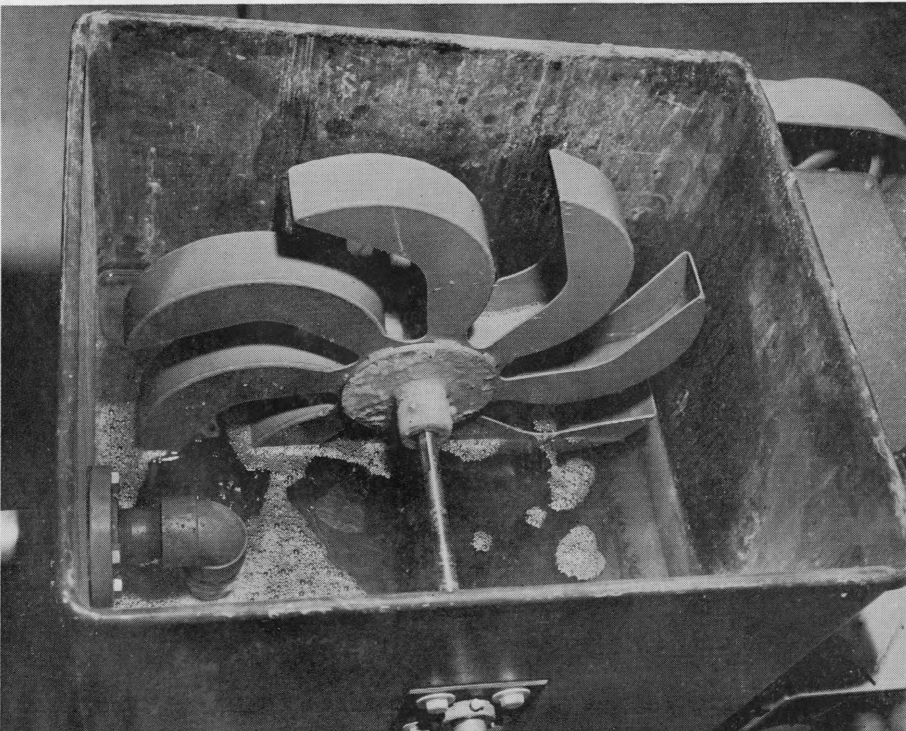
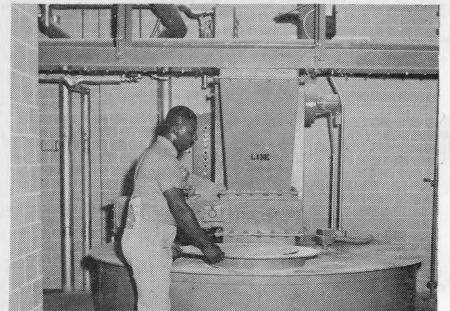


IN THIS HUGE RESERVOIR, which holds 72 million gallons, the river water is chlorinated before it flows to the new Belmont Plant (background). The water takes 22 hours to pass through the reservoir.

