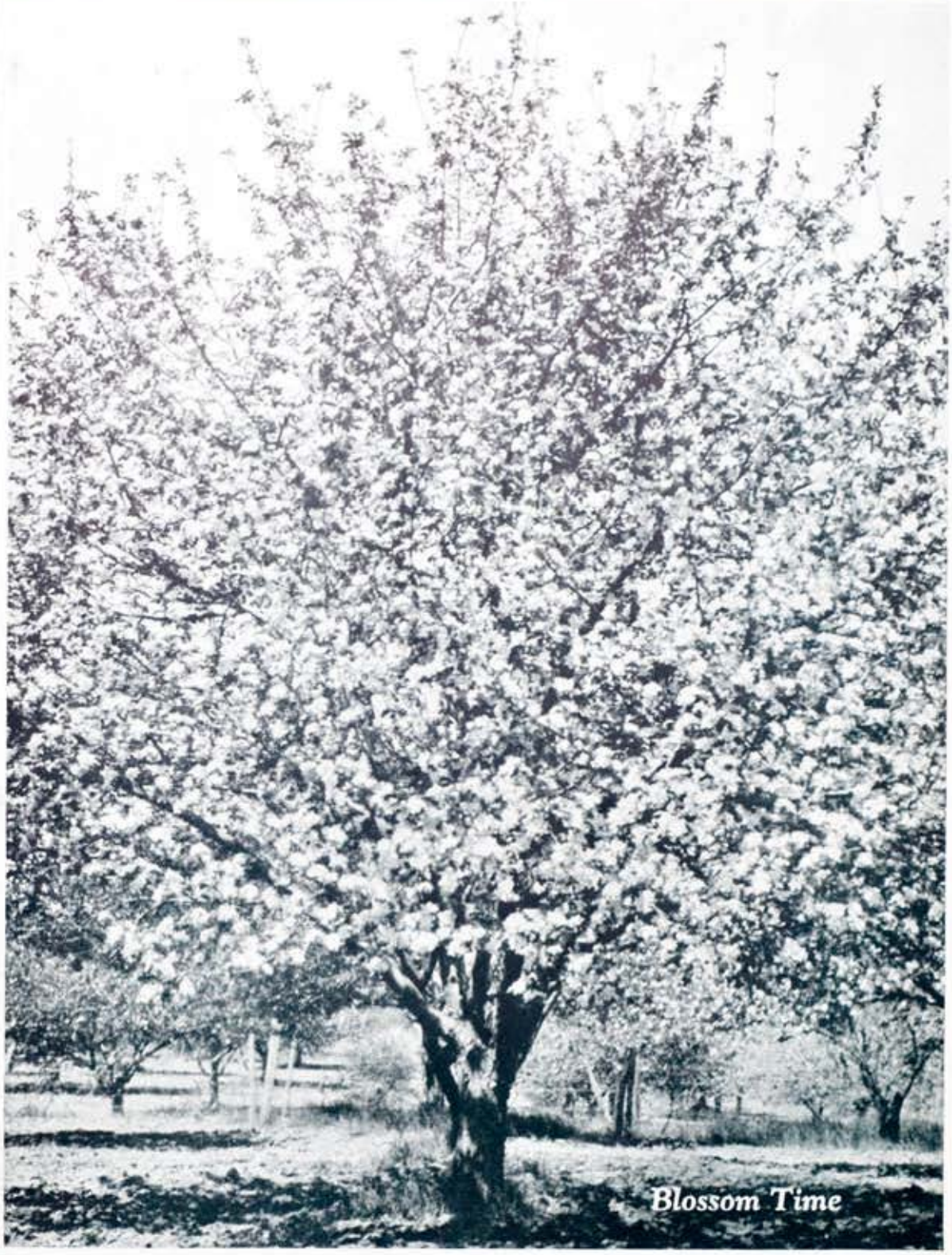
GAS & ELECTRIC NEWS

ROCHESTER GAS & ELECTRIC CORPORATION

May, 1934 Vol. 18 • No. 4



Blossom Time

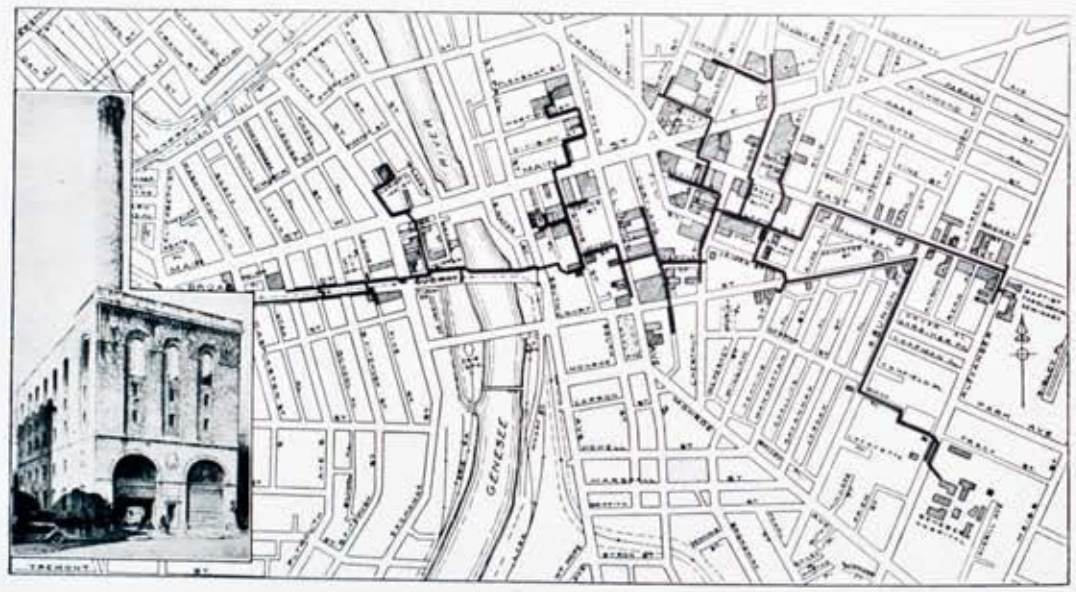
Heating a City . . . The Progress of District Heating in Rochester

LANDIS SHAW SMITH

This article is published on the occasion of the 25th Anniversary of the formation of the National District Heating Association and the holding of the Convention of the Association in Rochester, June 12 to 15, 1934. It also marks the 45th year of district steam service in Rochester and the Centennial Anniversary of the City of Rochester.

PROBABLY few Rochesterians realize that numerous downtown commercial buildings and factories in various sections of the City are supplied with clean, convenient, economical and dependable steam heating and industrial steam service through an extensive system of underground piping, served by five separate steam generating plants. Fewer still know that district steam heating, which followed soon after the invention of the warm air heater and preceded by many years the electric utility systems, the automobile, the radio and other modern necessities was invented in the nearby community of Lockport.

In 1877, Birdsell Holley, the inventor and manufacturer of fire fighting equipment, from whom Rochester's "Holley" fire system obtained its name, experimented with underground steam piping in yards adjacent to his Lockport residence. One and a half inch pipe installed in wooden boxes with a total length of about 500 feet was used. Insulation consisted of asbestos, felt and sawdust. Troubles naturally followed, as with any pioneering development. Early visions of supplying water service together with live steam for the operation of fire fighting engines soon gave way to the more practical idea of the advantages and possibilities for supplying houses and business buildings with heat through underground piping from a central source. It is interesting to note



Map of a part of the commercial and business district which is served with the Company's clean, convenient and dependable steam service from Station 8, on Lawn Street at the rear of the Gas and Electric Building.

that this early beginning is responsible for the fact that today the New York State Electric & Gas Company, of Lockport, supplies steam heating service to over 330 customers (from the large plant of the G. M. C. Harrison Radiator Corporation to small residences) some of which have been consumers for over 55 years.

