OFFICIAL PROCEEDINGS

OF THE

TWENTY-FIRST ANNUAL CONVENTION

OF

The National District Heating Association

HELD AT

CORONADO HOTEL, ST. LOUIS, MISSOURI

June 3, 4, 5, 6, 1930

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D. L. GASKILL, *Secretary*.

COMPARISON BETWEEN AN INDUSTRIAL AND BUSINESS STEAM DISTRICT

Steam heating from a central station in Rochester first started in 1889. The steam used was exhausted from the engine at an old Edison D. C. electric plant and sold to nearby factories and buildings at a low rate. There is little data available as to just how much steam was sold or how many customers were supplied, but this plant was in operation for ten years and was the beginning of district heating in Rochester.

In 1892, Station No. 2 was built near the present steam plant and supplied live steam at 100 lb. pressure and exhaust steam from the engines to two factories. Later, when Station No. 3 was built, these customers and others were tied in with the distribution system of Station No. 3 from which they are still being supplied with steam.

The original construction of Station No. 3 steam plant started in 1898. It has been remodeled several times, until now it is our largest steam and electric generating plant. This station is located very favorably for serving a factory district, being only a short distance from Eastman Kodak Company and Bausch & Lomb Optical Company, two of the largest steam customers, and a number of other large customers.

The development of this industrial steam district was slow at first and the distribution system small. Only a limited amount of information is available concerning the amount of steam sold or the number of customers served until 1912.

In 1912 there were twenty-seven customers that used a total of 190,000,000 lbs. of steam annually. This business has gradually increased until at the present time the factory district has 134 customers, using 820,000,000 lbs. of steam annually.

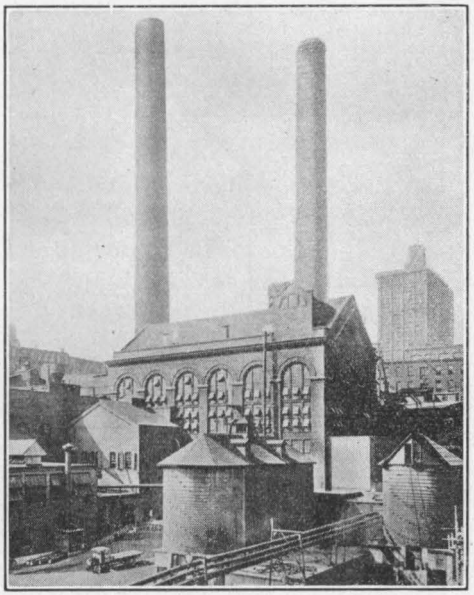
This growth is shown by the following tabulation:

Year	*Customers*	*Consumption*
1912	27	190,000,000 lb.
1915	41	296,000,000 lb.
1920	84	664,000,000 lb.
1925	117	795,000,000 lb.
1929	134	820,000,000 lb.

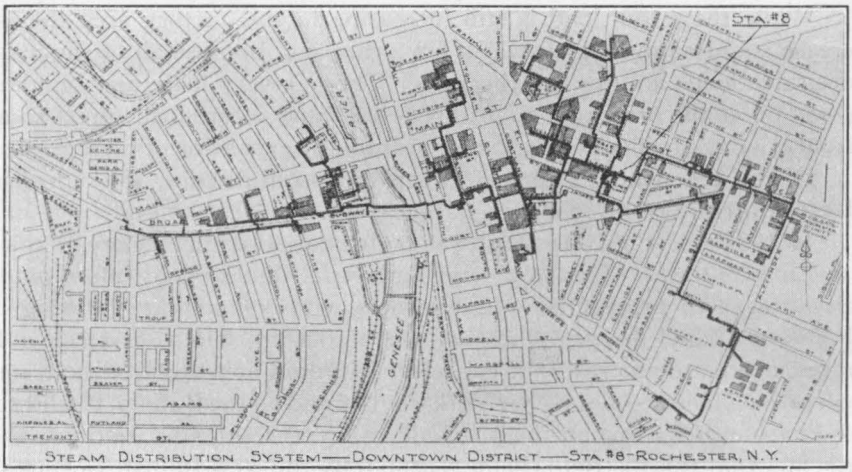
While the steam load is still increasing in this factory area the increase is not as rapid as it was a few years ago, because all of the most desirable loads are now on the lines. There is very little new building going on at the present time in this district and future loads must come from existing prospective customers or from the expansion of present ones.