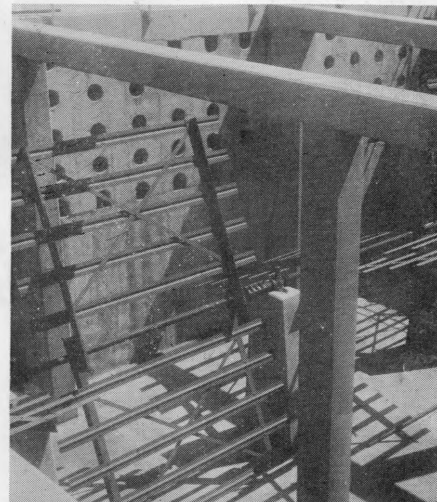
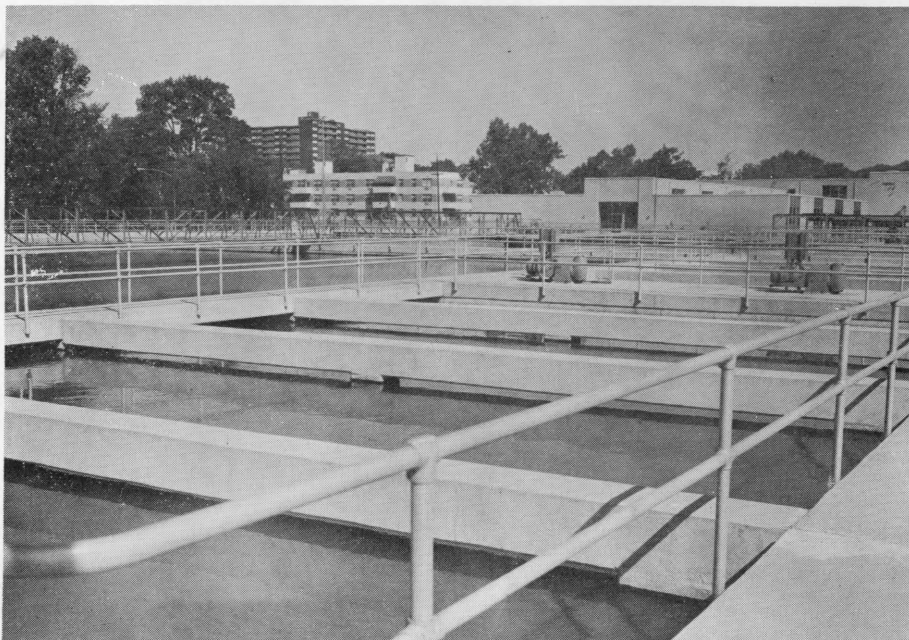
RIVER WATER GETS CHEMICALS HERE



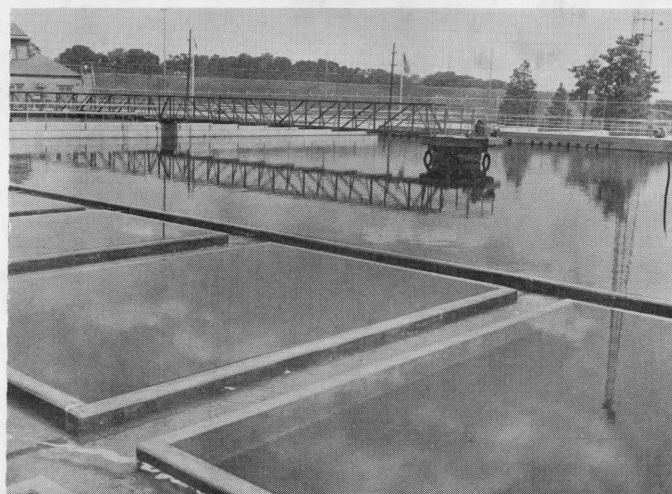
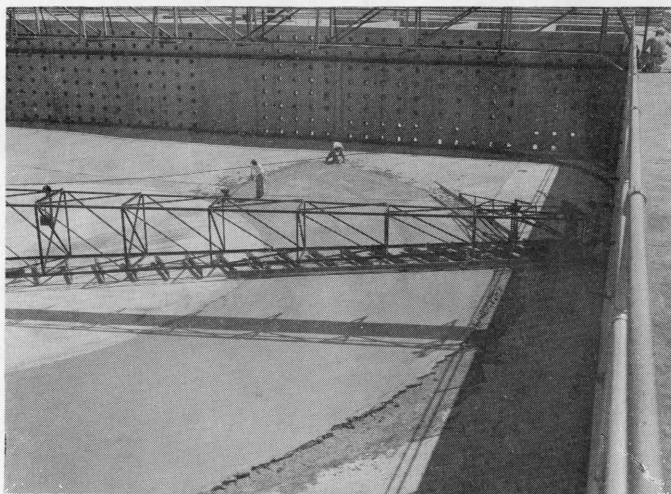
HIGHLY AUTOMATED is the chemical building where numerous chemical feeding devices are monitored and regulated from electronic control panels. The central panel shown above links the operator to the chlorinators (left), alum feeder (below), and lime feeder (right and right bottom). These devices inject precisely measured dosages of chemicals into the river water flowing beneath the building.