Other men of courage and vision watched this village experiment of 1877 with great interest and increasing enthusiasm and confidence. Although negotiations were commenced two years later to form a steam heating company in New York City, still more time elapsed before the actual commencement of service. Fireplaces were in vogue, the horse was the almost universal means of transportation and the "Gay Nineties" were yet to come. Small wonder, then, that some persons were skeptical of this new fangled idea of sending steam through pipes. Even in this enlightened day there are still many who have not completely realized the great success of the idea.

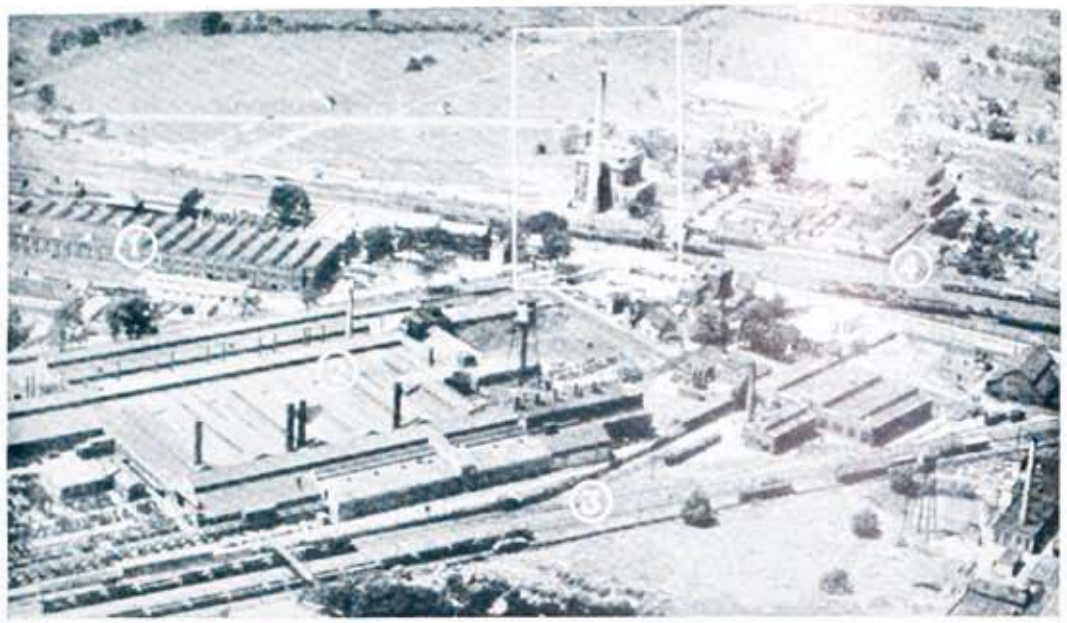
Second System Born

In 1882, however, the second system was born and from the difficulties and experiments of those early days has grown the largest steam system in the world serving a majority of the most important New York City buildings from the Battery to mid-town Central Park. A delightfully illustrated and descriptive book covering the development of this company from its early historic days to the present time may be seen upon request to the Industrial Department of Rochester Gas & Electric Corporation. Anyone interested in the history of New York City from 1880 to 1900 or in the development of this great steam system will enjoy reading it.