Of the 134 steam customers in this industrial district, 106 represent factories, 18 stores, 4 schools, 4 garages, and 2 private houses.

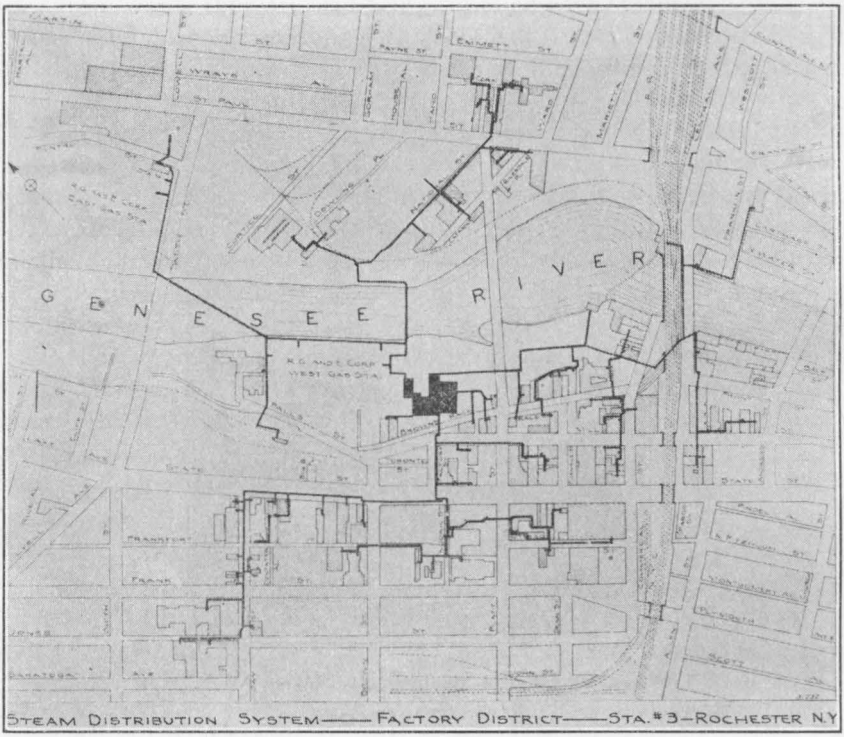
In 1927 a new heating plant was built in another factory area known as Lincoln Park. This is a large industrial district and offers many advantages to prospective plant owners who contemplate locating in Rochester, chief among which are the ability to obtain, at reasonable rates, adequate quantities of gas, electricity and steam; excellent transportation facilities on the New York Central and on the Buffalo, Rochester & Pittsburgh Railroads; the proximity of good residential sections, and the fact that this district is being featured by the New Industries Bureau of the Rochester Chamber of Commerce.



Factory District Steam Plant, Station No. 3,
Rochester, New York



STEAM DISTRIBUTION SYSTEM—DOWNTOWN DISTRICT—STA. #8-ROCHESTER, N.Y.



STEAM DISTRIBUTION SYSTEM——FACTORY DISTRICT——STA. #3—ROCHESTER N.Y.

Although this heating plant is only two years old three factories with a total steam consumption of 143,000,000 lbs. per year are being served.

Before drawing any comparisons between the factory steam districts and business districts, it might be well to give a brief history of the operations of The Rochester Gas and Electric Corporation in the downtown business territory.

The steam plant for this district was built in 1925 with the installation of two 1,100 h.p. boilers. Two years later it was necessary to add another boiler to take care of the additional business obtained. This plant was built in the downtown business district only after a careful survey had been made to determine the possible future steam load to be obtained.