BASINS SETTLE OUT IMPURITIES



SLOW MIXING BASINS (left) take over when the river water leaves the chemical building. The alum-and-lime laden water is stirred for 42 minutes by paddles of the type shown above, causing snow-flake-like "floc" to form.



LARGE SEDIMENTATION BASINS receive the water from the slow mixing basins. In the sedimentation basins the impurities adhere to the "floc" and settle to the bottom, where they are swept away by long steel clarifier arms (left). The clarified water flows off (right).

LABORATORIES MAKE 1.5 MILLION TESTS OF CITY WATER YEARLY

To assure good water for consumers, Water Department chemists and engineers make one and one-half million tests of water samples each year. Samples are collected daily from rivers, reservoirs, treatment plants, pipelines, and other points throughout the city.

Such tests are made throughout the treatment process at Belmont by a

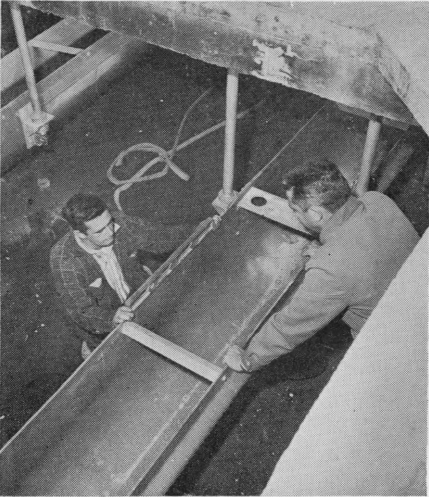
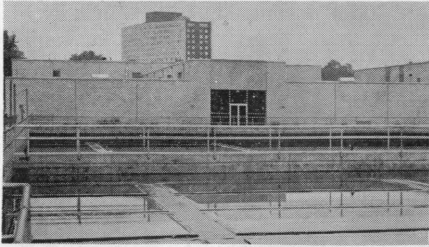
small laboratory in the chemical building.

In addition, the key laboratories of the Water Quality Control and Research Unit are located at Belmont. This unit, housed in the renovated former ozone building, keeps an eye on water quality in all parts of the water system. It also seeks new methods for turning out better water