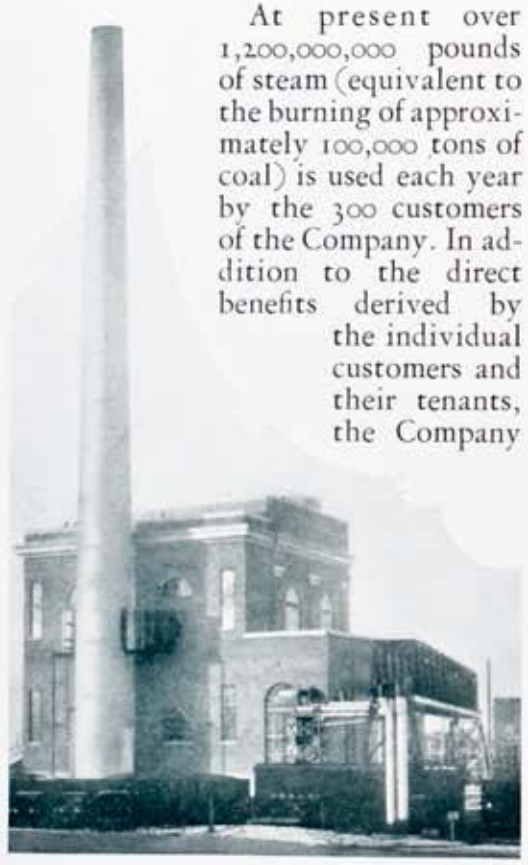
Rochester

Rochester, the third City to have district steam heating, started its first service in 1889. From this humble beginning in a very limited district on Exchange and Edison Streets adjacent to the then very busy Erie Canal, and using only exhaust steam from the old style reciprocating engines attached to the original design Edison bipolar electric generators, this system has developed, in its 45 years of continuous service, into the extensive system in use today. The Rochester system is today serving the largest group of industrial customers of any system in the world. Although Rochester is the 26th city in population in the United States, the steam system is the 6th largest.

Progress of underground steam construction. Electric welding crew has completed installation which consists of three pipes at this location: a 14-inch low pressure steam main; an 8-inch high pressure steam main and a 6-inch pipe through which the condensed steam is returned to the station. Insulation crew is at work in preparation for the final construction of concrete box forms, back fill and repaving.



Air view of Station 9 Steam generating station and district at Lincoln Park. This industrial district is completely supplied with steam, gas and electric service and besides being adjacent to the New York State Barge Canal is on the main line of the New York Central (4) and the Baltimore and Ohio Railroads (3). Two of station 9's largest consumers, the General Railway Signal Company (1) and the T. H. Symington Company (2) are shown in the foreground.



Close-up of Station 9 Steam Plant

At present over 1,200,000,000 pounds of steam (equivalent to the burning of approximately 100,000 tons of coal) is used each year by the 300 customers of the Company. In addition to the direct benefits derived by the individual customers and their tenants, the Company and its customers through their purchase of steam are aiding in making the City of Rochester a cleaner and more healthful place in which to work and live. This is accomplished through the elimination of many smoky chimneys and the lessened trucking of coal and ashes through the City streets.