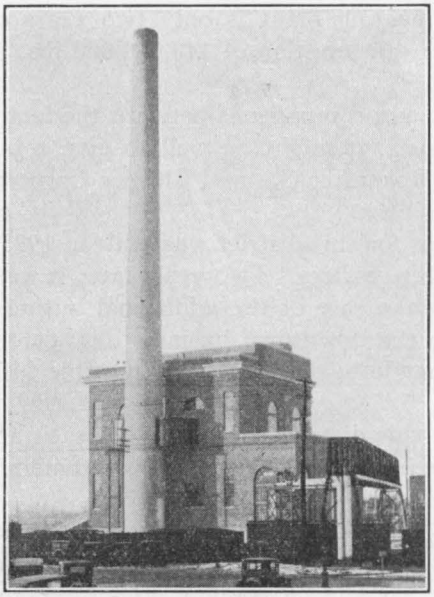
The growth in this district has been very satisfactory as shown by the yearly increase in steam sales and new customers.

Year	*Customers*	*Consumption*
1925	35	56,000,000 lbs.
1926	54	147,800,000 lbs.
1927	89	217,500,000 lbs.
1928	129	338,618,000 lbs.
1929	154	365,800,000 lbs.

In the factory district there are 134 customers using 820,000,000 lb. of steam; in the downtown district there are 145 customers using 365,800,-000 lb. of steam. The amount of steam sold in the factory district having the fewer customers is over twice that sold in the downtown district. The distribution system of the factory district has 42,000 sq. ft. of pipe surface, while the downtown district has 77,000 sq. ft., nearly twice as much.

These two facts indicate that the amount of steam sold per sq. ft. of pipe surface is four times as much in the factory district as in the downtown district.

The steam mains for the factory district were built at a decidedly lower cost than those in the downtown district. Much of the factory distribution system was installed some years ago, when materials and labor were cheaper. A large portion of the piping was run through the basements of factories; some mains were run overhead; and the remainder were located in the streets and under sidewalks. The con-