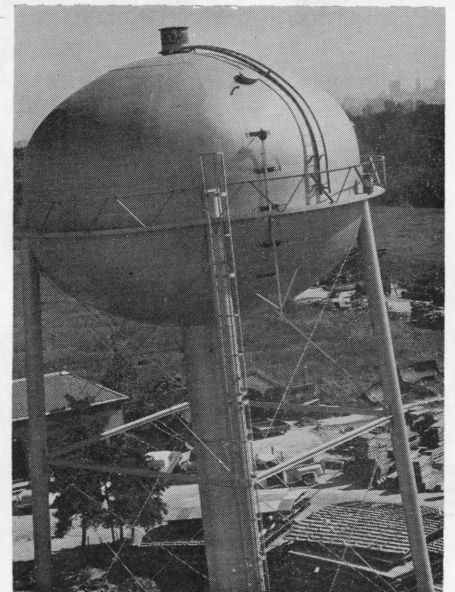
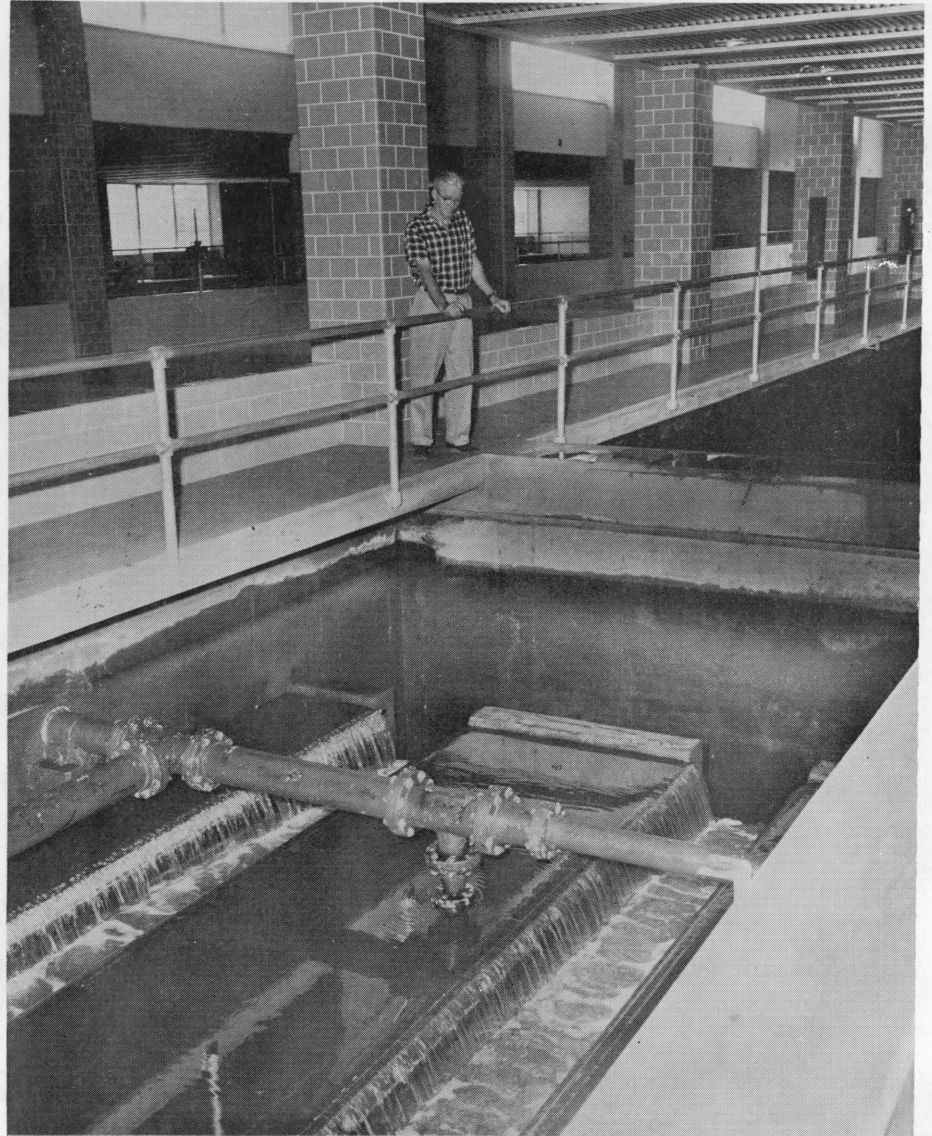
at all the treatment plants.

As a result of new plants and careful laboratory controls, the coliform organism count of Philadelphia water averages only 3% to 5% of what is permitted under the drinking water standards of the U. S. Public Health Service for interstate carriers. This makes it one of the purest treated waters in the nation.

FILTER BUILDING POLISHES WATER



FINAL TOUCHES are given the water in the filter building where it passes downward through 38 inches of sand and gravel in 26 rapid sand filter beds. Operated from big control panels like the one below, the beds can be regulated or cleansed with the press of a button. Filter bed at right is being washed with water supplied by tank at lower right. Above, a filter bottom for carrying water is adjusted in one of the beds.



PHILADELPHIA LEADS NATION IN WATER SUPPLY IMPROVEMENT

Philadelphia's water and sewerage systems are today among the most modern in the country. This is because of extensive modernization and expansion of facilities in the past 19 years.

These new facilities include:

Water Treatment Plants: Besides the new Belmont Plant, the Water Department has completed a \$25 million plant at Torresdale (1959) and an \$11 million plant at Queen Lane (1960). All of these plants are semi-automatic and rapid sand. They have a combined rated capacity of 480 million gallons of water daily and can muster a peak rate of 681 M.G.D.