Old Station 2

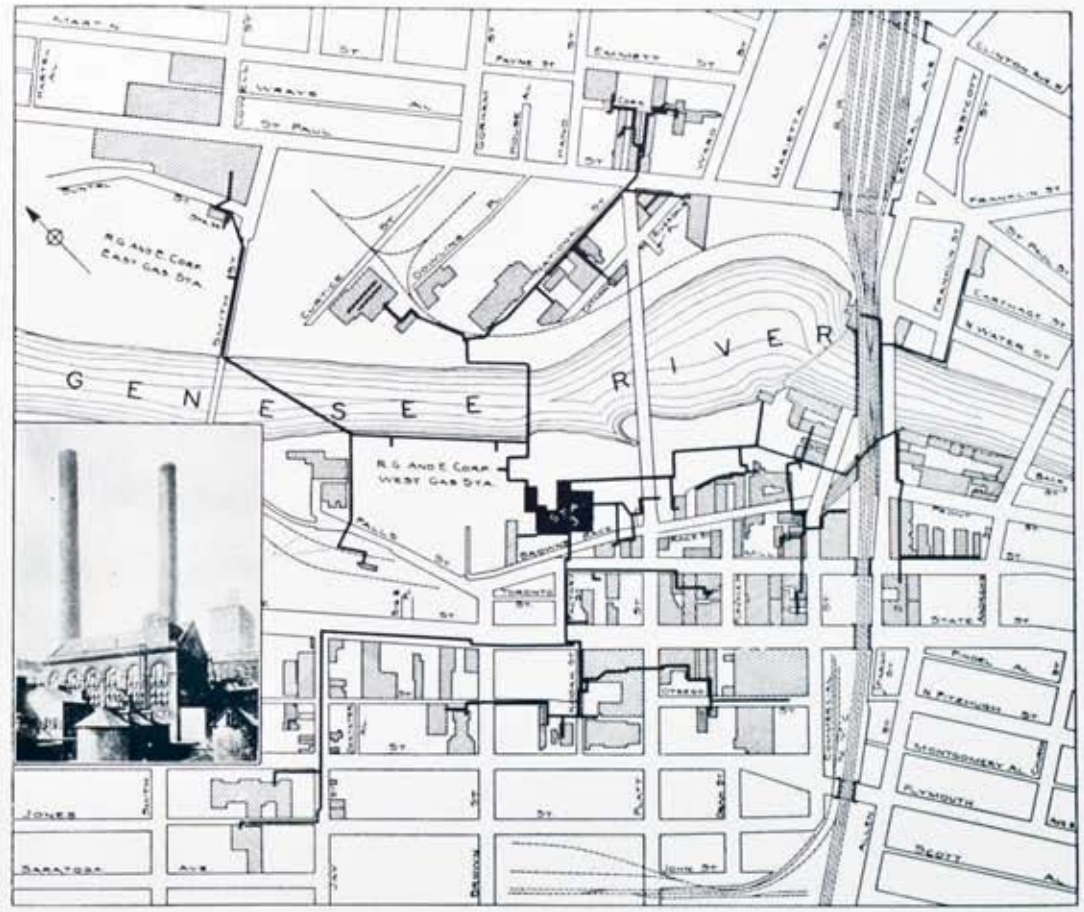
This spring (1934) saw the removal, after many years of idleness, of the interesting "porcupine" boilers from Old Station 2. This plant was erected in 1892 on the Genesee River Flats near the Mill Street, Furnace Street and Brown's Race section in the heart of Rochester's old industrial district where for many years water power was all-important and where the grist mills were located that made Rochester famous throughout the country as the Flour City. Station 2 supplied live steam direct from the porcupine boilers. The mains were relatively short, most of them above ground, and some passed through old penstocks and raceways. Even then service was dependable as it has been consistently. The E. B. Leary Company and others in the district who were among our first customers, have been served continuously for 42 years and are still enjoying the many benefits of district steam service. Old Station 2 continued to operate until 1910.

Station 3

This station in the factory district is the Company's largest steam and electric generating station. Approximately 25% to 30% of its annual steam production is sold to the Company's customers, the balance being used for electric production. As far as capacity is concerned, the electric service has required 750,000 pounds of steam per hour, while the steam sales has required 200,000 pounds per hour. Practically all (95%) of the steam sold at this station is high pressure steam (100 pounds to 180 pounds).

Work on Station 3 was commenced in 1898. It has been remodeled and enlarged many times. It had only 50 steam customers in 1918, but now serves a group of over 125 customers. One of the more recent (1926) changes in this station was the installation of powdered coal equipment in the north boiler room, changes in stokers and furnaces in the south boiler house and the erection of new concrete chimney to replace the former iron stacks.

The consistent growth of the steam business in this district has been a re-



Central factory district served by Station 3, the Company's largest steam and electric generating station, at Mill Street and Brown's Race. This district includes the Eastman Kodak Company Camera Works, the Bausch and Lomb Optical Company and other large industrial customers. Over 200,000 tons of coal have been used by this station in one year for steam and electric generation.

sult of the favorable location of this plant. Most of the factories served with steam are relatively close to the station which, coupled with the possibility of running steam mains above ground, results in materially lower distribution costs. The large industrial use results in a high consumption rate per foot of main installed. Low coal handling costs, cheap feed water, and lower investment in plant and buildings, because of tie-in with electric service and because of location, all enable the Company to sell steam at low rates with attractive possibilities to those interested in maintaining reasonable production costs.

Hand firing of boilers is no longer necessary where convenient district steam service is available.