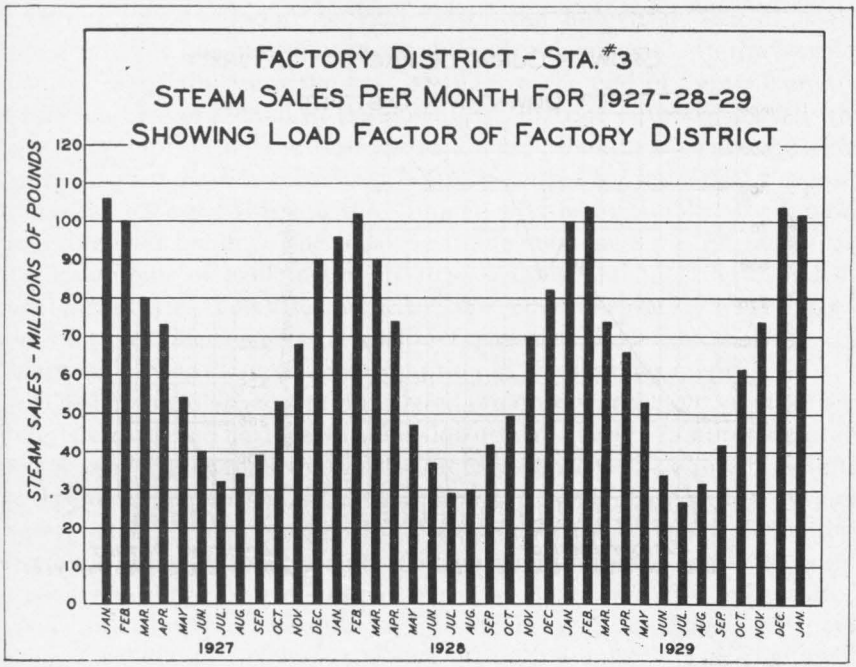


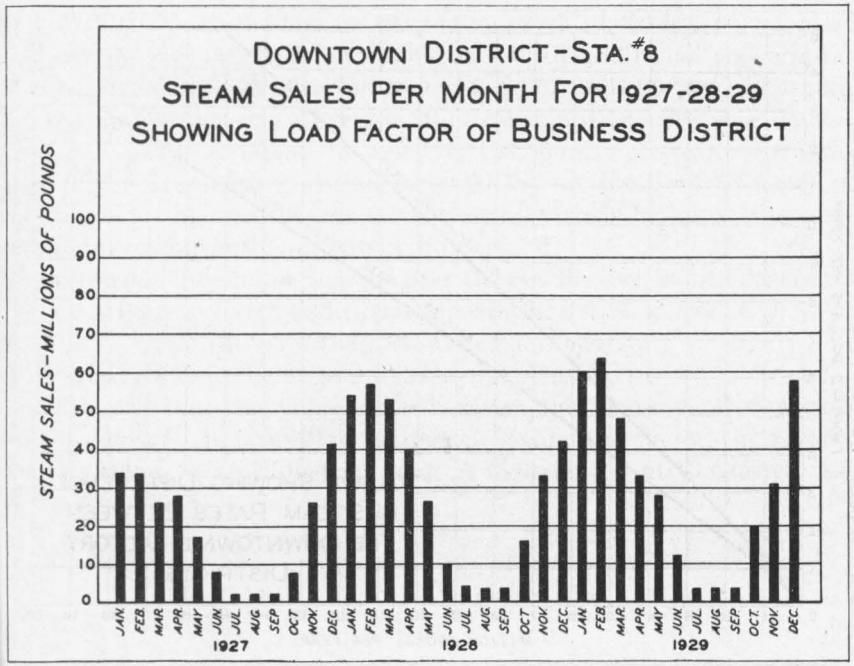
New Factory District Steam Plant, Station No. 9
at Lincoln Park, Rochester, New York

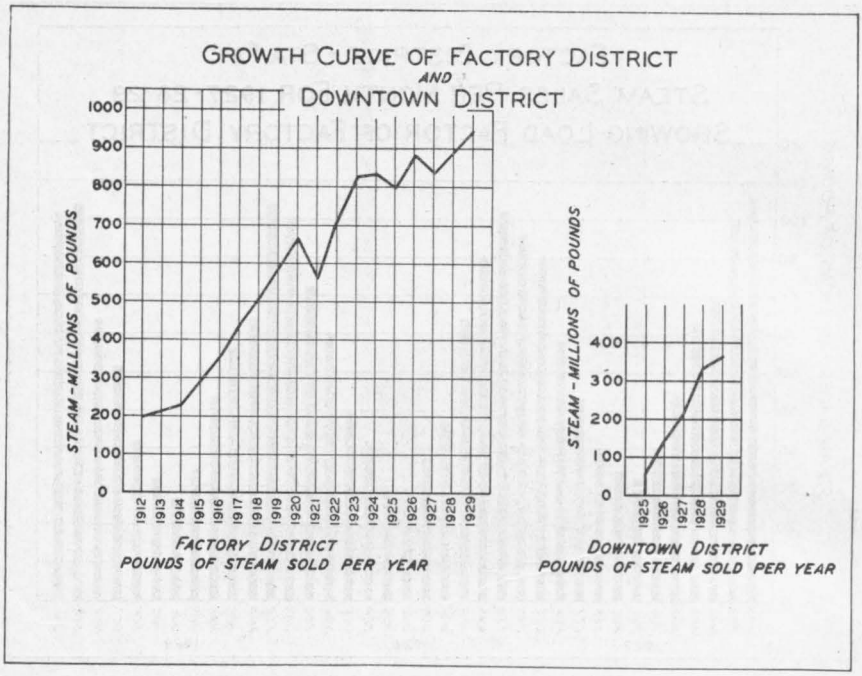
struction, as a whole, was less expensive than that required in the distribution system for the business district, where almost all the steam mains were laid underneath the busiest streets of the city and longer runs of pipe were necessary.

