

1385

"A STUDY OF THE MANHATTAN CITY WATER WORKS."

ERNEST F. SWANSON.

Sources of Reference.

1. Books, memoranda and accounts of city clerk.
2. Consultation with citizens.
3. Water and Gas Review.
4. Seager's Introduction to Economics.
5. Parson's, The City of the People.
6. Whinery's, Municipal Public Works.

O U T L I N E.

1. Preface:-

Introduction.

2. History of bond issue.

3. Description of plant.

Location and extent.

4. Receipts of plant.

Cost to patrons.

5. Metered water rates.

Discussion.

6. Open water rates.

Comparison of the two.

7. Per Capita consumption.

Comparison.

8. Cost of pumping to city.

Discussion.

9. Use of water for sprinkling.

10. Conclusion.

A Study of the Manhattan City Water Works.

In making a study of the municipal ownership of the water supply of a small city, drawbacks are encountered in that suitable statistics are hard to procure. Accounts are kept with little attempt at proper classification. Many items are placed under general heads such as "maintenance" and "miscellaneous". Under these heads are listed one fourth of all expenditures incurred by the city water works of Manhattan.

This ambiguous method of keeping books may be sufficient for ascertaining the loss and gain of the whole, but is certainly most unsatisfactory from the standpoint of the investigator into all the details of administration. Neither is it business-like nor safe.

In spite of this disadvantage sufficient data have been secured upon which to base a discussion that will justify the conclusions herein reached. My efforts in this line have been greatly facilitated by the hearty cooperation of the city clerk and the free access to all his books, memoranda, and accounts. Valuable assistance was also rendered by several worthy citizens of the town.

Criticisms offered are not intended to be personal, but merely to turn on the light where it is needed and to be suggestive of needed improvements.

In making a study of the plant in which the citizens of Manhattan are interested, we find that in accordance with the laws of the State of Kansas providing for the construction and maintenance of municipal water works systems, the citizens of Manhattan in 1886, then a city of about 2700 inhabitants began to agitate the question of installing a system of water works, and a special election on March 24th

of the following year, for the purpose of issuing bonds for the same.

The results of this election proved to be very favorable, as the returns show 438 "for" to 25 "against" the issuing of the bonds, which were originally \$50,000. at 6 per cent, to run 30 years from date, July 1st, 1887, interest payable semi-annually. The city at that time had an assessed valuation of about \$600,000.. The first ordinance stipulates that the pumping station shall be located at the foot of Bluemont, at the north limit of the city, and that the reservoirs, two in number, shall be located at the top, 195 feet above the pump pit. The system is what is ordinarily known as the "gravity system", and exerts a pressure of about 85 pounds in the lower parts of the city.

The first contract called for about 70 blocks of mains, of 4, 6, 8, and 10 inch pipes, with 39 fire hydrants attached, to this has been added from time to time until now the fire hydrants number 51 and the mains cover about 12 miles in length.

The water is now pumped from wells sunk a few feet from the banks of the Blue River, four in number, with eight inch casing, six inch points and fourteen feet strainers, giving an abundant supply of water for two pumps with a combined pumping capacity of 1,000,000 gallons daily. The reservoirs have a rated capacity of 750,000 gallons each:- These figures give a fair idea of the size of the plant, the valuation of which is about \$85,000.

It supplies water for all the various purposes for which the city has occasion to use it.

What interests us now is that paramount question in all business transactions of to-day, "How much does it cost?" and "Can we save some of the expense?". In order to suggest an answer to the latter let us from time to time make a comparison with a few other

towns similarly situated.

In the case of municipal ownership of water supplies, the plant must be sustained by collection of water rents or taxation, the latter method being rarely resorted to and then only to the extent of making up a deficit. Water rents are therefore adjusted to meet the needs of the plant's maintenance. Herein lies the economic phase of our subject.

The city of Manhattan consumes on an average 160,000 gallons daily, equivalent to 7,786,600 cubic feet per annum, for which is received \$5,508.13 yearly (taking an average of the past eight years). From this we find that as a whole the water rate averages 70.7 cents per T# cubic feet.

Let us keep this amount in mind as we investigate more closely. In the city, it is estimated, there are 500 patrons, of whom 325 are on meters and 175 have "flat" or open rates. The meter rates which are in force at present are as follows:-

1000 cu. ft. and less	\$1.50	per T	per Q*
1000 to 4000	1.85	" " " "	
4000 to 8000	1.50	" " " "	
8000 to 20,000	1.35	" " " "	
20,000 to 50,000	1.12½	" " " "	
50,000 and over	.95	" " " "	

In addition to these charges there is also a meter rent, as follows:-

1/2 inch tap	.25	per Q,	\$1.00	per year.
3/4 " " "	.40	" " "	1.60	" "
1 " " "	.50	" " "	2.00	" "
1½ " " "	.75	" " "	3.00	" "

T = 1,000
*Q = quarter, three months.

