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Accounting System of New York Department of Water Supply

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The present article deals only with the main outlines of the accounting system in use by the department of water supply, gas and electricity in the city of New York. It has to do with aggregates and hardly touches upon more than the system of control accounts.

The classification of fixed capital accounts, revenue and operating expenses to be described may seem to some over-elaborate. But the following facts should be kept in mind:

(1) The present plant of the department is made up of what were formerly the separate plants of two of America's largest cities, together with the plants of a number of smaller communities. All these civil divisions were in 1898 amalgamated into the so-called Greater New York. The effect of this diverse origin of the activities of the present department is still traceable in its system of accounts. To add to the complexity of this system, several plants formerly owned privately have become city property, subsequent to the formation of the greater city.

(2) The area of the various watersheds, i. e., the rainfall area contributory to its reservoirs, the latter including the underground sources of the city water on Long Island—is nearly 600 square miles. (Data for the new supplementary Catskill water supply are here left out of account.) The number of reservoirs

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is 38. Over 143 miles of aqueduct and conduits—in many cases over 13 feet in diameter—bring the water to the city. Forty-five pumping stations—the vast bulk of these on Long Island—aid gravity in getting the water to the consumer. The number of miles of distribution mains is 3,085, varying from 4 inches to 66 inches in diameter. The number of hydrants for fire and general street service reaches a grand total of 44,427. The appraised value of the entire water supply system reaches the colossal figure of about \$227,000,000.

(3) In addition to furnishing one of the primal necessities in the households of nearly five and one-half million people, the department furnishes this necessity to the largest centre of manufacture and of power stations—both steam and electric—in the western hemisphere, and perhaps in the world.

(4) The department constantly requires the services of over 2,000 employees in order to keep going.

(5) It has annual revenues from the sale of water totalling over \$13,000,000. Of the small army of public servants just named, a force of over 400 is employed merely in the collection and recording of these revenues. The latter activity requires the keeping of over 400,000 individual accounts—including approximately 250,000 consumers' accounts on a frontage basis, 100,000 on a meter basis and 50,000 miscellaneous accounts. Thus the department of water supply, gas and electricity is a big thing, and a complex system of accounting is essential in order to keep a record of its manifold activities.

The accounting system of this department, as related to its main function, water supply, has been developed primarily with the view of determining readily the following facts:

(1) The value of the department's landed and non-landed capital.

(2) The revenue accruing to the department in a stated period by reason of water furnished or services incidental thereto, as distinguished from the actual receipt or collection of cash.

(3) The cost of operation, maintenance and other charges incurred during a stated period, irrespective of the date of payment.

(4) The excess of revenue over costs.

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(5) Whether or not on the basis of the accounting results, accompanying statistics collected and unit costs, the department's business appears to have been conducted efficiently and economically.

DEFECTS IN ACCOUNTS.

Of course, from the point of view of a public utility enterprise privately owned, our system of accounts is incomplete. This is not due to faulty accounting, but to the fact that the department's business is conducted under certain requirements of the city charter, as well as certain rules and regulations imposed by the department of finance, the board of estimate and apportionment and other authorities. Our system of accounts—viewed as that of a non-municipal enterprise—is defective in the following respects:

- (1) The absence of revenues from general municipal service.
- (2) The absence of revenues from service for fire protection, in particular.
- (3) The absence of revenues from service to eleemosynary institutions.
- (4) The absence of the item "depreciation" in the operating expenses.
- (5) The absence in the operating expenses of the value of services or supplies furnished to this department by other municipal departments.
- (6) The absence in our expenditures of the interest and sinking fund accrual charges on the outstanding debt.

The reasons for these defects are stated below, the numbers corresponding with those given above for the items respectively in question:

(1) The absence of revenues from general municipal service is due to the fact that water is furnished free to all departments without any attempt to measure it, nor any appropriation being made for such service by these departments to reimburse this department for the value of the water furnished.

(2) No appropriation is made in the budget of the fire department to reimburse this department for the value of fire protection by reason of the installation and maintenance of hydrants and special mains.

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(3) No attempt has been made to measure the amount of water furnished free to eleemosynary institutions. The value of this service should be properly included in the revenues and in the expenses.

(4) No definite plan has been adopted by the municipal authorities to provide for the accounting of depreciation either by appropriations to a reserve or otherwise.

(5) This item is not included in the operating expense account because no appropriation is included in this department's budget to reimburse other municipal departments for the value of services and of materials and supplies, such as rentals, stationery, supervision, etc., furnished by them.