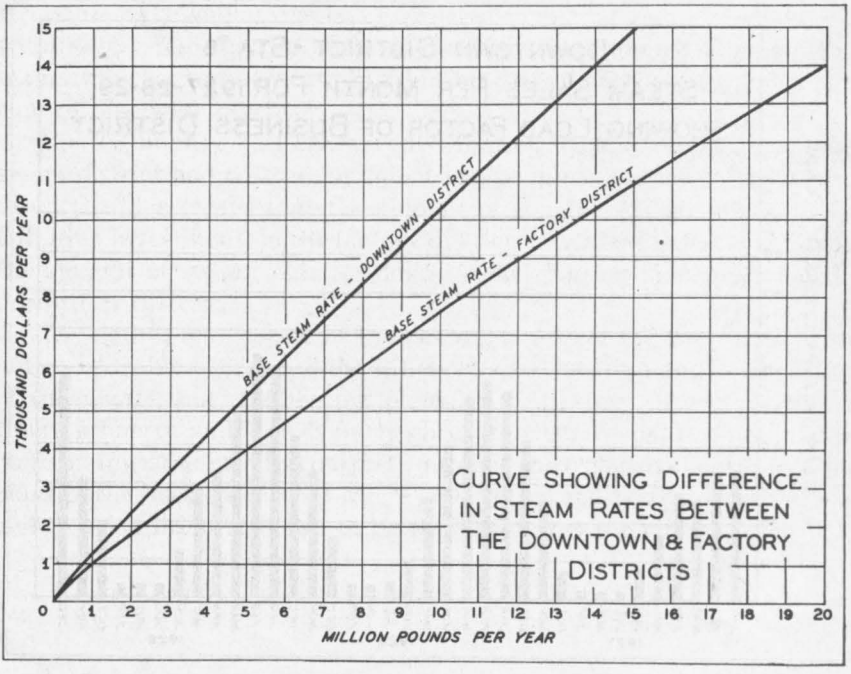
Up to January 1, 1929, the distribution system of the downtown steam district had cost nearly four times as much as that of the factory district. This means that the amount of steam sold, per dollar of distribution investment, in the factory district is approximately eight times the amount of steam sold, per dollar of distribution investment, in the downtown district.

The figures on the cost of the heating plants of the two districts are not comparable because of the different ages, location and construction of the plants, but the heating plant of the factory district is located where property and land is fairly cheap so that it would not require as large an investment. In contrast to this is the expensive location of the plant in the business district where land values and taxes are exceedingly high. In addition coal has to be trucked across the city to this plant.


FACTORY DISTRICT - STA. #3
STEAM SALES PER MONTH FOR 1927-28-29
SHOWING LOAD FACTOR OF FACTORY DISTRICT
STEAM SALES - MILLIONS OF POUNDS
0
10
20
30
40
50
60
70
80
90
100
110
120
JAN. FEB. MAR. APR. MAY JUN. JUL. AUG. SEP. OCT. NOV. DEC. JAN. FEB. MAR. APR. MAY JUN. JUL. AUG. SEP. OCT. NOV. DEC. JAN. FEB. MAR. APR. MAY JUN. JUL. AUG. SEP. OCT. NOV. DEC. JAN.
1927
1928
1929


DOWNTOWN DISTRICT - STA. #8
STEAM SALES PER MONTH FOR 1927-28-29
SHOWING LOAD FACTOR OF BUSINESS DISTRICT
STEAM SALES - MILLIONS OF POUNDS
0
10
20
30
40
50
60
70
80
90
100
JAN. FEB. MAR. APR. MAY JUN. JUL. AUG. SEP. OCT. NOV. DEC. JAN. FEB. MAR. APR. MAY JUN. JUL. AUG. SEP. OCT. NOV. DEC. JAN. FEB. MAR. APR. MAY JUN. JUL. AUG. SEP. OCT. NOV. DEC.
1927
1928
1929