The above charges are for the purpose of replacing the meters when no longer serviceable: The life of the meters used here are estimated at about ten years.

Combining the above tables, we find for the common householder having 1/2 inch tap and using the minimum allowance, that he pays a dollar and seventy-five cents per quarter or \$7.00 per year. This allows him about 80 gallons per day. As a general rule we find many patrons overrun the T cubic feet, and that as a penalty they must pay a higher rate, as we see by the table, \$1.85 per thousand. He may of course use four times as much water, but it costs him 4.93+ times as much as the small consumer. The second higher consumer has a great privilege: he may use twenty times the amount of water and yet it costs him but eighteen times as much as the small consumer pays.

Justly or unjustly the unfortunate who comes in this second class pays very much more for his water than any one else. The explanation I received for this was, that it "protected" the small consumers: the one for instance who uses only a small per cent of the minimum allowance. To illustrate, the patron who uses but 250 cubic feet per quarter, pays at the rate of \$6.00 per T or 500 cubic feet amounts to \$3.00 per T, etc. Based upon 1,000 cubic feet costing \$1.50.

It is plainly seen that these small consumers in a way pay more for their water than does the second class man; Therefore the thirty-five cents raise in his rent, it is supposed that they pay more nearly equal rates.

Would it not be better to fix the minimum allowance, say at 250 cubic feet, charge accordingly, and have a complete descending scale of rates? Thereby offering rather a premium on larger consumption.

The following is a comparative table of open rates now in force in the four cities indicated:-

Rates to:-	Rates per annum.			
	Arkansas City	Emporia	Iola	Manhattan.
Banks	\$ 8.00	\$ 5.00	\$ 5.00	\$ 4.00
Bakery one oven	8. to 15.	12.00	7.00	5.00
Baths, private	3.00	3.00	2.00	3.00
Residences	4. to 13.	6.00	4. to 7.40	5.00
Barber Shop one chair	5.00	6.00	4.00	5.00
Water per bbl.	.05	.03	.03	.05
Stores	8. to 15.	5. to 15.	5. to 15.	5. to 15.
Lawn Sprinkling) per ft. front)	.24	.10	.06	.10

The above is very incomplete but goes to show the various rates charged by cities for different purposes. In this connection it should be noted that water used by churches and public schools is free.

By way of comparison for the same cities compare their minimum meter charges, and the open rate for a six room residence:-

Cities	6 Room Res.	Meter rent per year	Meter rate.
(1) Arkansas City	\$6.00	\$3.00	\$.40 per gal.
(2) Emporia	6.50	None	.28 " "
(3) Iola	5.00	"	.20 " "
(4) Manhattan	5.00	1.00	.20 " "

In the case of No.1 after subtracting \$3.00 meter rent from the open rate charges we have left enough to buy 7,500 gallons of water, 21 gallons per day. Rather insufficient for a modern cottage home. Yet on their Rules, Rates, and Regulation pamphlet is printed this: "Patrons of the Arkansas City Water Works will save fifty per cent by using meters."

In the case of Manhattan after subtracting the \$1.00 meter rent, the remaining \$4.00 will purchase 20,000 gallons or 55 gallons per day. Therefore patrons who use the open rate pay 20 cents per T gallons for their water and those who use meters pay 23 1/3 cents per T gallons. It is a question of which is the better plan. If cleanliness is next to Godliness, and water will produce cleanliness, let us have all the water we can make use of. There should be no premium on stinting in the use of water, whether it be for domestic use, for flushing or for sprinkling streets.

The present population of the city is 4,500 with the addition of 1,000 students the consumption per capita is 29 gallons daily. There are, however, many wells in a city of this class, therefore the very low consumption of the city water is hardly a fair index of Manhattan's cleanliness. Take into consideration only the 500 families who use city water, and allowing five persons to each family, we have a per capita consumption of 64 gallons. Compare this with

Denver, Colo., where only 1.19% of the water is metered, the daily consumption per capita including the entire population is 300 gallons daily. From a list of cities in this country as given in the Water and Gas Review, out of twenty-five cities where 50% of the water and more is metered the highest daily per capita consumption is 80 gallons. Those having only 8% and less metered the least per capita consumption is 150 gallons, and up to 300 gallons daily.