Water Pumping Stations: Of the 15 water pumping stations, 14 are completely new or modernized. The 13 distribution stations have a combined pumping capacity of 1,500 million gallons daily—700 M.G.D. river water and 800 M.G.D. filtered water. This is a capacity increase of 275 million gallons daily in 10 years. The two high pressure stations, used for fire fighting, can each pump 15,000 gallons per minute.

Microwave Control: Important portions of the distribution system (most pumping stations, reservoirs, some pipelines and valves, etc.) are now monitored by microwave from a "Load Control Center," opened in 1960. An operator at the center can start or stop pumps in distant stations by pressing a button. Water flow rates, pressures, etc. are received by the center second by second.

Water Storage: New underground reservoirs holding 143 million gallons of filtered water have been completed. The department has also built five water storage tanks, and has started, or will soon start, construction of additional underground reservoirs. By 1967, storage capacity for filtered water will rise to one and one-eighth billion gallons.

Water Mains: The Water Department has built 550 miles of new water mains since 1952. The system as a whole has expanded to nearly 3,200 miles.

Water Meters: Since 1955, water meters have been placed in 140,000 unmetred properties, plus thousands of new homes. Every meter in the city has been thoroughly overhauled or replaced, and every property is

now metered. There are 526,000 water meters.

Sewage Treatment Plants: To protect the rivers, the city completed three modern sewage treatment 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 365 million gallons of sewage each day. This includes 100% of Philadelphia sewage, plus millions of gallons each day from neighboring communities.

Sewage Pumping Stations: Since the early 1950's, the Water Department has built or rebuilt seven sewage 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 sewage from branch sewers to the sewage treatment plants, 78 miles are new.

Sewers: With nearly 2,500 miles of sewers in its system, Philadelphia has built hundreds of miles of sanitary and small storm sewers in the past dozen years. In that time, the sewer system has had a net growth of more than 400 miles.

Storm Flood Relief: Many millions

CITY HAS PLENTIFUL WATER FOR ALL NEEDS

Despite drought . . . despite low rivers . . . despite the threat of unusual salt water intrusion in the Delaware, Philadelphia has an abundance of good water.

There is no water rationing in Philadelphia, nor is there likely to be. For Philadelphians this is the outstanding fact about the current drought.

This water abundance is no accident. It results from 19 years of planning and work, described elsewhere on this page.

The Hon. Stewart L. Udall, Secretary of the Interior, recently referred to Philadelphia's efforts, which he said should serve as a model for other cities. Forming a well organized, inter-related program, these efforts have greatly improved the Delaware and Schuylkill Rivers and provided the fine facilities needed to turn the river water into high quality drinking water.

of dollars have gone into big projects to control storm flooding. These have included the Wakeling, Passunk Avenue, Mill Creek, Main Relief and other sewers, as well as the straightening of Frankford Creek.

CITY WATER SUPPLY INVESTMENTS

WATER SYSTEM

	Encumbered-Expended		Scheduled
	1946-1964	1965-1970	1965-1970
Load Control Center	\$ 540,003		\$ 816,800
Torresdale Plant	25,710,012		256,000
Queen Lane Plant	11,460,524		690,600
Belmont Plant	12,305,601		313,600
Water Pumping Stations	10,310,267		1,136,000
Water Mains—Built, Replaced, Cleaned, Lined	62,309,109		35,750,000
Filtered Water Storage	7,402,351		8,538,500
Universal Metering	4,788,064		0
Miscellaneous	3,629,506		0
High Pressure Fire System	2,185,583		3,267,000
Water System Capital Improvements	\$140,641,020		\$50,768,500

SEWERAGE SYSTEM

	Encumbered-Expended		Scheduled
	1946-1964	1965-1970	1965-1970
Northeast Works	\$ 15,361,713		\$ 2,473,400
Southeast Works	6,624,501		89,600
Southwest Works	9,054,080		1,099,400
Sewage Pumping Stations	2,611,123		0
Interceptors	55,320,384		3,505,600
Sewers—Built, Replaced	120,840,089		55,158,700
Miscellaneous	2,296,929		163,900
Storm Flood Relief	26,925,750		4,566,800
Sewerage System Capital Improvements	\$239,034,569		\$67,057,400