GROWTH CURVE OF FACTORY DISTRICT
AND
DOWNTOWN DISTRICT
STEAM - MILLIONS OF POUNDS
0
100
200
300
400
500
600
700
800
900
1000
1912
1913
1914
1915
1916
1917
1918
1919
1920
1921
1922
1923
1924
1925
1926
1927
1928
1929
FACTORY DISTRICT
POUNDS OF STEAM SOLD PER YEAR
STEAM - MILLIONS OF POUNDS
0
100
200
300
400
1925
1926
1927
1928
1929
DOWNTOWN DISTRICT
POUNDS OF STEAM SOLD PER YEAR


THOUSAND DOLLARS PER YEAR
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
BASE STEAM RATE - DOWNTOWN DISTRICT
BASE STEAM RATE - FACTORY DISTRICT
CURVE SHOWING DIFFERENCE IN STEAM RATES BETWEEN THE DOWNTOWN & FACTORY DISTRICTS
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
MILLION POUNDS PER YEAR

From the standpoint of load factor the industrial district is far superior to the business district, as shown by the charts. In the warmer months, especially from the first of June to the end of September, the steam load is very small in the downtown district. Approximately the only consumption on the lines is for a small amount of water heating. In the factory district considerable steam is used for industrial purposes which carries right through the summer months and makes for a more desirable load factor. The most desirable customers on the lines from the standpoint of load factor are dry cleaning and pressing establishments, canneries, laundries, and garbage reduction works. The largest and best customer as regards load factor is the City Garbage Reduction Plant, which has its largest consumption in the summer months.

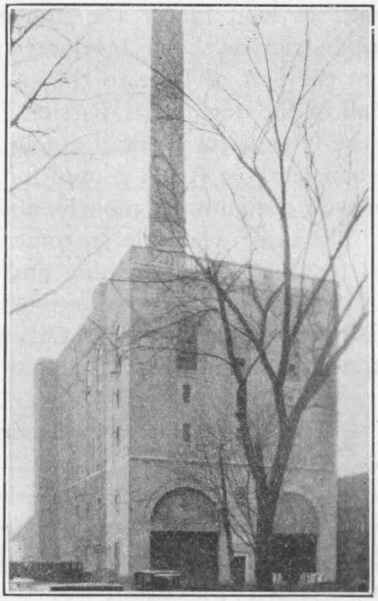
The heating districts are considered separately and have separate and different rates. The rate for the downtown district is approximately 20 per cent higher than that of the factory district. The reason for this is the higher cost of plant and equipment, land, distribution system, water, taxes, and delivered coal. The water for the boilers in the factory district is pumped from the river and thoroughly treated, while the water used in the downtown district is purchased from the city and treated.

As an example of the difference in steam costs, consider a customer using 3,000,000 lbs. of high pressure steam annually. With the downtown district rate, the cost would be $3,050.00, and with the factory rate $2,170.00. In the factory district the first 50,000 lbs. per month is sold at the rate of $1.12 per 1,000 lbs. With additional consumption the cost decreases and may run as low as $0.62 per 1,000 lbs., depending on the amount used. Added to this consumption rate is a demand charge of $6.00 per month for the first 100,000 lbs. of steam or fraction thereof, and for each additional 50,000 lbs. or fraction, 30 cents per month. This demand charge for the entire year is based on the steam consumption during the month of January.

In the downtown district, the first 100,000 lbs. per month costs $1.35 per 1,000 lbs., and with additional consumption runs as low as $0.82 per 1,000 lbs. With this rate there is no demand charge.

Both rates are subject to the same coal clause.

In concluding this comparison between the factory and downtown steam districts, it is well to enumerate again the factors in favor of district steam in an industrial area, as experienced in Rochester, New York.



Business District Steam Plant, Station No. 8,
Rochester, New York

The advantages are as follows:

1. Less money invested in plant and equipment.
2. Cheaper location of plant and buildings.
3. Less tax on land and buildings.
4. Larger amount of steam sold per foot of main installed.
5. Less investment in distribution system.
6. Better load factor.
7. Cheaper coal handling.
8. Cheaper feed water.
9. Larger customers.

The Rochester Gas & Electric Corporation, having faith in the development of a profitable steam load in the industrial district, has just recently purchased an isolated plant in an entirely different section of the city. This is the beginning of a central heating system in another manufacturing area.