From this we see that where water is metered there is a tendency to stint on its use, or there is an immense waste where it is open.

I am inclined to think the former is true in as many instances as the latter. Towns situated so that pumping does not cost unreasonably much, it appears that open rates would be of advantage to residence houses. However, water supplied to factories and railroads, etc. could be advantageously metered.

In order to insure against unnecessary waste, penalties could be inflicted for the same in the form of fines or shutting off their water for waste or defective plumbing. Competent inspectors, employed by the superintendent, who would be charged with inspecting all plumbing, connected with the water works.

Trouble is often encountered in the use of cheap meters, unless a very high class instrument is used they may register incorrectly.

How much does it cost to pump this water? As has been said the average daily pumpage is 160,000 gallons, which is costing the city as follows:- (taking the average for the past eight years)

Operating expenses including:-

Salaries, Fuel and Maintenance,-----	\$3,153.00
Construction, or permanent improvements,--	1,322.80

Interest on outstanding bond of \$48,000 at 6%,- \$2,880.00

Making a total of,----- \$7,355.80

From these figures it is plainly seen that, excluding the interest on the bond, the actual cost of supplying the water to the patrons is about 56.6 cents per T cubic feet giving a net gain of 13 cents, but by including the interest the expense amounts to 94.5 cents per T cubic feet, which shows a loss of 23.8 cents on every T cubic feet, amounting to \$1,853. per year. This discrepancy is, however, made up by a 2 1/2 mill levey on the city property.

How shall we explain some of the figures? Referring back to the table of meter rates we find the lowest charges for a thousand cubic feet is water is 95 cents, there are, however, only three or four patrons in the city who have advantage of this rate. The greater per cent of the patrons pay on an average of \$1.50 per T. Knowing that many who pay the minimum charges do not use near their full allowance, we are hardly justified in attributing to churches, schools, and fire service the enormous difference, as they would have to use more than once again the amount used by the 500 patrons.

It appear from the foregoing that an open rate with all its attendant advantages is possible in Manhattan; and that the whole population should not be taxed to make up the deficit created by less than half the population who use city water.

As has been said economy should be practiced in all transactions, especially true is this of public utilities. In order to do this everything must have its value in the form of dollars and cents. Accounts of the different items should be kept separate and books balanced at least once a year. As it is a well known fact that persons who keep no account of their expenditures waste much more than their friends who do. In like manner the city should keep a

strict account of the transactions carried on between the different departments of the city. That is if the water supply department would receive its compensation from the fire department, and other purposes for which free water is now given, the plant could then be placed on a selfsustaining basis.

The use of water in a city for street sprinkling and flushing are as important as the water in the bath tub. We know that dust is a very ready conveyance of germs, many of which may produce disease; therefore it is highly important they be kept down as much as possible. This can only be done by the use of water. This town and most others of its size leave this work to some private concern. The person or company pays so much for the water they use and then sprinkle the street for "tips".

This method is no doubt in most cases profitable to the man who sprinkles, but is expensive to his patrons. For one thing it is never effectivally done, because it is only partly done. To sprinkle part of a street, and leave the parts in front of vacant lots or houses whose owner will not pay for it unsprinkled is like trying to rid a house of flies by driving them out through the doors, but leaving the windows wide open. Effort in the one case is neutralized by negligence in the other.

Sufficient territory should be covered so that dust from unsprinkled portions will not be announced to those who are supposed to receive benefit from the sprinkling.

What appears to be a much better method is to have the city do this work, furnish the equipment necessary and hire men and teams, and make regulations as to time and manner of sprinkling.

Fanning out this work to private individuals results in private gain but little public good.

As to the advisability of a city owning its water supply, it depends largely upon the city. In the case of larger cities it is conceivable of municipal ownership being highly advantageous, in that the service is likely to be better, where sufficient capital can be raised to start or maintain a satisfactory system. The creed of monopoly profits removed, thereby being able to adjust the charges to the expenses which if under competent management ought to be low. The officials and inspectors appointed under civil service examinations, eliminating corruption or granting of franchises privileges, a thing which in a great many cities causes serious conflicts, and is a cause, in the poor management of so many plants. The enlargement in the scope of public ownership will develop public interest in city affairs, tending in time to make the operation of the utilities more efficient.

Manhattan has a very good system as a whole, efficient so far as tested. Still undoubtedly there is room for improvement, apply all the economic search lights, remedy the defects, and there is no doubt, but the general levies for its maintenance can be removed, to the delight of a great many citizens of the city.