

# MUNICIPAL DEPARTMENT

## THE FINANCIAL MANAGEMENT OF WATER WORKS.\*

At the annual convention of the Association in 1894 questions were asked in regard to the management of municipal water works as follows: First, are municipal water works systems self-supporting, or will the annual receipts meet the annual expenditures for maintenance, interest and depreciation? Second, are water rates sometimes lowered to a point that renders the works incapable of producing enough revenue to meet the expenditure? Third, is the bonded indebtedness expended for purpose other than those of legitimate construction? Fourth, should not extensions of pipe lines and laying of services and similar construction be classed as maintenance and be paid for from the yearly revenue as is the policy of private companies? Fifth, as an inference from the foregoing questions, are water works rates as high as they should be.

Barring those works which have adopted the form of statistics approved of by the Association, there seems to be no generally accepted system of financial management. Especial confusion seems to exist in regard to extensions of pipe lines and services. In some reports a part of the services are charged to maintenance and a part to construction, in one case 25 and 75 per cent. respectively. It has been claimed that as private companies make a practice of paying for ordinary extensions from current receipts, municipal works should do the same. Private companies differ from municipal ones in not setting aside a yearly sum for the depreciation of the plant or having the sinking fund.

A system adding to its construction account each year, but making no provision for paying the principal or for depreciation, will some day be loaded with debt and have a worn-out plant. This means insolvency or heavy taxes. This has led some to claim that all ordinary extension and construction should be classed as maintenance and paid for from current receipts, leaving only unusual expenditures to be met by an issue of bonds. This is unsatisfactory in leaving to arbitrary judgment the line between ordinary and unusual expenditures.

When a part of the revenues is set aside each year, that with accrued interest is amply sufficient at the end of the life of the works to renew them, all legitimate construction may be paid for by the issue of bonds, with the provision that for all such construction is provided a sum to cover its depreciation. This

keeps the finances of the present and future in equilibrium, letting each do its share of the work, and bears no injustice if construction be not unwisely undertaken. This system will never place the works out of debt in the sense of paying all the bonds, but good business management does not require that if there are always assets in hand equal to the liabilities. This provision for depreciation should not be confounded with a sinking fund, although the provision for the latter usually provides for the former. A sinking fund provides a fund for the payment of the bonds in a certain limit of time. This period may or may not be identical with the life of the plant, but rarely extends beyond 30 years. Two per cent. of the cost set aside each year, with accrued interest at  $3\frac{1}{3}$  per cent. per annum, will meet the total cost in 30 years. Mr. Coffin believes  $1\frac{1}{2}$  per cent. paid each year with interest will amply cover depreciation. This percentage, with 3 per cent. interest, will equal the cost in 37 years; at  $3\frac{1}{2}$  per cent. interest in 35 years. A well-built plant, kept in fair repair, should have a life of at least 35 to 40 years. This percentage for depreciation, if correct, should be used in finding the total annual expenditure to be met from the revenues in running the works on a business basis. If the percentage for a sinking fund is used, and this sinking fund will equal the cost of the works in a shorter period than the average life of the plant, the difference is an asset of the system uncovered by liabilities and can well be paid by taxation if necessary. If  $1\frac{1}{2}$  per cent. is a fair estimate for depreciation and 2 per cent. is paid into the sinking fund, the value of this asset at the time the bonds are paid is one-fourth of their face or one-fourth the cost of the works. The above is not an argument against paying for extensions or other construction from current funds if possible. This latter practice, while desirable, is not necessary to sound business management or the solvency of the works, and it is doubtful whether it is good policy to increase water rates for that purpose.

Construction implies new work, something created, labor and material applied to the production of something that did not previously exist in that form or place. It would include all expenditures for increasing or improving the plant in order to secure new sources of revenue. Also all renewals of worn out or superseded parts of the plant. It would not include repairs, care, or minor improvements to existing structures. Under this head would come new pipe lines and services, new or additional water supplies, improvements of supplies such as filtration plants, cleaning mud from basins, draining swamps, new buildings, reservoirs and stand pipes, and renewals on account of deterioration or insufficiency.

Maintenance implies all expenses connected with operating and maintaining the works, keeping all parts of the same in good order and condition as far as can be done by repairs. Repairs would include the replacing of a minor part of a

structure, but not the renewal of the whole; for instance, the renewal of a broken pipe, but not the relaying of a street line. It includes all expenditure necessary to maintain its revenues from present sources, but not for enlargements or additions to secure more revenue. Nor does it include the renewal of parts worn out or superseded provided for in the sum set aside for depreciation.

Among the items for maintenance should be placed salaries of permanent officials and employees, care and repairs of plant, and pumping expenses. These with the necessary amounts for interest and depreciation should constitute the total annual expenditures for operation, and should be met from the annual revenues and not by the sale of bonds.

Receipts for water from private parties being unquestionably part of the revenue, is the money paid by the municipality for water for public service and for fire protection a legitimate part of the revenue? If so, what relation to the whole expenditure does this item bear to be just to both consumer and taxpayer? A study in the increase in first cost of a water system chargeable to public and fire service shows that it may be said to average 75 per cent. For instance, the quantity and quality of the supply are not measurably affected, the pumping machinery is increased 100 per cent., pumping stations 33 per cent., pipe system 100 per cent., and reservoirs or standpipe 75 per cent. Similarly for maintenance the care and repairs of the pipe system are increased 100 per cent., pumping expenses 100 per cent., office expenses unaffected, and interest and depreciation about 75 per cent.; or an increase in the total annual expenditure of probably 50 to 75 per cent. This would make the additional expense due to fire protection from 23 to 43 per cent. of the total and should be paid by the taxpayer.

Viewing the subject from the standpoint of hydrant rental, as by private companies, the number of hydrants and the distance between them are important considerations, involving as they do the necessity of more or less hose when far apart. The present tendency is to put hydrants too far apart.

As a general rule a municipality could pay about 50 per cent. of the total annual expenditure as a return for fire protection without injustice to tax payers. A charge of \$30 per year for a hydrant is suggested as a general basis, the number and spacing to be allowed consideration in particular cases. For other public purposes, such as water used in public buildings, fountains, street sprinkling, and sewer flushing, Mr. Coffin quotes Dexter Brackett's paper read before the American Society of Civil Engineers, in June, 1895, giving four or five gallons per capita as ample for these purposes. Mr. Coffin estimates that three gallons per capita might be allowed for all public purposes except fires, and this should be paid for at rates between 15 and 20 cents per 1,000 gallons. A system in which the receipts from the three sources of revenue—viz., private consumers, public purposes, and fire protection equals or exceeds the total annual expenditure, including interest on the cost and a proper sum for depreciation, is self supporting and run on business principles with no injustice to either taxpayer or consumer.

(To be Continued.)

\* Abstract of a paper by Freeman C. Coffin, M. Am. Soc. C. E., read before the New England Water Works Association at the annual convention at Lynn, Mass., June 7, 1896.