(6) The absence of interest charges and sinking fund accruals in the income deductions is due to the fact that the board of estimate and apportionment and not this department has control of the issuing of bonds for the purposes of the water system. Nor are these bonds issued specifically for water purposes, but en bloc for general purposes, and they are allotted to this department by the comptroller from time to time to provide for actual disbursements.

It is realized that to correct these shortcomings would require changes both in the charter and in the municipal rules and regulations governing this department, and plans are under consideration to effect these changes.

BALANCE SHEET

In determining the investment in the existing water supply systems, a balance sheet was recently prepared. This was practically the first attempt made to show such a balance sheet. The amount of fixed capital was based upon an appraisal of the present worth of the existing plants made by the department's engineering bureau. The forms and procedure were outlined by the auditor of the department so that the classification might come up to accounting requirements. As a result of this classification, it is now possible to establish, with tolerable accuracy, the following:

- (1) The value of the landed capital of the existing plants.
- (2) The value of the non-landed capital.
- (3) From (1) and (2) the amount of accrued and current depreciation, as well as appreciation.

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In order to keep the appraisal of fixed capital up to date, a card system has been installed to provide for the entries of additions and withdrawals as they are made from time to time. In order to ascertain how nearly the appraisal made by the engineering bureau approaches the actual cost as measured by the expenditures from the proceeds of bonds issued, there has been prepared from various published reports, dating from 1842, a statement showing such cost.

The items entered on the assets side are:

- (1) Fixed capital, classified as (a) landed capital, (b) non-landed capital, (c) accrued depreciation of capital, (d) net total.
- (2) Current assets, namely consumers' accounts outstanding, and accounts with (a) city chamberlain (b) receiver of taxes and (c) collector of assessments and arrears.
- (3) Unexpended balances of appropriations classified as: (a) corporate stock funds, (b) appropriations—tax levy, (c) water revenue fund of Brooklyn*, (d) other special or trust accounts, (e) revenue bond fund appropriations.
- (4) Inventories, classified as (a) stores, and (b) equipment—portable—in use, the latter is not included in fixed capital.

It might be explained that accounts a, b and c under 2 above are necessitated by the fact that all collections made by this department are turned over to the city chamberlain; all accounts older than eighteen months are turned over to the receiver of taxes for collection, and, in the event of further delinquency, to the collector of assessments and arrears.

Account c under 3 above is required by a stipulation of the city charter that the expenditures for the borough of Brooklyn water supply system, including extensions and sinking fund charges, shall not be raised by taxation but be appropriated directly from the revenues.

*Prior to 1913 no stores records were kept, but all purchases were considered as expenditures.

The items on the liabilities side are:

- (1) Outstanding funded debt (at present to be worked out periodically from the records of the department of finance).
- (2) Capital surplus, i. e., excess of fixed capital over funded debt.
- (3) Liabilities on unexpended balances, classified as (a) payrolls, (b) open market orders outstanding, (c) contract liabilities outstanding, and (d) reservations for contingent liabilities and rescindments in favor of general fund for reduction of taxation.
- (4) Working surplus to balance inventories shown on the assets side.
- (5) Surplus applicable to sinking fund instalments, redemption of debt, etc.

CLASSIFICATION OF NON-LANDED CAPITAL

The non-landed fixed capital accounts are as follows:

- (1) Collection and storage system accounts, consisting of:
 - (a) impounding reservoirs, (b) wells, (c) infiltration galleries, (d) aqueducts and conduits, (e) distributing reservoirs, (f) water filtration plants, (g) sewage disposal plants, (h) chlorinating plants.
- (2) The accounts having reference to pumping are of two classes, those registering the changes in (a) buildings and (b) machinery. In each case accounts are kept separately for low pressure and high pressure buildings and machinery.
- (3) The accounts having reference to the distribution of the water supply are likewise kept separately for the low-pressure and the high-pressure systems. For each system the principal accounts are: (a) mains and appurtenances, (b) valves, and (c) hydrants and connections.

REVENUE ACCOUNTS

Up to the present time the only accounts kept have been the following: (a) meter rate revenue, (b) frontage rate revenue, (c) miscellaneous revenues from sale of water, and (d) miscellaneous revenues other than from sale of water. It is proposed in the future to amplify the broad classifications of meter-

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rate and frontage-rate revenues so as to separate them into (a) domestic, (b) commercial and (c) industrial, and to add the new accounts (d) municipal and (e) free, in order to arrive at an estimate of the value of these two services and incidentally to determine the variations in the per capita consumption of water. The miscellaneous revenue accounts will likewise be subdivided to an even greater degree.