"Porcupine" boilers formerly used at old Station 2 on the Genesee River flats near Platt Street. This station had eleven of these 500-horsepower, 175-pound pressure boilers. Installed in 1892, they were hand-fired through three doors in the cylindrical base.

The load factor of Station 3 is much improved because of the steam business here where, as in other stations, the Electric Department is enabled to maintain steam standby service to the hydraulic system at a lower cost. The combination of the steam and electric business results in lower costs of both steam and electric service to the customers and helps the Company to get and to keep electrical business. Station 3 serves some very large customers, for example, the Eastman Kodak Company (Camera Works and Office), the Genesee Reduction Works (City of Rochester, Garbage Disposal Plant) and the Bausch & Lomb Optical Company (complete plant). Each uses over 100,000,000 pounds of steam per year for heating and industrial purposes. If the total load of only these three customers is added to that of two of the Company's newer customers in this Station 3 District, the Genesee Brewing Company and the Cataract Brewing Company, a total load is obtained which is equal to the total load of approximately 150 average size commercial customers.

Stations 26 and 35 Districts

Customers have been obtaining service in these districts since the early 1900's. Station 26 District, a downtown commercial district, is now served by the Lawn Street Plant (approximately ¾ of a mile away). Station 35 serves the Cunningham Motor Company, the Baltimore & Ohio Warehouse and other industrial customers near Canal Street.

Station 8 District

The Lawn Street Commercial District Plant is a typical downtown district steam heating plant and system. It serves customers in an extended area approximately two miles long from the Van Bergh Building (now occupied by C. W. A.) at the northeast corner of Main Street West and Clarissa Street to the Genesee Hospital and Sears Roebuck Company building at the east end of the system. Following the purchase of the former Cutler Plant with its small nucleus of customers in the vicinity of East Avenue and Stillson Street, the Company in the few short months from April to October 1925 completed the erection of this million dollar system.

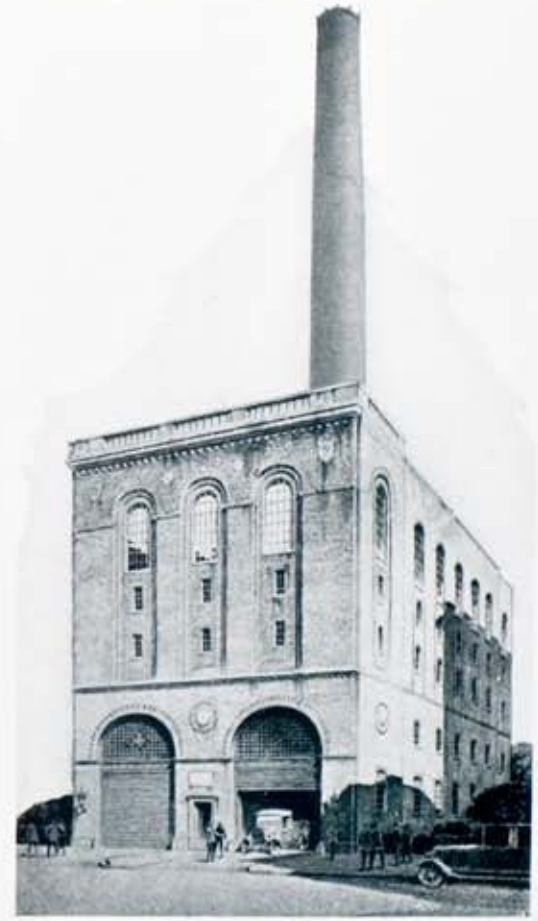
Two powdered coal boilers of 1100 H.P. normal rating with a 3,000 Kw turbine generator comprised the original installation. The additional customers secured necessitated the installation of an additional boiler in 1927 and other station improvements and made economically practicable the installation of an additional 5000 Kw turbine.

All of the steam in this district is distributed through underground mains. An idea of the difficulties encountered and the great care used in laying these mains can be gathered from two of the illustrations.