OPERATING EXPENSES

The classification of operating expenses in use by the department conforms substantially with that used by the public-service commissions of the various states, but it has been modified in the sub-accounts to meet the comptroller's budget classifications. There are of course two main subdivisions of expense accounts: (a) those having reference to administration and operation, and (b) maintenance, i. e., repairs and replacements. The following are the main accounts of the two classes named:

- (1) General administration—executive.
- (2) Bureau of water supply—water supply operating department subdivided under (a) administration, (b) collection and storage, (c) purification, (d) low pressure pumping, (e) high pressure pumping, (f) distribution, (g) analyzing and testing, (h) meter testing stations, (i) free service other than municipal (new account) and (j) undistributed.
- (3) Accounts having reference to water revenue collected, classified as (a) administration, (b) accounting and (c) inspection.

REPORTING EXPENDITURES

The above are of course the main accounts, which are further subdivided so that the total operating expense accounts aggregate nearly one thousand. Expenditures are incurred every day over the wide sweep of territory indicated at the beginning of this article and by many scores of employees of the department. In order to enable each employee responsible for any item of expenditure to report it properly—i. e., assign it to the proper account—as well as to cut down the amount of writing necessary, a bulletin has been prepared listing in logical order the titles of these several hundred accounts that are kept, and assigning to each

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account or kind of expense a special symbol. An employee who has often to report expenditures soon memorizes the symbols for the comparatively few accounts with which he has to deal. All requisitions on departmental storekeepers or purchasing agents must contain such symbol for each item specified in a requisition, thus showing its functional or expense classification. Likewise on the face of all invoices, other than those for goods delivered to storehouses, on time and service records, vouchers, etc., the symbols denoting such classification must be entered.

ILLUMINATION, POWER AND HEAT CONTROL

In addition to the accounts already mentioned as having to do with the general administration of the department and its main function of water supply, another set of accounts keeps a record of departmental activities relative to illumination, power and heat control. A considerable number of accounts, for example, is needed to record the administrative items of the bureau of gas and electricity, as (a) salaries and wages, (b) supplies, (c) hire of horses, vehicles and drivers, (d) office equipment, etc.

Recording the activities of the bureau named are (a) street and park lighting accounts, (b) lighting public buildings, (c) heat and power for city departments, (d) gas examination, (e) electrical inspection, (f) moving picture inspection.

The extent of these activities may be gleaned from the following facts: on January 1, 1915, the department had to light 2,676 miles of streets, 10 square miles of parks and about 3,000 public buildings, beside the regulatory work of (a) testing the quality of gas, (b) installation of electrical wiring, etc., and (c) supervision of moving picture theatres. It requires 230 employees, with salaries aggregating \$255,000 annually, to perform this work properly and an additional appropriation of \$4,030,000 for the lighting of streets and furnishing light, heat and power to municipal buildings.

THE ACCOUNTING FORCE OF THE DEPARTMENT.

In conclusion a brief description is furnished of the staff that handles the mass of accounting detail of which a bird's-eye view has just been given.

The accounting staff, numbering usually 237 men, is under the supervision of the auditor and is divided in three divisions:

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- (1) Fund accounting and auditing division,
- (2) Costs and statistics division.
- (3) Division of revenue collection.

(1) The fund accounting and auditing division keeps the following records: (a) appropriation funds, (b) corporate stock funds, (c) special or trust funds, (d) general ledgers and (e) claimants' ledger. The personnel numbers 13. It might be explained that the department receives two distinct classes of funds, viz.: (1) appropriation funds and (2) corporate stock funds. The former are raised by tax levy and, in the case of Brooklyn, from water revenue. All expenditures for additions and betterments are met by funds derived from the sale of corporate stock.

(2) The costs and statistics division keeps the following records: (a) stores ledgers, (b) equipment records, (c) analytical records of expense and construction, (d) machine shop records, (e) motor vehicles and (f) efficiency and statistics of pumping stations. This division prepares all financial and statistical reports. The personnel numbers 17.

(3) The division of revenue collection maintains central accounting control over the financial records kept in the bureau of water register and is responsible for the establishing of the proper charges and collections from the sale of water and from various miscellaneous sources throughout the branch offices of the department. The personnel numbers 207. The employees in the accounting branches of this division are under the joint supervision of the water register and the auditor.