The Lawn Street District has enjoyed a period of considerable activity from its very inception. For several years, well over 100,000,000 pounds of steam business was taken on annually and 100% of all the new buildings erected in the district served were added to the increasingly important list of customers. Even in the recent difficult times additional business has been obtained annually in spite of all adverse factors.

Station 9

This industrial district plant serves the General Railway Signal Company, the Symington Company and the Ritter Dental Mfg. Company at Lincoln Park.



The commercial district heating plant Station 8, Lawn Street at the rear of the R. G. and E. Bldg. This modern powdered coal steam generating plant serves all of the new buildings and many other customers in its district in the downtown section of Rochester.

Typical Steam Service and condensation meter installation showing simplicity of complete apparatus which eliminates necessity for boilers, coal storage, chimney, etc. The Company's steam service enters the building through the wall back of the separator (S) which insures high quality steam in the customers system. Steam flows through the Company's service valve (A) and the customers service valve (B) to the customer's regulating valve (R) which controlls the pressure on the customer's heating system. Returns from the radiation in the form of condensed steam are collected in the receiving tank (T) and measured by the direct reading condensate meter (M) which gives a continuous record of heat use.

...which are the ample land available; the ability to obtain at reasonable rates adequate and complete service in electricity, gas and steam; excellent transportation facilities on the New York Central, Baltimore & Ohio, and the Pennsylvania Railroad and the New York State Barge Canal. Nearby residential sections provide varying grades of good housing facilities to workers.

Station 11

In 1930 the Company added to its system an annual steam load of 70,000,000 pounds and 1,500,000 kilowatt-hours of electrical load by the purchase of the former Stecher Lithographic Corporation's plant and arrangements for the operation of this plant. Later additions have increased these figures and today the plant is serving this group of industrial customers to the mutual advantage of the customers and the Company. This district was too far away from the Lawn Street District to make it economically feasable to interconnect these systems. It is on the edge of an extended industrial district along the right-of-way of the New York Central Railroad Company in the east side of the City. This district has been studied for several years by the Company's Engineers and it has interesting possibilities for future developments of industrial steam service.

General

The growth of the steam business in the older factory districts, such as Station 3, has for a number of years been gradual and conservative for the simple reason that practically all of the desirable business from the point of view of main service cost has already been obtained. Most of the customers have come on as the old plants wore out and space became more valuable.

It is similar in general design to Station 8 and was erected in 1927. This district offers many advantages to prospective industrial customers, chief

In the Station 8 and other newer districts the growth has been much more rapid and spectacular. A majority of the load in such districts is obtained from new buildings, all of them using this more modern method of heating.

It is interesting to note that in Rochester, as in many of the other progressive cities, many of the customers realizing the financial and space-saving advantages of district steam service have entirely eliminated private boiler plants. In Rochester 77% of the Company's steam sales go to customers who rely entirely upon this convenient, dependable, economical and eminently clean form of heating service. All steam sold is metered either by steam flow or condensation meters. Customers are thus given an accurate up-to-the-minute record of their heating service. The Company employs men who specialize in steam heating service and who are available to help the customers obtain more complete and satisfactory utilization of steam for heating and industrial purposes.

Future

Perhaps it is dangerous to definitely predict the future. However, in a talk in *1928* we said, "We believe that the immediate future will be to increase loads on the present mains with no probable long extensions. The future may see an east side industrial plant. The future may also see a tie-in between Stations 3, 8 and 35."

The first two of these predictions have been exactly true. The tie-in is still a future possibility—perhaps a probability. Even in these recent times of stress and financial worry on the part of all, the Company has maintained its excellent service. This service was specially appreciated by the Company's customers during the past extremely cold winter (approximately 20% colder than normal). It has added each year to its steam load—so that we believe it is safe to plan on the fact that during this period of returning confidence and resumption of normal business activity the steam service will come in for its rightful share of appreciation and expansion.

Steam construction in progress in Chestnut Street. This view shows the method used in caring for the dirt removed from the trench, and to avoid interference with pedestrian and vehicular traffic and in the interest of safety. This dirt is used later for back-filling the trench.